Al-Madrasah: Jurnal Ilmiah Pendidikan Madrasah Ibtidaiyah
Vol. 9, No. 4, 2025
DOI 10.35931/am.v9i4.5186
P-ISSN: 2620-5807; E-ISSN: 2620-7184

THE PRESENT STUDY INVESTIGATES THE EFFICACY OF DIRECT INSTRUCTION IN ENHANCING STUDENT LEARNING OUTCOMES CONCERNING THE SOLAR SYSTEM

Berlin Siswanto
Pendidikan Dasar Sekolah Pascasarjana, Universitas Negeri Semarang
berlinsiswanto@gmail.com
Noening Andrijati
Fakultas Ilmu Pendidikan dan Psikologi, Universitas Negeri Semarang
noening06@mail.unnes.ac.id
Decky Avrilianda
Fakultas Ilmu Pendidikan, Universitas Negeri Semarang
decky.avrilianda@mail.unnes.ac.id
Ellianawati
Fakultas Matematika dan IPA, Universitas Negeri Semarang
ellianawati@mail.unnes.ac.id

Abstract

The objective of this study is to assess the efficacy of the Direct Instruction model in enhancing student achievement on the subject of the Solar System in the sixth grade at SDN Sumurlaban II. The present study employed a quasi-experimental design (pre-test–post-test control group) and comprised 40 students who were selected by random sampling. These students constituted the entire population of students in the sixth grade at the aforementioned school. Subsequently, the students were divided into two groups: 20 students in the experimental group (who received instruction using the Direct Instruction model) and 20 students in the control group (who received Konvensional instruction). The instruments employed in this study included a multiple-choice test and a short-answer test, as well as a classroom observation checklist. The collected data was subjected to statistical analysis, specifically the parametric t-test, to identify any significant differences in the pretest and posttest values. The findings of the present study demonstrate that the implementation of Direct Instruction has yielded a substantial enhancement in the academic performance of the students, particularly in the domain of abstract concepts such as the identification of the components of the Solar System, as well as the comprehension of concepts related to orbit, rotation, and revolution. This finding suggests that the Direct Instruction model is a viable teaching method in primary education, particularly in the context of systematically and structurally imparting scientific concepts.
Keywords: Direct Instruction, Learning Outcome, Solar System Material, Quasi-Experiments, Elementary School

INTRODUCTION

Education serves as the foundational element in the development of students' potential to become knowledgeable, creative, and productive human beings. A significant challenge in fundamental education is enhancing student learning outcomes in the domain of Natural Sciences (IPA), particularly in abstract subjects such as the Solar System.[1] Solar System material includes concepts about planets, orbits, rotations, and revolutions. For elementary school students, these concepts are often difficult to understand due to a lack of concrete experience.[2] An inadequate learning process may result in inadequate student comprehension and learning outcomes for this subject matter.[3] Consequently, the development of an effective and directed learning model is imperative to optimize students' learning outcomes, particularly in the domain of abstract concepts.

Conventional models of learning are still widely employed in classrooms, which is not inherently problematic. However, there are numerous alternative learning models that have the potential to enhance the efficacy of students and teachers in improving student learning outcomes in the classroom. The 21st-century learning model is predicated on a student-centered approach that emphasizes abilities such as critical thinking, creativity, collaboration, and communication (4C). It is characterized by technology-based, contextual, and project-based learning, as well as a focus on lifelong learning.[4]

The 21st-century learning model is an educational approach that emphasizes the development of critical thinking, creativity, collaboration, and communication skills (often referred to as the 4Cs), aligning with the demands of the digital era and globalization. This model is student-centered, encouraging active participation, independence, and the ability to solve real-world

[1] Trianto, *Model-Model Pembelajaran Inovatif Berorientasi Konstruktivistik Konsep, Landasan Teoritis-Praktis Dan Implementasinya*, in *Model-Model Pembelajaran Inovatif* (2007); Robert E Slavin, *Cooperative Learning Teori, Riset Dan Praktik*, in *Nusa Media* (2015); Ridwan Abdullah Sani, "Metode Pembelajaran Saintifik Untuk Implementasi Kurikulum 2013," *PT Bumi Aksara*, 2016.

