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Penulis	:	Anenggar Dewi Puspita, Ika Maryani* , Hanum Hanifa Sukma

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**Technology Readiness and Learning Outcomes of Elementary School Students
during Online Learning in the New Normal Era**

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Conflict of Interest

This research does not have a conflict of interest with anyone or any institution

**(Corresponding author)*

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Technology Readiness and Learning Outcomes of Elementary School Students during Online Learning in the New Normal Era

BUKTI SUBMIT

Abstract

Technology readiness is a condition where students are prepared to support the success of online learning during the COVID-19 pandemic. Good technology readiness will support learning and have an impact on student learning outcomes. This study aimed to determine the influence of fourth grade elementary school students' technology readiness on their online learning outcomes in the new normal era. The current research was conducted using a quantitative method through a survey on 93 elementary school students in Kretek District, Bantul, Yogyakarta, Indonesia. Samples were taken randomly using an incidental system from all fourth grade elementary school students with a population of 122 students. The technology readiness data were collected using a closed-ended questionnaire containing 20 statements, while data on learning outcomes were gathered from the students' final exam results. Data analysis was conducted using descriptive and inferential statistics. The results showed that technology readiness had a positive influence on student learning outcomes. This can be seen from the normality significance value of Technology Readiness (0.188) and of Learning Outcomes (0.399), which are greater than 0.05. Similarly, the linearity test showed that technology readiness and learning outcomes had a linear relationship ($0.638 > 0.05$). Hypothesis testing using a simple linear regression test revealed that at a significance level of 0.000 (< 0.05), the t-calculated (8.496) $>$ t table (1.701). Thus, it can be concluded that technology readiness has a significant effect on fourth grade students' learning outcomes in the new normal era.

Key words: *Technology Readiness, Online Learning, Learning Outcomes.*

Introduction

The pandemic of COVID-19 has created substantial changes in society, particularly in education. Especially at the primary school level, the modifications made to the education system make it difficult for teachers to convey content and for students to comprehend subject matter. Elementary schools are educational institutions that provide a six-year curriculum for children aged 6 to 12 years (Çimen & Koçyiğit, 2010; Dere, 2019). According to Piaget, children ages 7 to 11 are in the concrete operational stage, when they learn to use real-world examples in everyday situations (Piaget, 1972). Therefore, elementary pupils find it difficult to comprehend abstract concepts (Maryani et al., 2018; Sahin & Yilmaz, 2020). However, current online learning in schools substantially reduces student-teacher and student-learning media interactions. This system poses a challenge for educational human resources, including teachers, students, institutions, and even parents in the community. All relevant stakeholders must actively assist students in learning and acquiring the needed competencies.

During this pandemic, the government has established a temporary policy for distance learning (Azhari & Fajri, 2021; Giatman et al., 2020). However, one of Jogja's subdistricts, Bantul in the Kretek subdistrict, has begun implementing an odd-even system in its schools. Current elementary schools in the Kretek District use a Blended learning system that combines online and offline learning. This is consistent with the decision by the municipal government of Yogyakarta to permit schools to hold face-to-face meetings twice or once each week. This is done to prevent the transmission of the COVID-19 virus.

Today's educators must find out how to deliver learning materials that are easily accepted by students. Fundamentally, elementary school students are children who have not been able to effectively comprehend the information when learning is not face-to-face (Giatman et al., 2020). Similarly, Piaget's theory claims that Children aged 7 to 11 are in the concrete operational stage, employing real-world examples in their everyday lives (Piaget, 1972). According to this theory, elementary school-aged children have trouble comprehending information if they merely visualize it. This is seen by the disparities in student learning outcomes between online and offline instruction. The analysis of learning outcomes on research subjects showed that the increase in children's task scores during

1 online learning was much greater than during face-to-face learning, such as from 70 to 90 or
2 100. This is possible because parents sometimes assist their children with homework. In
3 actuality, children do not always comprehend the task at hand because their parents always
4 perform it. Meanwhile, in face-to-face learning, unlike online learning, students display their
5 real cognitive abilities and capabilities (Connolly & Stansfield, 2007; Patricia Aguilera-
6 Hermida, 2020). Students during face-to-face learning also represent the original ability of
7 the students themselves, which vary considerably from student to student.

8 It is difficult for elementary school teachers to make students feel at ease and willing
9 to take lessons when they are not delivered face-to-face. The usage of the Internet and
10 multimedia technologies can transform the manner in which information is sent and serve as
11 an alternative to classroom-based instruction (Zhang, 2006). The implementation of online
12 education necessitates the use of mobile devices, such as smartphones, laptops, and tablets,
13 that may be used to access information at any time and in any location (Gikas & Grant,
14 2013). In this instance, it is vital to prepare students for online learning, including ensuring
15 that their technology is ready to enable online learning during the COVID-19 pandemic. With
16 the current state of technology preparedness, the problem of educators distributing learning
17 materials to students can be resolved. During this pandemic, technology has had a
18 significant impact on education.

19 Technology readiness in online learning is significant since it is useful for solving a
20 problem that emerges in the learning process. Without technology readiness, teachers will
21 have difficulties delivering learning materials to students, and students will also find it
22 difficult to understand the information (Lukas & Yunus, 2021; Tang et al., 2021). In this
23 scenario, technology can be a supporter of the remote learning system, so that learning can
24 achieve the desired goals.

25 Rogantina (2017) explains that technology plays a crucial role in increasing the quality
26 of education (Ghavifekr & Rosdy, 2015; Raja & Nagasubramani, 2018). Technology can also
27 boost the efficacy and efficiency of the teaching and learning process, which in turn helps
28 the achievement of educational goals (Basheer et al., 2017)(Lu & Liu, 2015). This indicates
29 that technology in education gives benefits to help successful learning during a pandemic. So

1 it can be inferred that technology plays a vital part in learning during the COVID-19
2 pandemic, which must be done online to break the chain of dissemination of COVID-19.

3 The effectiveness of online education depends not only on students' technology
4 readiness, but also on their human capital. During the pandemic, student learning outcomes
5 will be affected by the technological preparedness of Human Resources personnel or the
6 elementary school children themselves. Students who possess a high level of technology
7 readiness will undoubtedly achieve better learning outcomes than those who do not. This
8 study intends to examine the effect of technology readiness on the learning outcomes of
9 fourth graders in elementary school.

10 Method

11 Research design

12 This study uses a quantitative approach with a survey method. The survey was conducted on
13 technology readiness data and learning outcomes on events that have passed so that they
14 are included in ex post facto research. This study aims to find the cause of changes in
15 learning outcomes caused by differences in technology readiness where data occurred in the
16 past.

18 Participant

19 This quantitative study surveyed 93 fourth-grade pupils from elementary schools in Kretek
20 District, Bantul, Yogyakarta Special Region, Indonesia. As a method of sampling, simple
21 random sampling was utilized.

23 Data collection tools

24 Data on students' technology readiness were taken using a closed-ended questionnaire
25 containing 20 statements, while data on student learning outcomes were collected through
26 secondary data in the form of students' final exam scores written in their semester report
27 cards.

28 Table 1. Technology Readiness Indicators (Frerking & Beauchamp, 2016)

Technology readiness indicators	Item No
Basic principles of technology	1,2,3,4
Formulation of technology concepts and their application	5,6

Proof of concept function	7,8
A collection of components in a relevant environment	9,10
Demonstration of a model or prototype in a relevant environment	11,12
System prototype demonstration in an application environment	13,14
Testing of completeness requirements in the application environment	15,16,17,18
Operation success test	19,20

1

2 **Data analysis**

3 The data analysis consisted of descriptive and inferential statistical analysis. It consisted of
4 validity and reliability test, normality test, linearity test, and hypothesis testing using simple
5 linear regression.

6

7 **Findings**

8 The analysis results related to pupils' technology readiness showed that the majority
9 (95%) of fourth grade students responded very well to the questionnaire. The results of the
10 questionnaire analysis showed that 32.3% of respondents had very low Technology
11 readiness (TR), 26.5% low, 20.4% moderate, 6.5% high, and 14% very high. Although the
12 learning process was done out offline with limited face-to-face meetings, these students
13 showed high satisfaction since they could communicate directly with teachers and
14 classmates. Furthermore, the pupils admitted that it was easier to understand the material
15 that was presented offline. To boost students' knowledge in online learning sessions,
16 teachers usually give light assignments to students. This task is meant so that students can
17 learn and understand the related subject matter independently.

18 As shown by the results of the hypothesis testing using simple linear regression, task
19 assignment had a considerable impact on the outcomes of online learning. The variables of
20 technology readiness and learning outcomes passed the Kolmogorov-Smirnov normality test
21 with significance levels of 0.188 and 0.339 (> 0.05), respectively. The linearity test
22 requirements were satisfied by the results of the normality test, which indicated that there
23 was no significant difference and that there was little perception among observers.
24 Furthermore, the linearity test showed a significance value of $0.638 > 0.05$. This figure

1 indicated that technology readiness and student learning outcomes had a linear relationship.
 2 Following the linearity test, simple linear regression was used to test the hypothesis. The
 3 findings of the Simple Linear Regression Test indicated that technology readiness had a
 4 substantial impact on student learning outcomes ($0.000 < 0.05$, when $t\text{-calculated} > t\text{-table}$
 5 ($8.496 > 1.701$)). Therefore, H_a was approved and H_o was rejected, where technology
 6 readiness had a 98.9% impact on the outcomes of online learning. On the basis of these
 7 findings, it can be stated that technology readiness has a significant impact on the online
 8 learning outcomes of primary school students in the new normal era.

