



(RESEARCH ARTICLE)



The effect of student characteristics and information technology on student learning outcomes with learning motivation as the moderator variable at all junior high schools in Gorontalo city

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International Journal of Science and Research Archive, 2023, 09(02), 039–052

Publication history: Received on 13 May 2023; revised on 20 June 2023; accepted on 23 June 2023

Article DOI: <https://doi.org/10.30574/ijrsra.2023.9.2.0487>

Abstract

This research aims to analyze the effect of student characteristics and information technology on student learning outcomes with learning motivation as the moderator variable at all junior high schools in Gorontalo City. We used a quantitative approach with survey method and 98 samples. The data analysis technique was double linear regression. The results demonstrated that student characteristics and information technology significantly impacted student learning outcomes. The better the student characteristics and the use of information technology, the higher the student learning outcome at all junior high schools in Gorontalo City. The effect of student characteristics and the use of information technology on student learning outcomes was scored 52.88, considered highly influential, whereas the rest, 47.12%, was affected by other variables unaddressed here.

Keywords: Student Characteristics; Use of Information Technology; Student Learning Outcome; Learning Motivation

1. Introduction

Learning outcomes are the final target of learning activities at schools. Students can elevate learning outcomes by systematic, conscious efforts leading to positive changes or learning processes. The end of the processes is the acquisition of student learning outcomes. Student learning outcomes are collected in an array of class learning outcomes. Learning outcomes are the outcomes of a teaching interaction and activities. From teacher perspectives, teaching activities are ended with learning outcome evaluation, whereas from student perspectives, learning outcomes herald the end of a learning process.

To examine increases in student learning outcomes, there should be criteria fulfilled by students in each subject. The lowest criteria stating student completeness achievement are called the Minimum Completeness Criteria (KKM). KKM should be determined before a new academic year takes up. The number of students exceeding the minimum completeness bound will not later teacher decisions of student learning completeness. If students come with poor learning outcome averages that do not meet KKM, teachers have to carry out a proper action on the outcomes, i.e., giving a remedial service to those without learning completeness or reinforcement services to those attaining KKM.

Minimum Completeness Criteria (KKM) are set by an education unit and building on the results of teacher deliberations in one or several education units sharing similar characteristics. Completeness Criteria exhibit the percentage of competency achievement levels, and accordingly, is stated at a maximum number of 100. The maximum number of 100 indicates an ideal completeness criterion. The national completeness target is 75 at minimum. Education units can undertake from the minimum criterion under the national target and enhance it progressively.

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Intelligence level also influences learning outcome acquisition. Smart or non-smart students can be identified from their IQ (Intelligence Quotient). Students with high IQ use their mind to learn and solve new problems correctly, expeditiously, and successfully. Meanwhile, those with low IQ will give students difficulties in receiving learning materials.

Learning styles are the key to develop work performance at schools and personal situations. To process and understand information at schools, students learn and communicate easily when using their learning styles. Identifying student learning styles allows teachers to approach and know students by delivering information in a range of styles.

Information technology (IT) or infotech is also known as telematics. The term bears a wealth of definitions, e.g., from William & Sawyer, "Information technology combines computation (computer) with communication paths carrying data, audio, or videos."

Information and technology are a sub-system of information systems. Especially from technological point of view, information technology are organizations' need and requirement to run their businesses. Principally, IT enables organizations to achieve goals. Online services related to education is, basically, delivering educational services for users using internet media. Educational world is inextricably correlated with information and knowledge. Accordingly, easy access to information and knowledge is of paramount importance. Information technology can also beget new features in the educational world. For example, multimedia-based learning systems (technology involving texts, pictures, sounds, and videos) can present more attractive learning materials with various and effective delivery.

Student learning motivations shown in each learning process plays a requisite role in escalating learning achievements in certain subjects. According to Nashar (2004:42), learning motivations are student tendency in learning that should be boosted by the desire to attain achievements.

To reflect their responsibilities, teachers should heighten student motivation. When students have no personal motivation, learning objectives will not be achieved. Motivations are influential factors to realize successful education. Motivations can be defined as the active driving force. Motivations will be active in particular periods, specifically when the need for achieving goals is urgent. A strong motivation will foster passion, enthusiasm, and feelings of pleasure for learning. Individuals will show interest, attention, full concentration, high perseverance, and orientation to achievements without feeling bored if they have learning motivations. Simply speaking, when students have no learning motivation, they will have no learning activity. With low motivations, it is assumed that the achievement will be low as well, and learning objectives will be impossible to attain.

