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

**[1]Ika Maryani*, [2]Siti Latifah, [3]Laila Fatmawati, [4]Vera Yuli Erviana, [5]Fitri Nur Mahmudah**

[1-4]Universitas Ahmad Dahlan Yogyakarta, Jalan Ki Ageng Pemanahan No.19 Sorosutan Yogyakarta, Indonesia,

[5]Universitas Ahmad Dahlan Yogyakarta, Jalan Pramuka No. 42, Sidikan, Yogyakarta, Indonesia

## 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. 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. It can be concluded that technology readiness has a significant effect on the learning outcomes of fourth grade students in the new normal era. The aspect of technology readiness supports students' ability to manage digital learning resources, digital platforms, and learning devices. The learning process using digital learning resources will run optimally and have an impact on the achievement of learning outcome.

**Keywords:** 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 & Koçyiiğit, 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

**Corresponding Author:** ika.maryani@pgsd.uad.ac.id

**https://orcid.org/0000-0002-7154-2902**

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

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

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

Rogantina (2017) explains that technology plays a crucial role in increasing the quality of education (Ghavifekr & Rosdy, 2015; Raja & Nagasubramani, 2018). Technology can also boost the efficacy and efficiency of the teaching and learning process, which in turn helps the achievement of educational goals (Basheer et al., 2017)(Lu & Liu, 2015). This indicates that technology in education gives benefits to help successful learning during a pandemic. So it can be inferred that technology plays a vital part in learning during the COVID-19 pandemic, which must be done online to break the chain of dissemination of COVID-19.

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

## Method

### Research design

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

### Participant

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

### Data collection tools

Data on students' technology readiness were taken using a closed-ended questionnaire containing 20 statements, while data on student learning outcomes were collected through secondary data in the form of students' final exam scores written in their semester report cards (Table 1).

### Data analysis

The data analysis consisted of descriptive and inferential statistical analysis. It consisted of validity and reliability test, nor-

**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 |

mality test, linearity test, and hypothesis testing using simple linear regression.

## Findings

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

As shown by the results of the hypothesis testing using simple linear regression, task assignment had a considerable impact on the outcomes of online learning. The variables of technology readiness and learning outcomes passed the Kolmogorov-Smirnov normality test with significance levels of 0.188 and 0.339 (> 0.05), respectively. The linearity test requirements were satisfied by the results of the normality test, which indicated that there 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 indicated that technology readiness and student learning outcomes had a linear relationship. Following the linearity test, simple linear regression was used to test the hypothesis. The findings of the Simple Linear Regression Test indicated that technology readiness had a substantial impact on student learning outcomes (0.000 < 0.05, when t-calculated > t-table (8.496 > 1.701)). Therefore, Hα was approved and Ho was rejected, where technology readiness had a 98.9% impact on the outcomes of online learning. On the basis of these findings, it can be stated that technology readiness has a significant impact on the online learning outcomes of primary school students in the new normal era.

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

### Normality Test

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

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

### Linearity Test

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

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

### Hypothesis Testing (Simple Linear Regression)

Simple linear regression explores the relationship between the independent and dependent variables. The following are the

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

| | | *Technology Readiness* | *Learning Outcomes* |
|---|---|---|---|
| *N* | | *93* | *93* |
| Normal Parametersa,b | Mean | 52.17 | 85.742 |
| | Std. Deviation | 7.638 | 2.7254 |
| Most Extreme Differences | Absolute | .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.*

**Table 3**. Linearity Test Result

| | | | *Sum of Squares* | *df* | *Mean Square* | *F* | *Sig.* |
|---|---|---|---|---|---|---|---|
| Learning Outcomes* Technology Readiness | 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 |
| | Within Groups | | 278.172 | 64 | 4.346 | | |
| | Total | | 683.366 | 92 | | | |

**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*

provisions of the simple linear hypothesis test: 1) Accept Ha if the probability (p) ≤ 0,05, indicating that the independent variable has a substantial simultaneous or partial effect on the dependent variable. Table 4 provides an overview of the outcomes of simple linear regression analysis (Table 4).

Table 4 shows t-calculated of 8.496 at a significance level of 0.000. Meanwhile, t-tabel with dk = n – 2 = 30 – 2 = 28 and α = 0.05 was 1.701. Therefore, t-calculated (8.496) > t-tabel (1.701) and the significance value (0.000) < 0.05. Thus, Ho was rejected and Hα was accepted. This finding indicated that technology readiness had a significant effect on learning outcomes. The research hypothesis saying "Technology readiness has an effect on elementary school students' learning outcomes during online learning in the new normal era" is accepted.

## Discussion

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

The learning facilities and parental involvement can enhance students' academic achievement (Higgins & Katsipataki, 2015; Wright et al., 2018). Parents who provide technology facilities as online learning resources mean to support their students' efforts in learning. The study further from (Higgins & Katsipataki, 2015; Wright et al., 2018) shows that learning environments and parental involvement had a 48.2% effect on students' mathematics achievement. Therefore, technology readiness is determined from the involvement of parents in providing online learning facilities.

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

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

## Conclusion

On the basis of research conducted in a cluster of elementary schools in Kretek District, Bantul, Yogyakarta Special Region, it can be concluded that in the new normal era, technology readiness has a major impact on the learning outcomes of primary school students during online learning. The linear regression test then revealed that the t-calculated (8.496) was bigger than the t-table (1.701) with a significance level of 0.000 (smaller than 0.05). This value implies acceptance of Ha, suggesting that technology readiness has a positive influence on students' learning outcomes. As a suggestion, teachers should pay attention to students' technological readiness before integrating IT-based learning. Initial diagnostics can be

done by involving reports from parents, reflection on student readiness, and teacher observations in class.

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