9 The technology readiness of elementary school students in Kretek District, Bantul,
 10 Yogyakarta Special Region, Indonesia, has a very significant impact on their academic
 11 performance. Because students already have a component that promotes online learning,
 12 technology readiness can increase student learning outcomes. This is reinforced by
 13 Chairudin's (2021) assertion that online learning has a major effect on student achievement.
 14 The research of Tutut Faridawati (2011) has also revealed that learning facilities and parental
 15 involvement can enhance pupils' mathematical achievement. The study further showed that
 16 learning environments and parental involvement had a 48.2% effect on students'
 17 mathematics achievement.

18

19 **3.1. Normality Test**

20 A normality test is used to determine whether the observational data have a normal
 21 distribution. In this study, Kolmogorov-Smirnov was used to test for normality. The
 22 advantage of the one-sample Kolmogorov-Smirnov normality test is that it is straightforward
 23 and does not lead to divergent opinions among observers (Sahab, 2019). Table 2 displays the
 24 result of the test for normality of data distribution in this study.

25

Table 2. Normality Test Result (One-Sample Kolmogorov-Smirnov Test)

		Technology Readiness	Learning Outcomes
N		93	93
Normal Parameters ^{a,b}	Mean	52.17	85.742
	Std. Deviation	7.638	2.7254
	Most Extreme Differences	.113	.098

Positive	.113	.098
Negative	-.081	-.066
Kolmogorov-Smirnov Z	1.087	.941
Asymp. Sig. (2-tailed)	.188	.339

a. Test distribution is Normal.
 b. Calculated from data.

1

2 Based on the table above, it can be seen that the asymp.sig values of technology readiness
 3 (0.188) and learning outcomes (0.339) are greater than 0.05 hence it can be concluded that
 4 the research data were normally distributed. The normality test is a test of difference
 5 between the data being tested for normality and the standard normal data. In this study, the
 6 significance value is over 0.05. The two variables above have met the requirements in the
 7 normality test and there is no significant difference between the values of the two variables.
 8 The advantage of the normality test utilized is that it does not produce much perception
 9 among observers.

10

11 3.2. Linearity Test

12 A linearity test is used to examine whether or not two variables have a linear connection
 13 that is statistically significant. Table 3 summarized the findings of the linearity test
 14 conducted in this study.

15

Table 3. Linearity Test Result

			Sum of Squares	df	Mean Square	F	Sig.
Learning Outcomes *	Between Groups	(Combined)	405.194	28	14.471	3.329	.000
		Linearity	302.275	1	302.275	69.545	.000
		Deviation from Linearity	102.919	27	3.812	.877	.638
Technology Readiness	Within Groups		278.172	64	4.346		
	Total		683.366	92			

16 According to Table 3, the linearity score of 0.638 is greater than 0.05, indicating that there is
 17 a linear relationship between technology readiness and learning outcomes.

18

19 3.3. Hypothesis Testing (Simple Linear Regression)

20 Simple linear regression explores the relationship between the independent and dependent
 21 variables. The following are the provisions of the simple linear hypothesis test: 1) Accept Ha

1 if the probability (p) $\leq 0,05$, indicating that the independent variable has a substantial
 2 simultaneous or partial effect on the dependent variable. Table 4 provides an overview of
 3 the outcomes of simple linear regression analysis.

4 **Table 4. Result of the Simple Linear Regression Analysis Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	73.361	1.473		49.814	.000
	Technology Readiness	.237	.028	.665	8.496	.000

5 *a. Dependent Variable: Learning Outcomes*

6 Table 4 shows t-calculated of 8.496 at a significance level of 0.000. Meanwhile, t-table with
 7 $dk = n - 2 = 30 - 2 = 28$ and $\alpha = 0.05$ was 1.701. Therefore, t-calculated (8.496) > t-table
 8 (1.701) and the significance value (0.000) < 0.05. Thus, H_0 was rejected and H_a was
 9 accepted. This finding indicated that technology readiness had a significant effect on
 10 learning outcomes. The research hypothesis saying “Technology readiness has an effect on
 11 elementary school students’ learning outcomes during online learning in the new normal
 12 era” is accepted.

13 Discussion

14 The technology readiness of elementary school students in Kretek District, Bantul,
 15 Yogyakarta Special Region, Indonesia, has a very significant impact on their academic
 16 performance. Because students already have a component that promotes online learning,
 17 technology readiness can increase student learning outcomes. The online learning has a
 18 major effect on student (Bahasoan et al., 2020; Lukas & Yunus, 2021) . The learning facilities
 19 and parental involvement can enhance students’ academic achievement (Higgins &
 20 Katsipataki, 2015; Wright et al., 2018). The study further showed that learning environments
 21 and parental involvement had a 48.2% effect on students’ mathematics achievement.

22 Digital technology simplifies work because it functions swiftly, with quality,
 23 effectively, and efficiently (Knox, 2019). The transmission of information is facilitated by
 24 technology. Technology use has an effect on student learning motivation because all
 25

1 students can integrate technology into their education (Ahmadi, 2018; Sun & Gao, 2019;
2 Wang, 2015). During online learning, the instructor presents the content before assigning
3 homework at the conclusion of the meeting (Martin & Bolliger, 2018). Compared to past
4 studies, the present study demonstrates that learning outcomes can be enhanced when
5 teachers distribute assignments via WhatsApp, Zoom, Google Classroom, and others
6 (Bahasoan et al., 2020; Lukas & Yunus, 2021). The use of technology in online learning
7 enhances students' comprehension of a subject and prevents them from becoming bored
8 easily.

9 **Conclusion**

10 On the basis of research conducted in a cluster of elementary schools in Kretek
11 District, Bantul, Yogyakarta Special Region, it can be concluded that in the new normal era,
12 technology readiness has a major impact on the learning outcomes of primary school
13 students during online learning. This is demonstrated by the significance values of
14 technology readiness (0.188) and learning outcomes (0.339), which are greater than 0.05.
15 The results of the normality test satisfy the test's criteria, and there is no statistically
16 significant difference. The linearity test revealed a linear association between learning
17 outcomes and technology readiness ($0.638 > 0.05$). The linear regression test then revealed
18 that the t-calculated (8.496) was bigger than the t-table (1.701) with a significance level of
19 0.000 (smaller than 0.05). This value implies acceptance of H_a , suggesting that technology
20 readiness has a positive influence on students' learning outcomes. In conclusion, the
21 research hypothesis that states, "Technology readiness has an effect on elementary school
22 students' learning outcomes during online learning in the new normal era" is valid

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REVIEWER**

Dear Ika Maryani, Siti Latifah, Laila Fatmawati, Vera Yuli Erviana, Fitri Nur Mahmudah (Author):

We have reached a decision regarding your submission to Pegem Journal of Education and Instruction, "Technology Readiness and Learning Outcomes of Elementary School Students during Online Learning in the New Normal Era".

Our decision is: **Revisions Required**

Reviewer A:

Recommendation: Revisions Required

1) Does the title reflect the content of the study?

Yes, acceptable.

Please, write your suggestions about the **Title**, if any, into the following field.

2) Does the abstract summarize the essential information in the study?

Yes, acceptable.

Please, write your suggestions about the **Abstract**, if any, into the following field.

3) Does the introduction section adequately explain the problems the study address and the framework of the study? Are the importance and the contribution/implications of the study clearly stated?

Yes, acceptable.

Please, write your suggestions about the **Introduction**, if any, into the following field.

4) Are research questions and/or hypotheses in line with the focus of the study?

Yes, acceptable.

Please, write your suggestions about the **Research Questions** or **Hypotheses**, if any, into the following field.

5) Are the method and technique(s) employed appropriate for the study?

Yes, but needs minor revision.

Please, write your suggestions about the **Method** or **Technique**, if any, into the following field.

6) Is the sample or the participants pertinent to the study?

Yes, but needs minor revision.

Please, write your suggestions about the **Sample** or **Participants**, if any, into the following field.

7) Are the data collection instruments employed appropriate for the study?

Yes, but needs minor revision.