2. Theoretical review

2.1. Learning Outcome Definition

Learning outcomes are acquired through learning activities. In another definition, learning outcomes refer to behavioral patterns, values, definitions, attitudes, appreciations, and skills. Learning per se is a process of acquiring a relatively permanent behavioral change (Sardiman, 2007). Learning outcomes suggest student skills after they have learning experiences. Learning outcomes have a salient role in the learning process. Learning outcome evaluation can inform teachers about student progress in achieving learning objectives through learning activities. Using the information, teachers can design and build further activities for students, either for the entire class or each individual. The explanation above gives us understanding that learning outcomes are changes in learning individuals, in either their knowledge or behaviors, attested to by test scores. Some experts provide definitions of what learning outcomes are. Sujana, in Iskandar (2011), argues that "learning outcomes are the result from learning processes identified using a measurement instrument, i.e., a planned and oral, written, or behavioral test.

2.2. Factors Affecting Student Learning Outcomes

Several factors impacting teaching-learning interactions are related to lesson plans. And yet, what is planned is not always 100% successful (Solihatin, 2012:11).

2.2.1. Environmental Factor

Social Environment

Social environment advocate learning. As social creatures, we need to live with others. Social environments influencing student learning interactions are:

School Environment

School environment is necessary to determine student learning outcomes. Teachers, administration, and classmates can affect the learning process of a student. A harmonious relationship between the three can motivate students to learn better at schools.

Community as Social Environment

The community as the social environment in which students live will impact their learning. Students should choose a social environment that buoy successful learning. A slum environment with the sheer amount of unemployment and neglected children can also influence student learning activities. They will encounter difficulties in finding friends to learn together, discuss, or borrow stationaries.

Family as Social Environment

Home or family as a social environment is the first and primary environment determining individual learning achievements. A peaceful home environment, parental concern about the development or the learning and education processes of their children will affect the children's learning achievements.

Non-Social Environment

Non-social environmental factors are:

- Natural environment, e.g., fresh air, appropriate temperature, appropriate brightness, appropriate lighting, and cool and calm atmospheres, are factors that can impact student learning activities. Students will face off a delayed learning process with unsupportive natural environment conditions.
- Learning materials (that are delivered to students), as well as teaching methods, should be adjusted to student development and age. As such, teachers should positively contribute to student learning activities by understanding learning materials well and implementing many different teaching methods aligned with student conditions.

2.2.2. Instrumental Factor

Instrumental factors, concerning their existence and use, are designed by conforming to the desired learning outcomes. The factors can help teachers realize the planned learning objectives. These instrumental factors can be in the form of: a) learning buildings, b) practicum tools, c) libraries, d) curriculum, e) learned materials, f) learning guidance, and so on.

2.2.3. Physiological Factors

Physiological factors are related to physical conditions of individuals. These factors are categorized into two:

Physical Condition

Physical conditions broadly impact individual learning activities. Healthy and fit physical conditions will have a positive influence on individual learning activities. Meanwhile, weak or ill physical conditions will inhibit a maximum learning outcome achievement. Therefore, physical conditions affect the learning process, and thereby, requiring a maintenance effort.

2.2.4. Psychological Factor

These psychological factors embrace anything related to individual mental conditions. An established and stable mental condition can endorse learning success.

Several psychological factors affecting the learning process are:

Intelligence

Intelligence is a psycho-physical ability to react to a stimulation or adjust to the environment correctly. Therefore, intelligence is related to not only brain quality but also other body organs. And yet, germane to intelligence, the brains are more significant compared to others as they function to control others.

Motivation

Motivation impacts student learning activity effectiveness. It fosters student to learn. Motivation is a process within active individuals. It impels, orients, and maintain individual behaviors. Motivation can also be defined as the influence of needs and desires towards individual intensity and behavioral orientation.

Interest

Simply defined, interest is a high tendency, excitement, or whim of an object. Interest, similar to intelligence and motivation, has an effect on learning activities. When having no interest, students will not learn enthusiastically or even be unwilling to learn. Thus, within a classroom learning context, teachers or other educators must build student interest in learning materials.