[2] made Wena, "Strategi Pembelajaran Inovatif Kontemporer: Suatu Tinjauan Konseptual Operasional," in *Jakarta: PT. Bumi Aksara*, preprint, 2009; A M Sardiman, *Interaksi Dan Motivasi Belajar Mengajar. 2011*, in *Jakarta: PT. Raja Grafindo Persada* (2011); M. Hosnan, *Pendekatan Saintifik Dan Kontekstual Dalam Pembelajaran Abad 21.: Kunci Sukses Implementasi Kurikulum 2013*, in *Prosiding TEP & PDs Transformasi Pendidikan Abad 21* (2014); Drs Daryanto, "Media Pembelajaran Edisi Ke-2 Revisi," *Yogyakarta: Penerbit Gava Media*, 2016; Ulin Niam, "Pengaruh Pendekatan Pembelajaran Aktif, Inovatif, Lingkungan, Kreatif, Efektif Dan Menyenangkan (Pailkem) Terhadap Kemampuan Mengklasifikasi Mata Pelajaran IPA," *SINAU : Jurnal Ilmu Pendidikan Dan Humaniora*, ahead of print, 2020, https://doi.org/10.37842/sinau.v1i01.11.

[3] Sharon Feiman, " Models of Teaching . Bruce Joyce , Marsha Weil ," *The School Review*, ahead of print, 1973, https://doi.org/10.1086/443124; Agus Suprijono, *PAIKEM (Pembelajaran Aktif Inovatif Kreatif Efektif Menyenangkan): Teori Dan Aplikasi*, in *Kumpulan Metode Pembelajaran* (2010); Mudjiono Dimyati, "Belajar Dan Pembelajaran," *Pengaruh Pembelajaran Student Team Achievement Division Dan Diskusi Terhadap Hasil Belajar Ipa Kelas Iv Sd*, 2006; Nana Sudjana, *Penilaian Hasil Proses Belajar Mengajar Cetakan Ketujuh Belas*, in *Penilaian Dan Hasil Belajar Mengajar* (2013); R. I. Arends, "Learning to Teach, 10th Edition.," *NY: McGraw-Hi*, 2015.

[4] Meyniar Albina et al., "Model Pembelajaran Di Abad Ke 21," *Warta Dharmawangsa* 16, no. 4 (2022), https://doi.org/10.46576/wdw.v16i4.2446.

problems using technology and contextual learning. In practice, it is implemented through various innovative strategies such as Project-Based Learning (PjBL)**,** where students work on real-life projects**;** Problem-Based Learning (PBL)**,** which challenges them to solve complex issues; Inquiry-Based Learning, which nurtures curiosity through investigation; Flipped Classroom, where students learn content at home and engage in interactive activities in class and Blended Learning, which combines face-to-face and online instruction. These models aim to create meaningful, relevant, and future-ready learning experiences for students.

In the 21st-century learning era, where critical thinking, creativity, collaboration, and communication (the 4Cs) are key competencies, instructional models must not only adapt to rapid global and technological changes but also ensure effective knowledge delivery. One model that remains relevant despite its traditional roots is Direct Instruction (DI). This model emphasizes a structured, systematic, and results-oriented approach, where the teacher plays an active role in delivering content clearly and explicitly. Within the context of 21st-century education, Direct Instruction serves as a strong foundation for equipping students with essential core knowledge before they engage in more collaborative and inquiry-based learning. When integrated with technology and differentiated strategies, Direct Instruction can be adapted into an interactive and engaging approach that supports fundamental literacy, numeracy, and foundational skills essential for further development of 21st-century competencies.[5]

Direct Instruction (DI) offers several key advantages that make it an effective teaching model, especially when clear, structured learning is required. One of its main strengths is clarity and efficiency teachers provide explicit instructions, step-by-step explanations, and guided practice, which helps students grasp concepts quickly and accurately. This model is also highly teacher-directed**,** making it ideal for introducing new content or foundational skills, particularly in subjects like mathematics, reading, or science. Additionally, DI allows for consistent assessment and feedback**,** enabling teachers to monitor student progress in real time and address misunderstandings immediately. It also supports classroom management by maintaining a structured and focused learning environment. When combined with modern tools and differentiation techniques, Direct Instruction can effectively support learners at different levels and prepare them for more complex, student-centered learning tasks aligned with 21st-century skills.[6]