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Pegem Eğitim ve Öğretim Dergisi <editor@...>
to me, Siti, Laila, Vera, Fitri

Sun, Aug 28, 2022, 8:15 PM

Dear author,

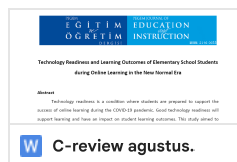
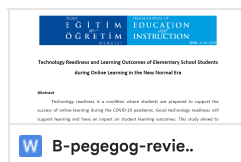
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1
2 **Technology Readiness and Learning Outcomes of Elementary School Students**
3 **during Online Learning in the New Normal Era**
4

5 **Abstract**

6 Technology readiness is a condition where students are prepared to support the
7 success of online learning during the COVID-19 pandemic. Good technology readiness will
8 support learning and have an impact on student learning outcomes. This study aimed to
9 determine the influence of fourth grade elementary school students' technology readiness
10 on their online learning outcomes in the new normal era. The current research was
11 conducted using a quantitative method through a survey on 93 elementary school students
12 in Kretek District, Bantul, Yogyakarta, Indonesia. Samples were taken randomly using an
13 incidental system from all fourth grade elementary school students with a population of 122
14 students. The technology readiness data were collected using a closed-ended questionnaire
15 containing 20 statements, while data on learning outcomes were gathered from the
16 students' final exam results. Data analysis was conducted using descriptive and inferential
17 statistics. The results showed that technology readiness had a positive influence on student
18 learning outcomes. This can be seen from the normality significance value of Technology
19 Readiness (0.188) and of Learning Outcomes (0.399), which are greater than 0.05. Similarly,
20 the linearity test showed that technology readiness and learning outcomes had a linear
21 relationship (0.638 > 0.05). Hypothesis testing using a simple linear regression test revealed
22 that at a significance level of 0.000 (< 0.05), the t-calculated (8.496) > t table (1.701). Thus, it
23 can be concluded that technology readiness has a significant effect on fourth grade students'
24 learning outcomes in the new normal era.

25 **Key words:** *Technology Readiness, Online Learning, Learning Outcomes.*
26
27

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MASUKAN REVIEWER

Introduction

The pandemic of COVID-19 has created substantial changes in society, particularly in education. Especially at the primary school level, the modifications made to the education system make it difficult for teachers to convey content and for students to comprehend subject matter. Elementary schools are educational institutions that provide a six-year curriculum for children aged 6 to 12 years (Çimen & Koçyiğit, 2010; Dere, 2019). According to Piaget, children ages 7 to 11 are in the concrete operational stage, when they learn to use real-world examples in everyday situations (Piaget, 1972). Therefore, elementary pupils find it difficult to comprehend abstract concepts (Maryani et al., 2018; Sahin & Yilmaz, 2020). However, current online learning in schools substantially reduces student-teacher and student-learning media interactions. This system poses a challenge for educational human resources, including teachers, students, institutions, and even parents in the community. All relevant stakeholders must actively assist students in learning and acquiring the needed competencies.

During this pandemic, the government has established a temporary policy for distance learning (Azhari & Fajri, 2021; Giatman et al., 2020). However, one of Jogja's subdistricts, Bantul in the Kretek subdistrict, has begun implementing an odd-even system in its schools. Current elementary schools in the Kretek District use a Blended learning system that combines online and offline learning. This is consistent with the decision by the municipal government of Yogyakarta to permit schools to hold face-to-face meetings twice or once each week. This is done to prevent the transmission of the COVID-19 virus.

Today's educators must find out how to deliver learning materials that are easily accepted by students. Fundamentally, elementary school students are children who have not been able to effectively comprehend the information when learning is not face-to-face (Giatman et al., 2020). Similarly, Piaget's theory claims that Children aged 7 to 11 are in the concrete operational stage, employing real-world examples in their everyday lives (Piaget, 1972). According to this theory, elementary school-aged children have trouble comprehending information if they merely visualize it. This is seen by the disparities in student learning outcomes between online and offline instruction. The analysis of learning outcomes on research subjects showed that the increase in children's task scores during

1 online learning was much greater than during face-to-face learning, such as from 70 to 90 or
2 100. This is possible because parents sometimes assist their children with homework. In
3 actuality, children do not always comprehend the task at hand because their parents always
4 perform it. Meanwhile, in face-to-face learning, unlike online learning, students display their
5 real cognitive abilities and capabilities (Connolly & Stansfield, 2007; Patricia Aguilera-
6 Hermida, 2020). Students during face-to-face learning also represent the original ability of
7 the students themselves, which vary considerably from student to student.

8 It is difficult for elementary school teachers to make students feel at ease and willing
9 to take lessons when they are not delivered face-to-face. The usage of the Internet and
10 multimedia technologies can transform the manner in which information is sent and serve as
11 an alternative to classroom-based instruction (Zhang, 2006). The implementation of online
12 education necessitates the use of mobile devices, such as smartphones, laptops, and tablets,
13 that may be used to access information at any time and in any location (Gikas & Grant,
14 2013). In this instance, it is vital to prepare students for online learning, including ensuring
15 that their technology is ready to enable online learning during the COVID-19 pandemic. With
16 the current state of technology preparedness, the problem of educators distributing learning
17 materials to students can be resolved. During this pandemic, technology has had a
18 significant impact on education.

19 Technology readiness in online learning is significant since it is useful for solving a
20 problem that emerges in the learning process. Without technology readiness, teachers will
21 have difficulties delivering learning materials to students, and students will also find it
22 difficult to understand the information (Lukas & Yunus, 2021; Tang et al., 2021). In this
23 scenario, technology can be a supporter of the remote learning system, so that learning can
24 achieve the desired goals.

25 Rogantina (2017) explains that technology plays a crucial role in increasing the quality
26 of education (Ghavifekr & Rosdy, 2015; Raja & Nagasubramani, 2018). Technology can also
27 boost the efficacy and efficiency of the teaching and learning process, which in turn helps
28 the achievement of educational goals (Basheer et al., 2017)(Lu & Liu, 2015). This indicates
29 that technology in education gives benefits to help successful learning during a pandemic. So

1 it can be inferred that technology plays a vital part in learning during the COVID-19
2 pandemic, which must be done online to break the chain of dissemination of COVID-19.

3 The effectiveness of online education depends not only on students' technology
4 readiness, but also on their human capital. During the pandemic, student learning outcomes
5 will be affected by the technological preparedness of Human Resources personnel or the
6 elementary school children themselves. Students who possess a high level of technology
7 readiness will undoubtedly achieve better learning outcomes than those who do not. This
8 study intends to examine the effect of technology readiness on the learning outcomes of
9 fourth graders in elementary school.

10 Method

11 Research design

12 This study uses a quantitative approach with a survey method. The survey was conducted on
13 technology readiness data and learning outcomes on events that have passed so that they
14 are included in ex post facto research. This study aims to find the cause of changes in
15 learning outcomes caused by differences in technology readiness where data occurred in the
16 past.

18 Participant

19 This quantitative study surveyed 93 fourth-grade pupils from elementary schools in Kretek
20 District, Bantul, Yogyakarta Special Region, Indonesia. As a method of sampling, simple
21 random sampling was utilized.

23 Data collection tools

24 Data on students' technology readiness were taken using a closed-ended questionnaire
25 containing 20 statements, while data on student learning outcomes were collected through
26 secondary data in the form of students' final exam scores written in their semester report
27 cards.

28 Table 1. Technology Readiness Indicators (Frerking & Beauchamp, 2016)

Technology readiness indicators	Item No
Basic principles of technology	1,2,3,4
Formulation of technology concepts and their application	5,6

Proof of concept function	7,8
A collection of components in a relevant environment	9,10
Demonstration of a model or prototype in a relevant environment	11,12
System prototype demonstration in an application environment	13,14
Testing of completeness requirements in the application environment	15,16,17,18
Operation success test	19,20

1

2 Data analysis

3 The data analysis consisted of descriptive and inferential statistical analysis. It consisted of
4 validity and reliability test, normality test, linearity test, and hypothesis testing using simple
5 linear regression.

6

7

Findings

8

9 The analysis results related to pupils' technology readiness showed that the majority
10 (95%) of fourth grade students responded very well to the questionnaire. The results of the
11 questionnaire analysis showed that 32.3% of respondents had very low Technology
12 readiness (TR), 26.5% low, 20.4% moderate, 6.5% high, and 14% very high. Although the
13 learning process was done out offline with limited face-to-face meetings, these students
14 showed high satisfaction since they could communicate directly with teachers and
15 classmates. Furthermore, the pupils admitted that it was easier to understand the material
16 that was presented offline. To boost students' knowledge in online learning sessions,
17 teachers usually give light assignments to students. This task is meant so that students can
18 learn and understand the related subject matter independently.

19 As shown by the results of the hypothesis testing using simple linear regression, task
20 assignment had a considerable impact on the outcomes of online learning. The variables of
21 technology readiness and learning outcomes passed the Kolmogorov-Smirnov normality test
22 with significance levels of 0.188 and 0.339 (> 0.05), respectively. The linearity test
23 requirements were satisfied by the results of the normality test, which indicated that there
24 was no significant difference and that there was little perception among observers.
Furthermore, the linearity test showed a significance value of $0.638 > 0.05$. This figure

1 indicated that technology readiness and student learning outcomes had a linear relationship.
 2 Following the linearity test, simple linear regression was used to test the hypothesis. The
 3 findings of the Simple Linear Regression Test indicated that technology readiness had a
 4 substantial impact on student learning outcomes ($0.000 < 0.05$, when $t\text{-calculated} > t\text{-table}$
 5 ($8.496 > 1.701$)). Therefore, H_a was approved and H_o was rejected, where technology
 6 readiness had a 98.9% impact on the outcomes of online learning. On the basis of these
 7 findings, it can be stated that technology readiness has a significant impact on the online
 8 learning outcomes of primary school students in the new normal era.