Skill

Other psychological factors affecting the learning process are skills. In common, skills are potential abilities of individuals to attain future success. In connection with learning, skills are commonplace learning abilities of students.

2.3. Learning Outcome Indicators

According to Sudjana (2016:22), learning outcomes are student abilities after having learning experiences. The national education system, in its educational objective formulation, either curricular or instructional objectives, adopts Bloom's learning outcome classification (in Sudjana, 2016:22-23), consisting of three spheres: cognitive, affective, and psychomotor.

- **Cognitive sphere** is related to intellectual learning outcomes, made up of six aspects: knowledge or memory, understanding, application, analysis, synthesis, and evaluation.
- **Affective sphere** is related to attitudes, composed of six aspects: acceptance, answers or reactions, assessment, organization, and internalization.
- **Psychomotor sphere** is related to skill and action learning abilities. This sphere comprises six aspects:
 - Reflective motions
 - Basic motion skills
 - Perceptual skills
 - Harmony or preciseness
 - Complex skill motion
 - Expressive and interpretative motions

2.4. Learning Motivation Definition

Motivation is derived from the Latin word "*movere*", which means to move. Motivation is an urge emerging due to either internal or external stimulation, making individuals to make particular behavioral/activity changes, leading to a better condition (Uno, 2007:9). Motivation refers to all driving forces within students, giving rise to learning activity sustainability and orientation, allowing goal attainment as envisaged by the learning subjects (Sardiman, 2009:75). Accordingly, motivation is a reason inducing individuals to conduct, complete, or halt an activity to realize a specific goal set by motivation. Learning motivation is an urge springing from internal (intrinsic) and external (extrinsic) elements of students to perform an activity. Intrinsic motivation embraces a desire and want to succeed, the impetus of the need for learning, and expectation from student aspirations. moreover, extrinsic motivation encompasses appreciation, conducive learning environment, attractive learning activities, and teacher efforts in teaching. Learning motivations affect cognitive, affective, and psychomotor aspects, and vice versa, demonstrating their correlation. Learning motivation plays a role in cultivating learning interests and spirit of students, especially junior high school ones.

2.5. How to Heighten Student Learning Motivation

2.5.1. Making a Learning Agenda

The first step to improve learning motivation is making a specific learning agenda. Learning agenda will help you regulate your time and materials to learn.

2.5.2. Determining a Learning Style

Each person nurtures a different learning style. Each learning method has both weaknesses and strengths. Understanding your learning style enables you to adapt to the materials learned.

2.5.3. Taking a Break

Break is substantive in the learning process. Constant learning without resting will tire both brains and the body. If your body is tired, you will have no optimum learning process.

2.5.4. Avoiding Learning Interruptions

Learning interruptions will retard the material absorbance process. To acquire a supportive learning atmosphere, avoid any possible interruptions. Manage your time to play gadgets, social media, watch the television, and playing online game in order not to disrupt your learning time.

2.5.5. Learning with Friends

If students start feeling bored indicating laziness when learning alone, they can learn with friends. In addition to be learning motivations and spirit, friends will help them find difficulties. Learning by discussion will make them understand more efficiently.

To learn and get an optimum learning outcome, a strong intention and willingness to endeavor are urgent. Self-persistence and confidence are vital to prevent us from feeling giving up amidst the process.

2.6. Indicator of Student Learning Motivation

Uno (2008:23) proposes that the indicators of student learning motivation can be classified as follows: (1) The desire and whim of success, (2) The urge and need for learning, (3) The hope and aspirations for the future, (4) The appreciation in learning, (5) A conducive learning environment. They help students learn well. The internal urge to succeed from students will motivate them to succeed and increase their learning spirit, which in turn, will promote their learning achievements.

2.7. Information Technology Definition

Information technology (IT) is a general term to technology enabling us to make, change, store, communicate, or disseminate information. Information technology combines high-speed computation and communication for data, sounds, and videos. Some examples of information technology are personal computers, telephones, TVs, electronic household equipment, and mobile phones.

2.8. Information Technology Objectives

In general, three objectives of information technology are:

- Allowing human beings to solve a problem efficiently.
- Espousing and opening creativity.
- Scaling up effectiveness and efficiency in finishing tasks.