Despite its effectiveness in delivering structured and clear instruction, the Direct Instruction (DI) model also has several limitations. One major drawback is its teacher-centered nature, which

[5] Zahriani Zahriani, "Kontektualisasi Direct Instruction Dalam Pembelajaran Sains," *Lantanida Journal* 2, no. 1 (2014), https://doi.org/10.22373/lj.v2i1.667; Moch Ilham Sidik NH. and Hendri Winata, "Meningkatkan Hasil Belajar Siswa Melalui Penerapan Model Pembelajaran Direct Instruction," *Jurnal Pendidikan Manajemen Perkantoran* 1, no. 1 (2016), https://doi.org/10.17509/jpm.v1i1.3262.

[6] Sidik NH. and Winata, "Meningkatkan Hasil Belajar Siswa Melalui Penerapan Model Pembelajaran Direct Instruction"; Zahriani, "Kontektualisasi Direct Instruction Dalam Pembelajaran Sains."

can limit student autonomy, creativity, and critical thinking skills that are essential in 21st-century learning. Because students play a more passive role, it may not fully engage them or encourage active exploration and problem-solving. Additionally, DI tends to follow a one-size-fits-all approach, which may not adequately address diverse learning styles or the needs of students who require more personalized or experiential learning. The model also often lacks opportunities for collaboration and real-world application, which are important components of meaningful and lifelong learning. As a result, while DI is effective for foundational instruction, it should ideally be complemented with more interactive and student-centered strategies to develop well-rounded learners.[7]

The Direct Instruction model is one of the learning models designed to provide direct, structured, and systematic teaching to students.[8] This pedagogical model prioritizes the explicit delivery of material, offering students clear guidance and instruction through structured practice.[9] Preliminary studies indicate that the implementation of Direct Instruction is conducive to enhancing learning outcomes across various subjects, particularly in contexts where fundamental understanding and low-to-mid-level cognitive abilities are requisite.[10] In the context of science education in elementary schools, the implementation of this model has the potential to enhance students' comprehension of abstract Solar System concepts through concrete and structured learning steps.

A substantial body of research has demonstrated the efficacy of Direct Instruction across various educational levels and disciplines. However, the application of this instructional model in Solar System materials at the elementary school level remains under-explored, as evidenced by the paucity of studies in this area.[11] The majority of extant studies have placed a greater emphasis on

[7] Zahriani, "Kontektualisasi Direct Instruction Dalam Pembelajaran Sains"; Sidik NH. and Winata, "Meningkatkan Hasil Belajar Siswa Melalui Penerapan Model Pembelajaran Direct Instruction."

[8] Feiman, " Models of Teaching . Bruce Joyce , Marsha Weil "; Paul Eggen and Don Kauchak, *Strategies and Model for Teachers: Teaching Content and Thinking Skills*, in *NASSP Bulletin* (1988); Barak Rosenshine, "Principles of Instruction: Research-Based Strategies That All Teachers Should Know," *American Educator*, 2012; Slavin, *Cooperative Learning Teori, Riset Dan Praktik*; Arends, "Learning to Teach, 10th Edition."

[9] Jere Brophy and Thomas L. Good, "Teacher Behaviour and Student Achievement," *Handbook of Research on Teaching*, 1986; J. William Moore and Judith A. Schaut, "Increasing Instructional Effectiveness through the Use of a Problem-Solving Approach to the Design of Instructional Systems," *Journal of Experimental Education*, ahead of print, 1978, https://doi.org/10.1080/00220973.1978.11011675; Robert J Marzano, Debra Pickering, and Jane E Pollock, *Classroom Instruction That Works: Research-Based Strategies for Increasing Student Achievement*, in *Representations* (2001).

[10] William Patching et al., "Direct Instruction in Critical Reading Skills," *Reading Research Quarterly*, ahead of print, 1983, https://doi.org/10.2307/747376; Barak Rosenshine, "Teaching Functions in Instructional Programs," *The Elementary School Journal*, ahead of print, 1983, https://doi.org/10.1086/461321; Brophy and Good, "Teacher Behaviour and Student Achievement"; Slavin, *Cooperative Learning Teori, Riset Dan Praktik*.