9 The technology readiness of elementary school students in Kretek District, Bantul,
 10 Yogyakarta Special Region, Indonesia, has a very significant impact on their academic
 11 performance. Because students already have a component that promotes online learning,
 12 technology readiness can increase student learning outcomes. This is reinforced by
 13 Chairudin's (2021) assertion that online learning has a major effect on student achievement.
 14 The research of Tutut Faridawati (2011) has also revealed that learning facilities and parental
 15 involvement can enhance pupils' mathematical achievement. The study further showed that
 16 learning environments and parental involvement had a 48.2% effect on students'
 17 mathematics achievement.

18

19 **3.1. Normality Test**

20 A normality test is used to determine whether the observational data have a normal
 21 distribution. In this study, Kolmogorov-Smirnov was used to test for normality. The
 22 advantage of the one-sample Kolmogorov-Smirnov normality test is that it is straightforward
 23 and does not lead to divergent opinions among observers (Sahab, 2019). Table 2 displays the
 24 result of the test for normality of data distribution in this study.

25 **Table 2. Normality Test Result (One-Sample Kolmogorov-Smirnov Test)**

		Technology Readiness	Learning Outcomes
N		93	93
Normal Parameters ^{a,b}	Mean	52.17	85.742
	Std. Deviation	7.638	2.7254
	Most Extreme Differences	.113	.098

	Positive	.113	.098
	Negative	-.081	-.066
Kolmogorov-Smirnov Z		1.087	.941
Asymp. Sig. (2-tailed)		.188	.339

a. Test distribution is Normal.

b. Calculated from data.

1
2 Based on the table above, it can be seen that the asymp.sig values of technology readiness
3 (0.188) and learning outcomes (0.339) are greater than 0.05 hence it can be concluded that
4 the research data were normally distributed. The normality test is a test of difference
5 between the data being tested for normality and the standard normal data. In this study, the
6 significance value is over 0.05. The two variables above have met the requirements in the
7 normality test and there is no significant difference between the values of the two variables.
8 The advantage of the normality test utilized is that it does not produce much perception
9 among observers.

10 11 3.2. Linearity Test

12 A linearity test is used to examine whether or not two variables have a linear connection
13 that is statistically significant. Table 3 summarized the findings of the linearity test
14 conducted in this study.

15 **Table 3. Linearity Test Result**

			Sum of Squares	df	Mean Square	F	Sig.
Learning Outcomes *	Between Groups	(Combined)	405.194	28	14.471	3.329	.000
		Linearity	302.275	1	302.275	69.545	.000
		Deviation from Linearity	102.919	27	3.812	.877	.638
Technology Readiness	Within Groups		278.172	64	4.346		
	Total		683.366	92			

16 According to Table 3, the linearity score of 0.638 is greater than 0.05, indicating that there is
17 a linear relationship between technology readiness and learning outcomes.

18 19 3.3. Hypothesis Testing (Simple Linear Regression)

20 Simple linear regression explores the relationship between the independent and dependent
21 variables. The following are the provisions of the simple linear hypothesis test: 1) Accept H_a

1 if the probability ($p \leq 0,05$), indicating that the independent variable has a substantial
 2 simultaneous or partial effect on the dependent variable. Table 4 provides an overview of
 3 the outcomes of simple linear regression analysis.

4 **Table 4. Result of the Simple Linear Regression Analysis Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	73.361	1.473		49.814	.000
	Technology Readiness	.237	.028	.665	8.496	.000

5 *a. Dependent Variable: Learning Outcomes*

6 Table 4 shows t-calculated of 8.496 at a significance level of 0.000. Meanwhile, t-table with
 7 $dk = n - 2 = 30 - 2 = 28$ and $\alpha = 0.05$ was 1.701. Therefore, t-calculated (8.496) > t-table
 8 (1.701) and the significance value (0.000) < 0.05. Thus, H_0 was rejected and H_a was
 9 accepted. This finding indicated that technology readiness had a significant effect on
 10 learning outcomes. The research hypothesis saying "Technology readiness has an effect on
 11 elementary school students' learning outcomes during online learning in the new normal
 12 era" is accepted.

13 Discussion

14
 15 The technology readiness of elementary school students in Kretek District, Bantul,
 16 Yogyakarta Special Region, Indonesia, has a very significant impact on their academic
 17 performance. Because students already have a component that promotes online learning,
 18 technology readiness can increase student learning outcomes. The online learning has a
 19 major effect on student (Bahasoan et al., 2020; Lukas & Yunus, 2021) . The learning facilities
 20 and parental involvement can enhance students' academic achievement (Higgins &
 21 Katsipataki, 2015; Wright et al., 2018). The study further showed that learning environments
 22 and parental involvement had a 48.2% effect on students' mathematics achievement.

23 Digital technology simplifies work because it functions swiftly, with quality,
 24 effectively, and efficiently (Knox, 2019). The transmission of information is facilitated by
 25 technology. Technology use has an effect on student learning motivation because all

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1 students can integrate technology into their education (Ahmadi, 2018; Sun & Gao, 2019;
2 Wang, 2015). During online learning, the instructor presents the content before assigning
3 homework at the conclusion of the meeting (Martin & Bolliger, 2018). Compared to past
4 studies, the present study demonstrates that learning outcomes can be enhanced when
5 teachers distribute assignments via WhatsApp, Zoom, Google Classroom, and others
6 (Bahasoan et al., 2020; Lukas & Yunus, 2021). The use of technology in online learning
7 enhances students' comprehension of a subject and prevents them from becoming bored
8 easily.

9 Conclusion

10 On the basis of research conducted in a cluster of elementary schools in Kretek
11 District, Bantul, Yogyakarta Special Region, it can be concluded that in the new normal era,
12 technology readiness has a major impact on the learning outcomes of primary school
13 students during online learning. This is demonstrated by the significance values of
14 technology readiness (0.188) and learning outcomes (0.339), which are greater than 0.05.
15 The results of the normality test satisfy the test's criteria, and there is no statistically
16 significant difference. The linearity test revealed a linear association between learning
17 outcomes and technology readiness ($0.638 > 0.05$). The linear regression test then revealed
18 that the t-calculated (8.496) was bigger than the t-table (1.701) with a significance level of
19 0.000 (smaller than 0.05). This value implies acceptance of H_a , suggesting that technology
20 readiness has a positive influence on students' learning outcomes. In conclusion, the
21 research hypothesis that states, "Technology readiness has an effect on elementary school
22 students' learning outcomes during online learning in the new normal era" is valid

Commented [13]: What are the suggestions from this research for future studies?

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- 19

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6 Technology readiness is a condition where students are prepared to support the
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25 **Key words:** *Technology Readiness, Online Learning, Learning Outcomes.*
26
27

Commented [11]: What is the contribution of the results of this research to the study of the field of science?

MASUKAN REVIEWER 2

Introduction

The pandemic of COVID-19 has created substantial changes in society, particularly in education. Especially at the primary school level, the modifications made to the education system make it difficult for teachers to convey content and for students to comprehend subject matter. Elementary schools are educational institutions that provide a six-year curriculum for children aged 6 to 12 years (Çimen & Koçyiğit, 2010; Dere, 2019). According to Piaget, children ages 7 to 11 are in the concrete operational stage, when they learn to use real-world examples in everyday situations (Piaget, 1972). Therefore, elementary pupils find it difficult to comprehend abstract concepts (Maryani et al., 2018; Sahin & Yilmaz, 2020). However, current online learning in schools substantially reduces student-teacher and student-learning media interactions. This system poses a challenge for educational human resources, including teachers, students, institutions, and even parents in the community. All relevant stakeholders must actively assist students in learning and acquiring the needed competencies.

During this pandemic, the government has established a temporary policy for distance learning (Azhari & Fajri, 2021; Giatman et al., 2020). However, one of Jogja's subdistricts, Bantul in the Kretek subdistrict, has begun implementing an odd-even system in its schools. Current elementary schools in the Kretek District use a Blended learning system that combines online and offline learning. This is consistent with the decision by the municipal government of Yogyakarta to permit schools to hold face-to-face meetings twice or once each week. This is done to prevent the transmission of the COVID-19 virus.

Today's educators must find out how to deliver learning materials that are easily accepted by students. Fundamentally, elementary school students are children who have not been able to effectively comprehend the information when learning is not face-to-face (Giatman et al., 2020). Similarly, Piaget's theory claims that Children aged 7 to 11 are in the concrete operational stage, employing real-world examples in their everyday lives (Piaget, 1972). According to this theory, elementary school-aged children have trouble comprehending information if they merely visualize it. This is seen by the disparities in student learning outcomes between online and offline instruction. The analysis of learning outcomes on research subjects showed that the increase in children's task scores during

1 online learning was much greater than during face-to-face learning, such as from 70 to 90 or
2 100. This is possible because parents sometimes assist their children with homework. In
3 actuality, children do not always comprehend the task at hand because their parents always
4 perform it. Meanwhile, in face-to-face learning, unlike online learning, students display their
5 real cognitive abilities and capabilities (Connolly & Stansfield, 2007; Patricia Aguilera-
6 Hermida, 2020). Students during face-to-face learning also represent the original ability of
7 the students themselves, which vary considerably from student to student.