2.9. Information Technology Significance

The general significance of information technology has been mentioned, i.e., enabling us to access to information or a range of information easily. However, for each field, information technology has a certain significance.

2.9.1. Educational Field

Information technology has the most significant effect on educational fields. The cause is that its main function as the place for information sharing for both children and adults.

2.9.2. Social Field

Information technology plays a critical role in social fields, e.g., socialization from particular institutions for the broad society.

2.9.3. Industrial Field

Information technology plays a vital role in industrial fields, especially trading industries.

2.10. Information Technology Indicator

Information technology helps us solve problems, open creativity, and promote effectiveness and efficiency in working. According to Ali & Wandra (2010:3), the subsystems in the machine are:

- Hardware
- Software
- Database
- Brainware

2.11. Student Characteristic Definition

Based on *Kamus Besar Bahasa Indonesia*, characters are spiritual characteristics, educational science, and morals differentiating ones from others. The word “character” was derived from the Greek “*character*” and “*charrasain*”, that meant sharpening, deepening. Poerwardarminta defines characters as including psychological characteristics and morals that differentiating ones from others. In addition, characters are all personal traits covering behaviors, habits, preferences, distaste, abilities, potencies, values, and thinking patterns (Majid & Andayani, 2011:42).

Characters are the founding values building individual personalities, through hereditary or environmental effect, differentiating them with others and are embodied in their attitudes and behaviors on a daily basis (Samani & Hariyanto, 2013:237).

2.12. What Impacts Student Characters

2.12.1. Character Building Elements

Alicia, in Maragustam, states that the most critical element of character building is the mind. All programs generated from individual life experiences are there. Individual thinking patterns will influence the following patterns. If the thinking pattern embedded conforms to social principles and norms, the behaviors wrought will breed peace and happiness.

2.12.2. Character Building Process

The character-building process commences with foundation building. Foundation serves as the base for particular beliefs and self-concepts. The more the information and experiences individuals accept, the more mature the belief system and thinking pattern built, bringing about clearer actions, habits, and unique characters of each individual. Appropriate belief systems congruent with the applicable social norms will bring on good characters and self-concept, engendering a better and happier life (Maragustam, 26-27).

2.12.3. Character Building

Building is a process, matter, manner, or action of building. Characters cover individual morals or personalities built on internalizing many different policies believed and used as the foundation for viewing, thinking, behaving, and acting (Ismail, ...:5).

2.13. Student Character Indicator

Some student character indicators by Kesuma (2011) are:

- **Religious:** Religious, as suggested by Wahyu, refers to a personal relationship with the celestial being, all-powerful, all-loving, and all-merciful (God), generating a consequence of the desire for being willing to the celestial being by carrying out His instructions and avoiding His prohibitions.
- **Honest:** Honest is shown by those determined to make themselves trustworthy in speeches, actions, and works.
- **Tolerant:** Tolerant is accepting others’ differences, not urging beliefs to others, not disliking others due to their different beliefs, schools, or principles, and not judging others by their backdrops, appearances, or habits because they never ask to be born in a specific nationality, ultimate beauty of prowess, or a high social status.
- **Disciplined:** Disciplined suggests orderliness and compliance with applicable regulations and stipulations.

- **Hard-working:** Hard-working demonstrates determined efforts to deal with learning and task challenges and solve tasks well.

3. Material and method

3.1. Research Approach

This quantitative research answered the proposed problems using a measurement technique carefully applied on certain variables, giving off generalizable conclusions coming to be detached from temporal and situational contexts and the types of data collected, especially quantitative ones.

3.2. Research Design

This research used a method survey to analyze the effect of student characteristics and information technology on student learning outcomes with student learning motivation as the moderator variable at all junior high schools in Gorontalo City.

3.3. Population and Sample

3.3.1. Population

Sugiyono (2016:80) defined a population as a generalized area made up of objects/subjects with particular quality and characteristics determined by researchers to examine and draw for conclusions. The research population was composed of all seventh and eighth graders at all junior high schools in Gorontalo students, with a total number of 4,860 students.