[11] Feiman, " Models of Teaching . Bruce Joyce , Marsha Weil "; Rosenshine, "Principles of Instruction: Research-Based Strategies That All Teachers Should Know"; Slavin, *Cooperative Learning Teori, Riset Dan Praktik*; Arends, "Learning to Teach, 10th Edition."

the domains of mathematics, reading, and other fundamental competencies.[12] Consequently, this study introduces scientific novelty by assessing the efficacy of Direct Instruction in the context of science materials, particularly the Solar System. The study employs a multifaceted approach, incorporating multiple-choice test instruments, short fill-in-the-blank, and observational studies of student learning activities to generate comprehensive data.[13] Consequently, it is hypothesized that the findings of this study will provide theoretical and practical contributions to the development of science learning models in elementary schools.

The problem formulation developed in this study is derived from this background and is as follows: The objective of this study is to determine the efficacy of the Direct Instruction model in enhancing student learning outcomes concerning the Solar System in class VI SDN Sumurlaban II. In accordance with the problem's formulation, the hypotheses proposed in this study are as follows: A substantial discrepancy in learning outcomes has been identified between students instructed through the Direct Instruction model and those educated via conventional methods on Solar System subjects. This finding is supported by the research of.[14] The objective of this study is to examine the effectiveness of the application of the Direct Instruction model in improving student learning outcomes. Additionally, it seeks to provide an empirical picture of the model's influence on student understanding of Solar System material.[15]

RESEARCH METHODS

The type of research used is experimental research using a quasi-experimental design (pretest-posttest control group), the target in this research is grade VI students of SDN Sumurlaban II. This research was conducted on Monday, April 14, 2025 involving 40 students who were

[12] Brophy and Good, "Teacher Behaviour and Student Achievement"; Patching et al., "Direct Instruction in Critical Reading Skills"; Edmund T. Emmer and Mary Claire Gerwels, "Classroom Management in Middle and High School Classrooms," in *Handbook of Classroom Management* (2015), https://doi.org/10.4324/9780203874783.ch15.

[13] Dimyati, "Belajar Dan Pembelajaran"; Suprijono, *PAIKEM (Pembelajaran Aktif Inovatif Kreatif Efektif Menyenangkan): Teori Dan Aplikasi*; Sudjana, *Penilaian Hasil Proses Belajar Mengajar Cetakan Ketujuh Belas*; Hosnan, *Pendekatan Saintifik Dan Kontekstual Dalam Pembelajaran Abad 21.: Kunci Sukses Implementasi Kurikulum 2013*.

[14] Eggen and Don Kauchak, *Strategies and Model for Teachers: Teaching Content and Thinking Skills*; Brophy and Good, "Teacher Behaviour and Student Achievement"; Rosenshine, "Principles of Instruction: Research-Based Strategies That All Teachers Should Know"; Robert E. Slavin, *Educational Psychology : Theory and Practice, Twelfth Edition*, in *Pearson Education* (2018).

[15] Wena, "Strategi Pembelajaran Inovatif Kontemporer: Suatu Tinjauan Konseptual Operasional"; Sudjana, *Penilaian Hasil Proses Belajar Mengajar Cetakan Ketujuh Belas*; Hosnan, *Pendekatan Saintifik Dan Kontekstual Dalam Pembelajaran Abad 21.: Kunci Sukses Implementasi Kurikulum 2013*; Daryanto, "Media Pembelajaran Edisi Ke-2 Revisi."

purposively selected and divided evenly into two groups, namely 20 students in the experimental group (getting learning with the Direct Instruction model) and 20 students in the control group (getting conventional learning).[16]

The instruments used include learning evaluation tests in the form of multiple choice questions and short fill-in-the-blank questions, as well as classroom learning activity observation sheets. The data obtained were analyzed using parametric statistical tests (t-test) to identify significant differences in pretest and posttest scores.[17]