8 It is difficult for elementary school teachers to make students feel at ease and willing
9 to take lessons when they are not delivered face-to-face. The usage of the Internet and
10 multimedia technologies can transform the manner in which information is sent and serve as
11 an alternative to classroom-based instruction (Zhang, 2006). The implementation of online
12 education necessitates the use of mobile devices, such as smartphones, laptops, and tablets,
13 that may be used to access information at any time and in any location (Gikas & Grant,
14 2013). In this instance, it is vital to prepare students for online learning, including ensuring
15 that their technology is ready to enable online learning during the COVID-19 pandemic. With
16 the current state of technology preparedness, the problem of educators distributing learning
17 materials to students can be resolved. During this pandemic, technology has had a
18 significant impact on education.

19 Technology readiness in online learning is significant since it is useful for solving a
20 problem that emerges in the learning process. Without technology readiness, teachers will
21 have difficulties delivering learning materials to students, and students will also find it
22 difficult to understand the information (Lukas & Yunus, 2021; Tang et al., 2021). In this
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24 achieve the desired goals.

25 Rogantina (2017) explains that technology plays a crucial role in increasing the quality
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27 boost the efficacy and efficiency of the teaching and learning process, which in turn helps
28 the achievement of educational goals (Basheer et al., 2017)(Lu & Liu, 2015). This indicates
29 that technology in education gives benefits to help successful learning during a pandemic. So

1 it can be inferred that technology plays a vital part in learning during the COVID-19
2 pandemic, which must be done online to break the chain of dissemination of COVID-19.

3 The effectiveness of online education depends not only on students' technology
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5 will be affected by the technological preparedness of Human Resources personnel or the
6 elementary school children themselves. Students who possess a high level of technology
7 readiness will undoubtedly achieve better learning outcomes than those who do not. This
8 study intends to examine the effect of technology readiness on the learning outcomes of
9 fourth graders in elementary school.

10 Method

11 Research design

12 This study uses a quantitative approach with a survey method. The survey was conducted on
13 technology readiness data and learning outcomes on events that have passed so that they
14 are included in ex post facto research. This study aims to find the cause of changes in
15 learning outcomes caused by differences in technology readiness where data occurred in the
16 past.

18 Participant

19 This quantitative study surveyed 93 fourth-grade pupils from elementary schools in Kretek
20 District, Bantul, Yogyakarta Special Region, Indonesia. As a method of sampling, simple
21 random sampling was utilized.

23 Data collection tools

24 Data on students' technology readiness were taken using a closed-ended questionnaire
25 containing 20 statements, while data on student learning outcomes were collected through
26 secondary data in the form of students' final exam scores written in their semester report
27 cards.

28 Table 1. Technology Readiness Indicators (Frerking & Beauchamp, 2016)

Technology readiness indicators	Item No
Basic principles of technology	1,2,3,4
Formulation of technology concepts and their application	5,6

Proof of concept function	7,8
A collection of components in a relevant environment	9,10
Demonstration of a model or prototype in a relevant environment	11,12
System prototype demonstration in an application environment	13,14
Testing of completeness requirements in the application environment	15,16,17,18
Operation success test	19,20

1

2 Data analysis

3 The data analysis consisted of descriptive and inferential statistical analysis. It consisted of
4 validity and reliability test, normality test, linearity test, and hypothesis testing using simple
5 linear regression.

6

7

Findings

8

9 The analysis results related to pupils' technology readiness showed that the majority
10 (95%) of fourth grade students responded very well to the questionnaire. The results of the
11 questionnaire analysis showed that 32.3% of respondents had very low Technology
12 readiness (TR), 26.5% low, 20.4% moderate, 6.5% high, and 14% very high. Although the
13 learning process was done out offline with limited face-to-face meetings, these students
14 showed high satisfaction since they could communicate directly with teachers and
15 classmates. Furthermore, the pupils admitted that it was easier to understand the material
16 that was presented offline. To boost students' knowledge in online learning sessions,
17 teachers usually give light assignments to students. This task is meant so that students can
18 learn and understand the related subject matter independently.

19 As shown by the results of the hypothesis testing using simple linear regression, task
20 assignment had a considerable impact on the outcomes of online learning. The variables of
21 technology readiness and learning outcomes passed the Kolmogorov-Smirnov normality test
22 with significance levels of 0.188 and 0.339 (> 0.05), respectively. The linearity test
23 requirements were satisfied by the results of the normality test, which indicated that there
24 was no significant difference and that there was little perception among observers.
Furthermore, the linearity test showed a significance value of $0.638 > 0.05$. This figure

1 indicated that technology readiness and student learning outcomes had a linear relationship.
 2 Following the linearity test, simple linear regression was used to test the hypothesis. The
 3 findings of the Simple Linear Regression Test indicated that technology readiness had a
 4 substantial impact on student learning outcomes ($0.000 < 0.05$, when $t\text{-calculated} > t\text{-table}$
 5 ($8.496 > 1.701$)). Therefore, H_a was approved and H_o was rejected, where technology
 6 readiness had a 98.9% impact on the outcomes of online learning. On the basis of these
 7 findings, it can be stated that technology readiness has a significant impact on the online
 8 learning outcomes of primary school students in the new normal era.

9 The technology readiness of elementary school students in Kretek District, Bantul,
 10 Yogyakarta Special Region, Indonesia, has a very significant impact on their academic
 11 performance. Because students already have a component that promotes online learning,
 12 technology readiness can increase student learning outcomes. This is reinforced by
 13 Chairudin's (2021) assertion that online learning has a major effect on student achievement.
 14 The research of Tutut Faridawati (2011) has also revealed that learning facilities and parental
 15 involvement can enhance pupils' mathematical achievement. The study further showed that
 16 learning environments and parental involvement had a 48.2% effect on students'
 17 mathematics achievement.

18

19 **3.1. Normality Test**

20 A normality test is used to determine whether the observational data have a normal
 21 distribution. In this study, Kolmogorov-Smirnov was used to test for normality. The
 22 advantage of the one-sample Kolmogorov-Smirnov normality test is that it is straightforward
 23 and does not lead to divergent opinions among observers (Sahab, 2019). Table 2 displays the
 24 result of the test for normality of data distribution in this study.

25 **Table 2. Normality Test Result (One-Sample Kolmogorov-Smirnov Test)**

		Technology Readiness	Learning Outcomes
N		93	93
Normal Parameters ^{a,b}	Mean	52.17	85.742
	Std. Deviation	7.638	2.7254
	Most Extreme Differences	.113	.098

	Positive	.113	.098
	Negative	-.081	-.066
Kolmogorov-Smirnov Z		1.087	.941
Asymp. Sig. (2-tailed)		.188	.339

a. Test distribution is Normal.

b. Calculated from data.

1
2 Based on the table above, it can be seen that the asymp.sig values of technology readiness
3 (0.188) and learning outcomes (0.339) are greater than 0.05 hence it can be concluded that
4 the research data were normally distributed. The normality test is a test of difference
5 between the data being tested for normality and the standard normal data. In this study, the
6 significance value is over 0.05. The two variables above have met the requirements in the
7 normality test and there is no significant difference between the values of the two variables.
8 The advantage of the normality test utilized is that it does not produce much perception
9 among observers.

10

11 3.2. Linearity Test

12 A linearity test is used to examine whether or not two variables have a linear connection
13 that is statistically significant. Table 3 summarized the findings of the linearity test
14 conducted in this study.

15

Table 3. Linearity Test Result

			Sum of Squares	df	Mean Square	F	Sig.
Learning Outcomes	Between Groups	(Combined)	405.194	28	14.471	3.329	.000
		Linearity	302.275	1	302.275	69.545	.000
		Deviation from Linearity	102.919	27	3.812	.877	.638
Technology Readiness	Within Groups		278.172	64	4.346		
	Total		683.366	92			

16 According to Table 3, the linearity score of 0.638 is greater than 0.05, indicating that there is
17 a linear relationship between technology readiness and learning outcomes.

18

19 3.3. Hypothesis Testing (Simple Linear Regression)

20 Simple linear regression explores the relationship between the independent and dependent
21 variables. The following are the provisions of the simple linear hypothesis test: 1) Accept H_a

1 if the probability ($p \leq 0,05$), indicating that the independent variable has a substantial
 2 simultaneous or partial effect on the dependent variable. Table 4 provides an overview of
 3 the outcomes of simple linear regression analysis.

4 **Table 4. Result of the Simple Linear Regression Analysis Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	73.361	1.473		49.814	.000
	Technology Readiness	.237	.028	.665	8.496	.000

a. Dependent Variable: Learning Outcomes

5
 6 Table 4 shows t-calculated of 8.496 at a significance level of 0.000. Meanwhile, t-table with
 7 $dk = n - 2 = 30 - 2 = 28$ and $\alpha = 0.05$ was 1.701. Therefore, t-calculated (8.496) > t-table
 8 (1.701) and the significance value (0.000) < 0.05. Thus, H_0 was rejected and H_a was
 9 accepted. This finding indicated that technology readiness had a significant effect on
 10 learning outcomes. The research hypothesis saying "Technology readiness has an effect on
 11 elementary school students' learning outcomes during online learning in the new normal
 12 era" is accepted.