3.3.2. Sample

Samples were parts of the number and characteristics of a population (Sugiyono, 2019:62). In this research, the sampling method was using the Slovin formula (Sujarweni, 2014:16). The population comprised 4,860 samples at a 10% error tolerance limit, calculated using the following formula:

$$n = \frac{N}{1 + N(e)^2}$$

Description:

n : Sample size
 N : Population size
 E : Error percentage

The number of research samples was:

Known : N = 4,860

e = 10%

$$\text{Then } : n = \frac{4,860}{1 + 4,860 (0.1)^2}$$

$$n = \frac{4,860}{1 + 4,860 (0.01)}$$

$$n = \frac{4,860}{1 + 48.6}$$

$$n = \frac{4,860}{49.6} = 97.9 = 98$$

3.4. Data Collection Technique

To collect accurate data to answer the problems, we used questionnaires. We distributed a set of written questions or statements to respondents to be answered using a scale method. We used structured questionnaires with closed answers. They contained a number of written questions pertinent to factual data or opinions related to respondents. Moreover, the scale method used was a Likert scale to measure individual or group attitudes, opinions, and perceptions of a social phenomenon. The measured variables became sub-variables.

3.5. Validity and Reliability Test

A validity test was performed when there were similarities between the collected data and the factual phenomenon taking place on the examined object. The research instrument was considered valid if the r-count was higher than the r-table. We could use a correlation formula (product moment) by correlating variables. The formula was:

$$r = \frac{(\sum XY) - (\sum X)(\sum Y)}{\sqrt{[n(\sum X^2) - (\sum X)^2][n(\sum Y)^2 - (\sum Y)^2]}}$$

Description

- r = Coefficient of correlation
- n = Number of respondents
- $\sum X$ = Total instrument item score
- $\sum Y$ = Total answer score
- $\sum X^2$ = Squared total item score
- $\sum Y^2$ = Squared total answer score
- $\sum XY$ = The result of the multiplication of an item answer score to the total score

If the correlation result was significant at more than 5% (0.05), it was valid. We used the SPSS program to undertake this analysis.

3.5.1. Reliability Test

Reliability demonstrated the reliability level. Being reliable was being trustworthy, making it reliable. A reliability test could be carried out using an alpha technique. An instrument with a measured reliability level was the variable ≥ 0.06 or 60%. The formula used was Cronbach's alpha, as follows.

$$r_{11} = \left[\frac{n}{(n-1)} \right] \left[1 - \frac{\sum s_i^2}{s_t^2} \right]$$

Description:

- r^{11} = Coefficient of reliability
- n = Number of items
- s_i^2 = nth problem score variance
- s_t^2 = Total variance score

From the calculation results using Cronbach's Alpha, we could interpret the reliability level of the coefficient of correlation, or in this context, the criteria for the calculation results using the above formula (Arikunto, 2005:100).

3.5.2. Classical Assumption Test

A classical assumption test aimed to acquire good regression without error or deviation. The test covered many other tests as follows (Ghozali, 2013:57-74):

3.5.3. Data Normality Test

This test aimed to examine if the regression model of dependent and independent variables was normal distributed. The normality test was carried out using a normal probability plot and Kolmogorov Smirnov. Vis a vis the normal probability plot test, when the chart in the test demonstrated data distribution around the diagonal line and following the line, the model regression fulfilled normality assumptions. With regard to the Kolmogorov-Smirnov test, data were normal if the significance $> \alpha = 0.05$.

3.5.4. Multicollinearity Test

A multicollinearity test was conducted by identifying the Variance Inflation Factor (VIF). It aimed to investigate the correlation between independent variables in a regression. No correlation was stated when VIF from a multicollinearity test was < 10 .

3.5.5. Heteroscedasticity Test

A heteroscedasticity test aimed to observe whether there are variance differences between existing data residuals in a regression. We used a plot chart analysis of the dependent variable prediction value (ZPRDCH) and its residual (sresid). The bases for this analysis were:

- If a certain pattern was found, and if dots forming a particular pattern were regular (undulating, widening, and the narrowing), there was heteroscedasticity.
- If no certain pattern was found, and if dots were found above and below 0 in axis Y, there was no heteroscedasticity.

3.6. Double Linear Regression

The double linear regression aimed to analyze or predict the effect of two or more independent variables on the dependent one to exhibit a functional or causal relationship between two or more independent variables and independent ones (Ridwan, 2004:152). In other words, a double linear regression tested the impact of the electronic word of mouth and price on purchase decision.

3.7. Data Analysis Technique (Moderation Regression Analysis)

According to Ghozali (2018), the Moderate Regression Analysis (MRA) aimed to examine if a moderator variable would either reinforce or undercut the relationship between independent and dependent variables. The Moderate Regression Analysis (MRA) was also referred to as an interaction test between independent and moderator variables.

4. Results

4.1. Statistical Description

This research was titled “The Effect of Student Characteristics and Information Technology on Student Learning Outcomes with Learning Motivation as the Moderator Variable at All Junior High Schools in Gorontalo City. Research questionnaires were given to respondent from 13 junior high schools and meeting sample standards. Primary data were collected using questionnaires directly distributed to respondents. We managed to gather 98 respondents that had fulfilled the determined sample standards as the research subjects. The samples were seventh and eighth graders, amounted to 98 in total (47 males and 52 females).

4.2. Classical Assumption Test

4.2.1. Data Normality Test

A normality test aimed to identify data distribution in a data group or variable and whether the data distribution was normal. The test could be performed using the normal probability plot method, the result of which is indicated in Figure 1.

From Figure 1, data (dots) were scattered around the diagonal line and followed the line. Accordingly, data in this regression model fulfilled the data normality assumption. There were also several deviant dots, and as such, requiring the Kolmogorov-Smirnov test to undertake. The One Sample Kolmogorov-Smirnov test results are pointed out in Table 1.

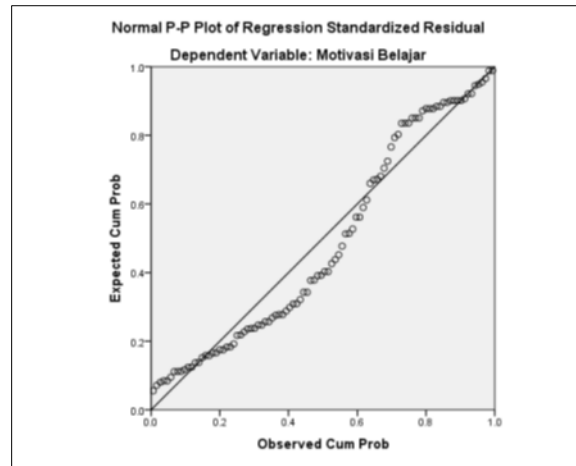


Figure 1 Normal Probability Plot Test Result

Table 1 Normality Test Results

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		98
Normal Parameters ^{a,b}	Mean	.0000000
	Std. Deviation	6.35145194
Most Extreme Differences	Absolute	.120
	Positive	.120
	Negative	-.112
Test Statistic		.120
Asymp. Sig. (2-tailed)		.001 ^c

In Table 1, the Kolmogorov-Smirnov Z value of the regression residual variable was 0.120. The value was smaller than Z table of 1.96. The significance value was higher than 0.05 ($0.01 < 0.05$), and hence, data were normally distributed.

4.2.2. Multicollinearity

Predicated on data processing, we acquired the Variance Inflation Factor (VIF) of each variable, as presented in Table 2.

Table 2 Multicollinearity Test Results

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Student Characteristics	.987	1.989
	IT Use	.987	1.989

Source: Data Processed, 2022

As stated in Table 2, the Variance Inflation Factor (VIF) values of student characteristic and IT use variables were 1.989 and 1.989, respectively. The values were lower than the standard one (10). In so doing, the regression model fulfilled the multicollinearity test.

4.2.3. Heteroscedasticity Test

A heteroscedasticity test aimed to investigate whether variance differences of the extant data residuals were found in a regression. The heteroscedasticity test results are suggested in Figure 2.

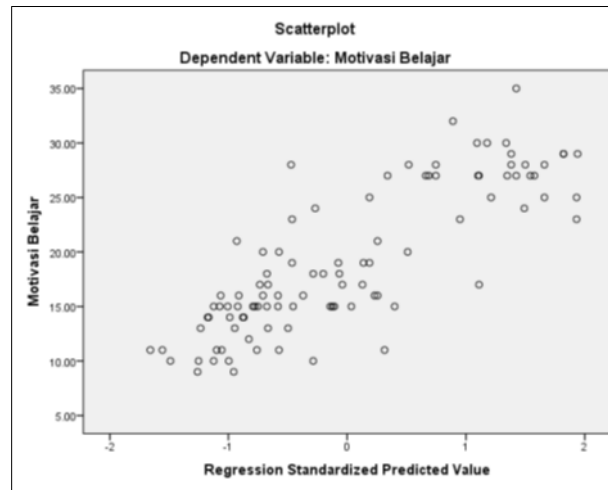


Figure 2 Heteroscedasticity Test Results

From Figure 2, dots were randomly scattered above or below 0 in axis Y. Accordingly, the regression model had no heteroscedasticity.