Discussion

15 The technology readiness of elementary school students in Kretek District, Bantul,
 16 Yogyakarta Special Region, Indonesia, has a very significant impact on their academic
 17 performance. Because students already have a component that promotes online learning,
 18 technology readiness can increase student learning outcomes. The online learning has a
 19 major effect on student (Bahasoan et al., 2020; Lukas & Yunus, 2021) . The learning facilities
 20 and parental involvement can enhance students' academic achievement (Higgins &
 21 Katsipataki, 2015; Wright et al., 2018). The study further showed that learning environments
 22 and parental involvement had a 48.2% effect on students' mathematics achievement.

23 Digital technology simplifies work because it functions swiftly, with quality,
 24 effectively, and efficiently (Knox, 2019). The transmission of information is facilitated by
 25 technology. Technology use has an effect on student learning motivation because all

Commented [I2]: added a little discussion between the findings and theoretical studies

1 students can integrate technology into their education (Ahmadi, 2018; Sun & Gao, 2019;
2 Wang, 2015). During online learning, the instructor presents the content before assigning
3 homework at the conclusion of the meeting (Martin & Bolliger, 2018). Compared to past
4 studies, the present study demonstrates that learning outcomes can be enhanced when
5 teachers distribute assignments via WhatsApp, Zoom, Google Classroom, and others
6 (Bahasoan et al., 2020; Lukas & Yunus, 2021). The use of technology in online learning
7 enhances students' comprehension of a subject and prevents them from becoming bored
8 easily.

9 Conclusion

10 On the basis of research conducted in a cluster of elementary schools in Kretek
11 District, Bantul, Yogyakarta Special Region, it can be concluded that in the new normal era,
12 technology readiness has a major impact on the learning outcomes of primary school
13 students during online learning. This is demonstrated by the significance values of
14 technology readiness (0.188) and learning outcomes (0.339), which are greater than 0.05.
15 The results of the normality test satisfy the test's criteria, and there is no statistically
16 significant difference. The linearity test revealed a linear association between learning
17 outcomes and technology readiness ($0.638 > 0.05$). The linear regression test then revealed
18 that the t-calculated (8.496) was bigger than the t-table (1.701) with a significance level of
19 0.000 (smaller than 0.05). This value implies acceptance of H_a , suggesting that technology
20 readiness has a positive influence on students' learning outcomes. In conclusion, the
21 research hypothesis that states, "Technology readiness has an effect on elementary school
22 students' learning outcomes during online learning in the new normal era" is valid

Commented [13]: What are the suggestions from this research for future studies?

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1
2 **Technology Readiness and Learning Outcomes of Elementary School Students**
3 **during Online Learning in the New Normal Era**
4

5 **Abstract**

6 Technology readiness is a condition where students are prepared to support the
7 success of online learning during the COVID-19 pandemic. Good technology readiness will
8 support learning and have an impact on student learning outcomes. This study aimed to
9 determine the influence of fourth grade elementary school students' technology readiness
10 on their online learning outcomes in the new normal era. The current research was
11 conducted using a quantitative method through a survey on 93 elementary school students
12 in Kretek District, Bantul, Yogyakarta, Indonesia. Samples were taken randomly using an
13 incidental system from all fourth grade elementary school students with a population of 122
14 students. The technology readiness data were collected using a closed-ended questionnaire
15 containing 20 statements, while data on learning outcomes were gathered from the
16 students' final exam results. Data analysis was conducted using descriptive and inferential
17 statistics. The results showed that technology readiness had a positive influence on student
18 learning outcomes. Hypothesis testing using a simple linear regression test revealed that at a
19 significance level of 0.000 (< 0.05), the t-calculated (8.496) $>$ t table (1.701). Thus, it can be
20 concluded that technology readiness has a significant effect on fourth grade students'
21 learning outcomes in the new normal era. It can be concluded that technology readiness has
22 a significant effect on the learning outcomes of fourth grade students in the new normal era.
23 The aspect of technology readiness supports students' ability to manage digital learning
24 resources, digital platforms, and learning devices. The learning process using digital learning
25 resources will run optimally and have an impact on the achievement of learning outcome.

26 **Key words:** *Technology Readiness, Online Learning, Learning Outcomes.*
27
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Introduction

The pandemic of COVID-19 has created substantial changes in society, particularly in education. Especially at the primary school level, the modifications made to the education system make it difficult for teachers to convey content and for students to comprehend subject matter. Elementary schools are educational institutions that provide a six-year curriculum for children aged 6 to 12 years (Çimen & Koçyiğit, 2010; Dere, 2019). According to Piaget, children ages 7 to 11 are in the concrete operational stage, when they learn to use real-world examples in everyday situations (Piaget, 1972). Therefore, elementary pupils find it difficult to comprehend abstract concepts (Maryani et al., 2018; Sahin & Yilmaz, 2020). However, current online learning in schools substantially reduces student-teacher and student-learning media interactions. This system poses a challenge for educational human resources, including teachers, students, institutions, and even parents in the community. All relevant stakeholders must actively assist students in learning and acquiring the needed competencies.

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28 Table 1. Technology Readiness Indicators (Frerking & Beauchamp, 2016)

Technology readiness indicators	Item No
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Proof of concept function	7,8
A collection of components in a relevant environment	9,10
Demonstration of a model or prototype in a relevant environment	11,12
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Testing of completeness requirements in the application environment	15,16,17,18
Operation success test	19,20

1

2 Data analysis

3 The data analysis consisted of descriptive and inferential statistical analysis. It consisted of
4 validity and reliability test, normality test, linearity test, and hypothesis testing using simple
5 linear regression.

6

7

Findings

8

9 The analysis results related to pupils' technology readiness showed that the majority
10 (95%) of fourth grade students responded very well to the questionnaire. The results of the
11 questionnaire analysis showed that 32.3% of respondents had very low Technology
12 readiness (TR), 26.5% low, 20.4% moderate, 6.5% high, and 14% very high. Although the
13 learning process was done out offline with limited face-to-face meetings, these students
14 showed high satisfaction since they could communicate directly with teachers and
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16 that was presented offline. To boost students' knowledge in online learning sessions,
17 teachers usually give light assignments to students. This task is meant so that students can
18 learn and understand the related subject matter independently.

19 As shown by the results of the hypothesis testing using simple linear regression, task
20 assignment had a considerable impact on the outcomes of online learning. The variables of
21 technology readiness and learning outcomes passed the Kolmogorov-Smirnov normality test
22 with significance levels of 0.188 and 0.339 (> 0.05), respectively. The linearity test
23 requirements were satisfied by the results of the normality test, which indicated that there
24 was no significant difference and that there was little perception among observers.
Furthermore, the linearity test showed a significance value of $0.638 > 0.05$. This figure

1 indicated that technology readiness and student learning outcomes had a linear relationship.
 2 Following the linearity test, simple linear regression was used to test the hypothesis. The
 3 findings of the Simple Linear Regression Test indicated that technology readiness had a
 4 substantial impact on student learning outcomes ($0.000 < 0.05$, when $t\text{-calculated} > t\text{-table}$
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 6 readiness had a 98.9% impact on the outcomes of online learning. On the basis of these
 7 findings, it can be stated that technology readiness has a significant impact on the online
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9 The technology readiness of elementary school students in Kretek District, Bantul,
 10 Yogyakarta Special Region, Indonesia, has a very significant impact on their academic
 11 performance. Because students already have a component that promotes online learning,
 12 technology readiness can increase student learning outcomes. This is reinforced by
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 15 involvement can enhance pupils' mathematical achievement. The study further showed that
 16 learning environments and parental involvement had a 48.2% effect on students'
 17 mathematics achievement.

18

19 **3.1. Normality Test**

20 A normality test is used to determine whether the observational data have a normal
 21 distribution. In this study, Kolmogorov-Smirnov was used to test for normality. The
 22 advantage of the one-sample Kolmogorov-Smirnov normality test is that it is straightforward
 23 and does not lead to divergent opinions among observers (Sahab, 2019). Table 2 displays the
 24 result of the test for normality of data distribution in this study.

25 **Table 2. Normality Test Result (One-Sample Kolmogorov-Smirnov Test)**

		Technology Readiness	Learning Outcomes
N		93	93
Normal Parameters ^{a,b}	Mean	52.17	85.742
	Std. Deviation	7.638	2.7254
	Most Extreme Differences	.113	.098

	Positive	.113	.098
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a. Test distribution is Normal.

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2 Based on the table above, it can be seen that the asymp.sig values of technology readiness
3 (0.188) and learning outcomes (0.339) are greater than 0.05 hence it can be concluded that
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7 normality test and there is no significant difference between the values of the two variables.
8 The advantage of the normality test utilized is that it does not produce much perception
9 among observers.

10

11 3.2. Linearity Test

12 A linearity test is used to examine whether or not two variables have a linear connection
13 that is statistically significant. Table 3 summarized the findings of the linearity test
14 conducted in this study.