4.2.4. Hypothesis Test

After a regression equation model was acquired, the hypothesis test could be carried out using the following phases.

Determining Hypotheses

- H0₁: Student characteristics did not affect learning motivations at all junior high schools in Gorontalo City.
- Ha₁: Student characteristics affected learning motivations at all junior high schools in Gorontalo City.
- H0₂: Information technology use did not affect learning motivations at all junior high schools in Gorontalo City.
- Ha₂: Information technology use affected learning motivations at all junior high schools in Gorontalo City.

Determining the Significance Level

We used a 95% significance level, or in other words, the significance level (alpha) was 5%.

Determining the Statistical test

A t-test was used to test the significance of the impact in the regression model. The hypothesis test could be conducted once the regression equation model was acquired.

Determining the Test Criteria

The test criteria were determined by comparing the-t count and the t-table. If the first value was higher than the second, H0 was rejected, but if the first was smaller, H0 was accepted.

Conclusion

In this session, we provide the detailed explanation of our hypothesis testing using SPSS 21. The results of the test for the effect of student characteristics and information technology use on student learning outcomes with student learning motivation as the moderator variable at all junior high schools in Gorontalo City are:

- Effect of Student Characteristics on Student Learning Outcomes at All Junior High Schools in Gorontalo City

The t-count of the student characteristic variable was 1.748, and the t-table at a 5% significance level and the degree of freedom $n - k - 1$ or $98 - 2 - 1 = 95$ was 0.678. If compared, the t-count was higher than the t-table ($1.748 > 0.678$). The

significance value of the t-count of 0.084 was smaller than the alpha value of 0.5 ($0.084 < 0.5$). As such, student characteristics positively and significantly impacted student learning outcomes with student learning motivation as the moderator variable at all junior high schools in Gorontalo.

- Effect of Information Technology Use on Student Learning Outcomes at All Junior High Schools in Gorontalo City

The t-count of the student characteristic variable was 2.640, and the t-table at a 5% significance level and the degree of freedom $n - k - 1$ or $98 - 2 - 1 = 95$ was 0.678. If compared, the t-count was higher than the t-table ($2.640 > 0.678$). The significance value of the t-count of 0.010 was smaller than the alpha value of 0.5 ($0.010 < 0.5$). Hence, student characteristics positively and significantly influenced student learning outcomes with student learning motivation as the moderator variable at all junior high schools in Gorontalo City.

- Student Learning Motivation as the Moderator Variable to Solidify the Effect of Student Characteristics on Student Learning Outcomes at All Junior High Schools in Gorontalo City

The t-count of the learning motivation variable was 0.992, and the t-table at a 5% significance level and the degree of freedom $n - k - 1$ or $98 - 2 - 1 = 95$ was 0.678. If compared, the t-count was higher than the t-table ($0.992 > 0.678$). The significance value of the t-count of 0.324 was smaller than the alpha value of 0.5 ($0.324 < 0.5$). Thus, student learning motivation as the moderator variable positively and significantly solidified the effect student characteristics on student learning outcomes at all junior high schools in Gorontalo City.

- Student Learning Motivation as the Moderator Variable to Solidify the Effect of Information Technology Use on Student Learning Outcomes at All Junior High Schools in Gorontalo City

The t-count of the learning motivation variable was 8.129, and the t-table at a 5% significance level and the degree of freedom $n - k - 1$ or $98 - 2 - 1 = 95$ was 0.678. If compared, the t-count was higher than the t-table ($8.129 > 0.678$). The significance value of the t-count of 0.000 was smaller than the alpha value of 0.5 ($0.000 < 0.5$). Thus, student learning motivation as the moderator variable positively and significantly solidified the effect information technology use on student learning outcomes at all junior high schools in Gorontalo City.

5. Discussion

The discussion was adjusted to the research problems disentangled using the available variables as follows.