15

Table 3. Linearity Test Result

			Sum of Squares	df	Mean Square	F	Sig.
Learning Outcomes	Between Groups	(Combined)	405.194	28	14.471	3.329	.000
		Linearity	302.275	1	302.275	69.545	.000
		Deviation from Linearity	102.919	27	3.812	.877	.638
Technology Readiness	Within Groups		278.172	64	4.346		
	Total		683.366	92			

16 According to Table 3, the linearity score of 0.638 is greater than 0.05, indicating that there is
17 a linear relationship between technology readiness and learning outcomes.

18

19 3.3. Hypothesis Testing (Simple Linear Regression)

20 Simple linear regression explores the relationship between the independent and dependent
21 variables. The following are the provisions of the simple linear hypothesis test: 1) Accept H_a

1 if the probability ($p \leq 0,05$), indicating that the independent variable has a substantial
 2 simultaneous or partial effect on the dependent variable. Table 4 provides an overview of
 3 the outcomes of simple linear regression analysis.

4 **Table 4. Result of the Simple Linear Regression Analysis Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	73.361	1.473		49.814	.000
	Technology Readiness	.237	.028	.665	8.496	.000

5 *a. Dependent Variable: Learning Outcomes*

6 Table 4 shows t-calculated of 8.496 at a significance level of 0.000. Meanwhile, t-table with
 7 $dk = n - 2 = 30 - 2 = 28$ and $\alpha = 0.05$ was 1.701. Therefore, t-calculated (8.496) > t-table
 8 (1.701) and the significance value (0.000) < 0.05. Thus, H_0 was rejected and H_a was
 9 accepted. This finding indicated that technology readiness had a significant effect on
 10 learning outcomes. The research hypothesis saying "Technology readiness has an effect on
 11 elementary school students' learning outcomes during online learning in the new normal
 12 era" is accepted.

13 Discussion

14
 15 The technology readiness of elementary school students in Kretek District, Bantul,
 16 Yogyakarta Special Region, Indonesia, has a very significant impact on their academic
 17 performance. Hypothesis testing is an indicator of this influence. This is a good relationship
 18 to say that technology readiness can support the success of the online learning process.
 19 Because students already have a component that promotes online learning, technology
 20 readiness can increase student learning outcomes This is reinforced by research (Bahasoan
 21 et al., 2020; Lukas & Yunus, 2021) that online learning has a major effect on students.

22 The learning facilities and parental involvement can enhance students' academic
 23 achievement (Higgins & Katsipataki, 2015; Wright et al., 2018). Parents who provide
 24 technology facilities as online learning resources mean to support their students' efforts in
 25 learning. The study further from (Higgins & Katsipataki, 2015; Wright et al., 2018) shows that

1 learning environments and parental involvement had a 48.2% effect on students'
2 mathematics achievement. Therefore, technology readiness is determined from the
3 involvement of parents in providing online learning facilities.

Commented [I2]: added a little discussion between the findings and theoretical studies

4 Digital technology simplifies work because it functions swiftly, with quality,
5 effectively, and efficiently (Knox, 2019). The transmission of information is facilitated by
6 technology. Technology use has an effect on student learning motivation because all
7 students can integrate technology into their education (Ahmadi, 2018; Sun & Gao, 2019;
8 Wang, 2015). High motivation allows students to learn independently to master the learning
9 content.

10 During online learning, the instructor presents the content before assigning
11 homework at the conclusion of the meeting (Martin & Bolliger, 2018). Compared to past
12 studies, the present study demonstrates that learning outcomes can be enhanced when
13 teachers distribute assignments via WhatsApp, Zoom, Google Classroom, and others
14 (Bahasoan et al., 2020; Lukas & Yunus, 2021). The use of technology in online learning
15 enhances students' comprehension of a subject and prevents them from becoming bored
16 easily.

17 Conclusion

18 On the basis of research conducted in a cluster of elementary schools in Kretek
19 District, Bantul, Yogyakarta Special Region, it can be concluded that in the new normal era,
20 technology readiness has a major impact on the learning outcomes of primary school
21 students during online learning. The linear regression test then revealed that the t-
22 calculated (8.496) was bigger than the t-table (1.701) with a significance level of 0.000
23 (smaller than 0.05). This value implies acceptance of H_a , suggesting that technology
24 readiness has a positive influence on students' learning outcomes. As a suggestion, teachers
25 should pay attention to students' technological readiness before integrating IT-based
26 learning. Initial diagnostics can be done by involving reports from parents, reflection on
27 student readiness, and teacher observations in class.

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1
2 **Technology Readiness and Learning Outcomes of Elementary School Students**
3 **during Online Learning in the New Normal Era**
4

5 **Abstract**

6 Technology readiness is a condition where students are prepared to support the
7 success of online learning during the COVID-19 pandemic. Good technology readiness will
8 support learning and have an impact on student learning outcomes. This study aimed to
9 determine the influence of fourth grade elementary school students' technology readiness
10 on their online learning outcomes in the new normal era. The current research was
11 conducted using a quantitative method through a survey on 93 elementary school students
12 in Kretek District, Bantul, Yogyakarta, Indonesia. Samples were taken randomly using an
13 incidental system from all fourth grade elementary school students with a population of 122
14 students. The technology readiness data were collected using a closed-ended questionnaire
15 containing 20 statements, while data on learning outcomes were gathered from the
16 students' final exam results. Data analysis was conducted using descriptive and inferential
17 statistics. The results showed that technology readiness had a positive influence on student
18 learning outcomes. Hypothesis testing using a simple linear regression test revealed that at a
19 significance level of 0.000 (< 0.05), the t-calculated (8.496) $>$ t table (1.701). Thus, it can be
20 concluded that technology readiness has a significant effect on fourth grade students'
21 learning outcomes in the new normal era. It can be concluded that technology readiness has
22 a significant effect on the learning outcomes of fourth grade students in the new normal era.
23 The aspect of technology readiness supports students' ability to manage digital learning
24 resources, digital platforms, and learning devices. The learning process using digital learning
25 resources will run optimally and have an impact on the achievement of learning outcome.

26 **Key words:** *Technology Readiness, Online Learning, Learning Outcomes.*
27
28

Commented [11]: What is the contribution of the results of this research to the study of the field of science?

Introduction

The pandemic of COVID-19 has created substantial changes in society, particularly in education. Especially at the primary school level, the modifications made to the education system make it difficult for teachers to convey content and for students to comprehend subject matter. Elementary schools are educational institutions that provide a six-year curriculum for children aged 6 to 12 years (Çimen & Koçyiğit, 2010; Dere, 2019). According to Piaget, children ages 7 to 11 are in the concrete operational stage, when they learn to use real-world examples in everyday situations (Piaget, 1972). Therefore, elementary pupils find it difficult to comprehend abstract concepts (Maryani et al., 2018; Sahin & Yilmaz, 2020). However, current online learning in schools substantially reduces student-teacher and student-learning media interactions. This system poses a challenge for educational human resources, including teachers, students, institutions, and even parents in the community. All relevant stakeholders must actively assist students in learning and acquiring the needed competencies.

During this pandemic, the government has established a temporary policy for distance learning (Azhari & Fajri, 2021; Giatman et al., 2020). However, one of Jogja's subdistricts, Bantul in the Kretek subdistrict, has begun implementing an odd-even system in its schools. Current elementary schools in the Kretek District use a Blended learning system that combines online and offline learning. This is consistent with the decision by the municipal government of Yogyakarta to permit schools to hold face-to-face meetings twice or once each week. This is done to prevent the transmission of the COVID-19 virus.

Today's educators must find out how to deliver learning materials that are easily accepted by students. Fundamentally, elementary school students are children who have not been able to effectively comprehend the information when learning is not face-to-face (Giatman et al., 2020). Similarly, Piaget's theory claims that Children aged 7 to 11 are in the concrete operational stage, employing real-world examples in their everyday lives (Piaget, 1972). According to this theory, elementary school-aged children have trouble comprehending information if they merely visualize it. This is seen by the disparities in student learning outcomes between online and offline instruction. The analysis of learning outcomes on research subjects showed that the increase in children's task scores during

1 online learning was much greater than during face-to-face learning, such as from 70 to 90 or
2 100. This is possible because parents sometimes assist their children with homework. In
3 actuality, children do not always comprehend the task at hand because their parents always
4 perform it. Meanwhile, in face-to-face learning, unlike online learning, students display their
5 real cognitive abilities and capabilities (Connolly & Stansfield, 2007; Patricia Aguilera-
6 Hermida, 2020). Students during face-to-face learning also represent the original ability of
7 the students themselves, which vary considerably from student to student.

8 It is difficult for elementary school teachers to make students feel at ease and willing
9 to take lessons when they are not delivered face-to-face. The usage of the Internet and
10 multimedia technologies can transform the manner in which information is sent and serve as
11 an alternative to classroom-based instruction (Zhang, 2006). The implementation of online
12 education necessitates the use of mobile devices, such as smartphones, laptops, and tablets,
13 that may be used to access information at any time and in any location (Gikas & Grant,
14 2013). In this instance, it is vital to prepare students for online learning, including ensuring
15 that their technology is ready to enable online learning during the COVID-19 pandemic. With
16 the current state of technology preparedness, the problem of educators distributing learning
17 materials to students can be resolved. During this pandemic, technology has had a
18 significant impact on education.