5.1. Effect of Student Characteristics on Student Learning Outcomes at All Junior High Schools in Gorontalo City

A character was a fundamental value building individual personalities. It was established on hereditary or environmental influences, differentiated individuals from others, and was manifested in individual attitudes and behaviors on a daily basis (Samani & Hariyanto, 2013:237). Character education built and shaped individual mindset, attitudes, and behaviors, enabling students to have positive personalities, moral values, high spirit, and responsibilities. Within an educational context, character education referred to a conscious effort to make students have positive personalities and moral values in good agreement with the Graduate Competence Standard (SKL) and could implement the positiveness on a daily basis (Alfiana, 2017:40).

5.2. Effect of Information Technology Use on Student Learning Outcomes at All Junior High Schools in Gorontalo City

Information technology dissented high-speed computation and communication for data, voices, and videos. Several examples of information technology were personal computers, telephones, TVs, electronic household equipment, and mobile phones.

The descriptive statistics test results through a respondent response analysis demonstrated that the information technology use variable was considered good at a score of 91.47%. It exhibited that students at all junior high schools in Gorontalo City were very good at using information technology. Information technology had the greatest effect on education. The cause was that education played a key function of being media in which children or adults could share information.

5.3. Student Learning Motivation as a Moderator Variable to Solidify the Effect of Student Characteristics on Student Learning Outcomes at All Junior High Schools in Gorontalo City

A learning outcome referred to student abilities acquired from a learning activity. By another definition, it constituted a behavioral pattern, value, description, attitude, appreciation, and skill. Learning was a process by individuals seeking to acquire a relatively permanent behavioral change (Sardiman, 2007). A learning outcome played a pivotal role in the learning process. An assessment process of learning outcomes provided information for teachers with respect to student progress in the attempt to achieve learning objectives through learning activities.

5.4. Student Learning Motivation as a Moderator Variable to Solidify the Effect of Information Technology Use on Student Learning Outcomes at All Junior High Schools in Gorontalo City

Learning outcomes would be augmented if student characteristics and information technology use could efficiently act as places to realize a better learning action. As in Maslow's need hierarchy theory interpreted within a school context, school institutions had a huge commitment to pay attention to student needs to elevate learning outcomes and motivation. According to Maslow (2018), five levels of needs: physiological (student characteristics), security, social, appreciation, and actualization needs (information technology use), could be elicited in environments close to students, i.e., schools and families. Within a school context, students would likely spend most of their time in the class where they learned and used information technology at schools. Fundamentally, information technology uses enhanced knowledge, i.e., actual information students could employ as references for learning, escalating their learning outcomes.

The descriptive statistics test results through a respondent response analysis indicated that the information technology use variable was also considered good at a score of 91.47%. It pointed out that students at all junior high schools in Gorontalo City were very good at using information technology. Information technology significantly impacted on education. Additionally, student motivation increased as technology use at schools gave them space for accessing broader information, finding expansive knowledge, and communicating with others.

6. Conclusion

Based on the results and discussion, we could draw several conclusions as follows.

- Student characteristics positively and significantly influenced learning outcomes with learning motivation as a moderator variable at all junior high schools in Gorontalo City at a coefficient of partial determination of 17.48%.
- Information technology use positively and significantly influenced learning outcomes at all junior high schools in Gorontalo City at a coefficient of partial determination of 26.40%.
- Student learning motivation could solidify student characteristics, significantly influencing learning outcomes at all junior high schools in Gorontalo City at a coefficient of partial determination of 9%.
- Student learning motivation could solidify information technology use, significantly influencing learning outcomes with learning motivation as a moderator variable at all junior high schools in Gorontalo City at a coefficient of determination of 52.88%, whereas the rest, 47.12%, could be explained by other variables unanalyzed here, e.g., teacher competency, teacher commitment, school head leadership, and class management.

Suggestion

Building on results and conclusions, our suggestions are:

- Teachers should strive to create a conducive class by building a good relationship with students and facilitating them to gain high learning outcomes.
- Schools, particularly the school heads, need to design a regulation that can improve student religiosity.
- The Department of Education and Culture in Gorontalo Province should make various efforts that can stimulate teacher performance, such as learning facility and infrastructure provision, capacity building, and compatible and sustainable character reinforcement.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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