19 Technology readiness in online learning is significant since it is useful for solving a
20 problem that emerges in the learning process. Without technology readiness, teachers will
21 have difficulties delivering learning materials to students, and students will also find it
22 difficult to understand the information (Lukas & Yunus, 2021; Tang et al., 2021). In this
23 scenario, technology can be a supporter of the remote learning system, so that learning can
24 achieve the desired goals.

25 Rogantina (2017) explains that technology plays a crucial role in increasing the quality
26 of education (Ghavifekr & Rosdy, 2015; Raja & Nagasubramani, 2018). Technology can also
27 boost the efficacy and efficiency of the teaching and learning process, which in turn helps
28 the achievement of educational goals (Basheer et al., 2017)(Lu & Liu, 2015). This indicates
29 that technology in education gives benefits to help successful learning during a pandemic. So

1 it can be inferred that technology plays a vital part in learning during the COVID-19
2 pandemic, which must be done online to break the chain of dissemination of COVID-19.

3 The effectiveness of online education depends not only on students' technology
4 readiness, but also on their human capital. During the pandemic, student learning outcomes
5 will be affected by the technological preparedness of Human Resources personnel or the
6 elementary school children themselves. Students who possess a high level of technology
7 readiness will undoubtedly achieve better learning outcomes than those who do not. This
8 study intends to examine the effect of technology readiness on the learning outcomes of
9 fourth graders in elementary school.

10 Method

11 Research design

12 This study uses a quantitative approach with a survey method. The survey was conducted on
13 technology readiness data and learning outcomes on events that have passed so that they
14 are included in ex post facto research. This study aims to find the cause of changes in
15 learning outcomes caused by differences in technology readiness where data occurred in the
16 past.

18 Participant

19 This quantitative study surveyed 93 fourth-grade pupils from elementary schools in Kretek
20 District, Bantul, Yogyakarta Special Region, Indonesia. As a method of sampling, simple
21 random sampling was utilized.

23 Data collection tools

24 Data on students' technology readiness were taken using a closed-ended questionnaire
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9 (95%) of fourth grade students responded very well to the questionnaire. The results of the
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24 Furthermore, the linearity test showed a significance value of $0.638 > 0.05$. This figure

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a. Test distribution is Normal.

b. Calculated from data.

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2 Based on the table above, it can be seen that the asymp.sig values of technology readiness
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7 normality test and there is no significant difference between the values of the two variables.
8 The advantage of the normality test utilized is that it does not produce much perception
9 among observers.

10

11 3.2. Linearity Test

12 A linearity test is used to examine whether or not two variables have a linear connection
13 that is statistically significant. Table 3 summarized the findings of the linearity test
14 conducted in this study.

15

Table 3. Linearity Test Result

			Sum of Squares	df	Mean Square	F	Sig.
Learning Outcomes	Between Groups	(Combined)	405.194	28	14.471	3.329	.000
		Linearity	302.275	1	302.275	69.545	.000
		Deviation from Linearity	102.919	27	3.812	.877	.638
Technology Readiness	Within Groups		278.172	64	4.346		
	Total		683.366	92			

16 According to Table 3, the linearity score of 0.638 is greater than 0.05, indicating that there is
17 a linear relationship between technology readiness and learning outcomes.

18

19 3.3. Hypothesis Testing (Simple Linear Regression)

20 Simple linear regression explores the relationship between the independent and dependent
21 variables. The following are the provisions of the simple linear hypothesis test: 1) Accept H_a

1 if the probability (p) $\leq 0,05$, indicating that the independent variable has a substantial
 2 simultaneous or partial effect on the dependent variable. Table 4 provides an overview of
 3 the outcomes of simple linear regression analysis.

4 **Table 4. Result of the Simple Linear Regression Analysis Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	73.361	1.473		49.814	.000
	Technology Readiness	.237	.028	.665	8.496	.000

a. Dependent Variable: Learning Outcomes

5
 6 Table 4 shows t-calculated of 8.496 at a significance level of 0.000. Meanwhile, t-table with
 7 $dk = n - 2 = 30 - 2 = 28$ and $\alpha = 0.05$ was 1.701. Therefore, t-calculated (8.496) > t-table
 8 (1.701) and the significance value (0.000) < 0.05. Thus, H_0 was rejected and H_a was
 9 accepted. This finding indicated that technology readiness had a significant effect on
 10 learning outcomes. The research hypothesis saying "Technology readiness has an effect on
 11 elementary school students' learning outcomes during online learning in the new normal
 12 era" is accepted.

13 Discussion

14
 15 The technology readiness of elementary school students in Kretek District, Bantul,
 16 Yogyakarta Special Region, Indonesia, has a very significant impact on their academic
 17 performance. Hypothesis testing is an indicator of this influence. This is a good relationship
 18 to say that technology readiness can support the success of the online learning process.
 19 Because students already have a component that promotes online learning, technology
 20 readiness can increase student learning outcomes This is reinforced by research (Bahasoan
 21 et al., 2020; Lukas & Yunus, 2021) that online learning has a major effect on students.

22 The learning facilities and parental involvement can enhance students' academic
 23 achievement (Higgins & Katsipataki, 2015; Wright et al., 2018). Parents who provide
 24 technology facilities as online learning resources mean to support their students' efforts in
 25 learning. The study further from (Higgins & Katsipataki, 2015; Wright et al., 2018) shows that

1 learning environments and parental involvement had a 48.2% effect on students'
2 mathematics achievement. **Therefore, technology readiness is determined from the**
3 **involvement of parents in providing online learning facilities.**

Commented [I2]: added a little discussion between the findings and theoretical studies

4 Digital technology simplifies work because it functions swiftly, with quality,
5 effectively, and efficiently (Knox, 2019). The transmission of information is facilitated by
6 technology. Technology use has an effect on student learning motivation because all
7 students can integrate technology into their education (Ahmadi, 2018; Sun & Gao, 2019;
8 Wang, 2015). **High motivation allows students to learn independently to master the learning**
9 **content.**

10 During online learning, the instructor presents the content before assigning
11 homework at the conclusion of the meeting (Martin & Bolliger, 2018). Compared to past
12 studies, the present study demonstrates that learning outcomes can be enhanced when
13 teachers distribute assignments via WhatsApp, Zoom, Google Classroom, and others
14 (Bahasoan et al., 2020; Lukas & Yunus, 2021). The use of technology in online learning
15 enhances students' comprehension of a subject and prevents them from becoming bored
16 easily.

17 Conclusion

18 On the basis of research conducted in a cluster of elementary schools in Kretek
19 District, Bantul, Yogyakarta Special Region, it can be concluded that in the new normal era,
20 technology readiness has a major impact on the learning outcomes of primary school
21 students during online learning. The linear regression test then revealed that the t-
22 calculated (8.496) was bigger than the t-table (1.701) with a significance level of 0.000
23 (smaller than 0.05). This value implies acceptance of H_a , suggesting that technology
24 readiness has a positive influence on students' learning outcomes. **As a suggestion, teachers**
25 **should pay attention to students' technological readiness before integrating IT-based**
26 **learning. Initial diagnostics can be done by involving reports from parents, reflection on**
27 **student readiness, and teacher observations in class.**

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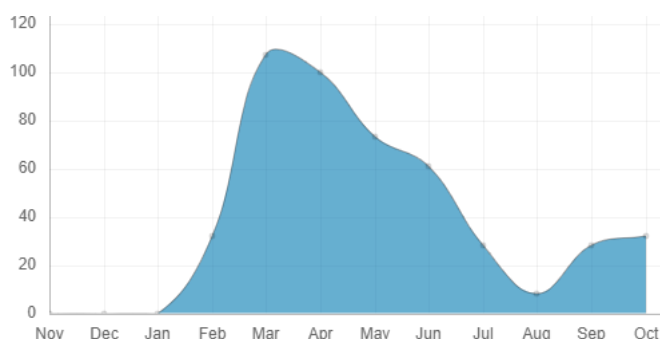
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Abstract

Technology readiness is a condition where students are prepared to support the success of online learning during the COVID-19 pandemic. Good technology readiness will support learning and have an impact on student learning outcomes. This study aimed to determine the influence of fourth grade elementary school students' technology readiness on their online learning outcomes in the new normal era. The current research was conducted using a quantitative method through a survey on 93 elementary school students in Kretek District, Bantul, Yogyakarta, Indonesia. Samples were taken randomly using an incidental system from all fourth grade elementary school students with a population of 122 students. The technology readiness data were collected using a closed-ended questionnaire containing 20 statements, while data on learning outcomes were gathered from the students' final exam results. Data analysis was conducted using descriptive and inferential statistics. The results showed that technology readiness had a positive influence on student learning outcomes. This can be seen from the normality significance value of Technology Readiness (0.188) and of Learning Outcomes (0.399), which are greater than 0.05. Similarly, the linearity test showed that technology readiness and learning outcomes had a linear relationship (0.638 > 0.05). Hypothesis testing using a simple linear regression test revealed that at a significance level of 0.000 (< 0.05), the t-calculated (8.496) > t table (1.701). Thus, it can be concluded that technology readiness has a significant effect on fourth grade students' learning outcomes in the new normal era.

Downloads



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