The present experimental research utilized a quasi-experimental design with a pretest-posttest, control group design. The study population comprised 40 sixth-grade students from SDN Sumurlaban II, who were purposively selected and divided equally into two groups: an experimental group of 20 students who received learning through the Android media-based Direct Instruction model, and a control group of 20 students who received conventional learning.[18]

Tabel 1. Pretest-posttest control group

E	O_1	X_1	O_2
K	O_3	X_2	O_4

Description:

E : Experiment Class
K : Control Class
O_1 : Initial test (before treatment) in the experimental class
O_2 : Final test (after treatment) in the experimental class
O_3 : Initial test (before treatment) in control class
O_4 : Final test (after treatment) in control class
X_1 : Application of conventional learning
X_2 : Implementation of Direct Instruction learning

The research process commenced with the preparation and validation of instruments, which included learning evaluation tests in the form of multiple choice questions and short fill-in-the-blank questions. In addition, classroom activity observation sheets were utilized to measure students' initial conditions through pretests and to document classroom dynamics. The learning research was conducted in a consistent manner over a predetermined period, with external variables

[16] gamaliel septian rachma devina inka, airlanda, "Efektivitas Pengguanan Probelem Based Learning Dan Contextual Teaching and Learning Terhadap Minat Belajar Ipa Kelas III," *Ilmiah Pendidikan Dasar* 5, no. September (2023).

[17] Yulanda Trisula Sidarta Yohanes, Dwi Ratna Kamala Sari Lukman, and Ni Wayan Ria Lestari, "Penerapan Pre & Post-Test Terhadap Hasil Pembelajaran Mahasiswa Jurusan Akuntansi UPBJJ UT Mataram," *Ideas: Jurnal Pendidikan, Sosial, Dan Budaya* 7, no. 4 (2021), https://doi.org/10.32884/ideas.v7i4.529.

[18] Suhartono et al., "A Comparison Study: Effects of the Group Investigation Model and the Direct Instruction Model toward Science Concept Understanding," *Jurnal Pendidikan IPA Indonesia* 8, no. 2 (2019), https://doi.org/10.15294/jpii.v8i2.18135.

being controlled to minimize bias. The experimental group received a more structured and technology-integrated treatment, while the control group followed conventional learning methods.

Following the intervention, a posttest was administered to both groups using the same instrument to measure changes in learning outcomes. The data obtained was analyzed quantitatively using a parametric t-test to identify significant differences between the two groups. The results of the quantitative data analysis, which were supported by descriptive observation data of classroom activities, were then interpreted in relation to the problems and objectives of the study. The overarching objective of the study was to examine the effectiveness of the Android media-based Direct Instruction model in improving students' critical thinking skills.[19]

RESULTS AND DISCUSSION

This research was conducted at Sumurlaban II State Elementary School, which is located in Sumurlaban Village, Tirtajaya District, Karawang Regency in the 2024/2025 even semester in accordance with the Learning Implementation Plan (RPP). In accordance with the purpose of this study, the researcher wants to know whether there is an effect of the direct instruction learning model in improving student learning outcomes.

Systematically the stages of research implementation with a pretest-posttest control group design. This study began with the selection of 40 students of class VI SDN Sumurlaban II who initially took the pretest, where an evaluation was carried out through multiple choice questions and short fillings and classroom activity observations were made to determine initial conditions.[20] After the pretest, students were divided into two groups equally, namely the experimental group who received special teaching in the form of learning with the Direct Instruction model integrated with android-based learning media, and the control group who received conventional learning. After the intervention, both groups took a posttest with the same instrument to measure changes in learning outcomes.

The control class in this study used a conventional learning model with the syntax of introduction, material delivery, exercises and assignments. While the experimental class used the Android media-based Direct Instruction learning model with the syntax of the teacher starting the learning by explaining the objectives to be achieved that day: understanding more deeply the concept of the Solar System, linking new material to the knowledge that students already have, providing an overview of the importance of understanding the movement and arrangement of celestial bodies.

[19] Robert E Slavin, "Educational Psychology: Theory and Practice (5th Ed.).," in *Educational Psychology: Theory and Practice (5th Ed.).*, preprint, 1997.

[20] Yohanes, Lukman, and Lestari, "Penerapan Pre & Post-Test Terhadap Hasil Pembelajaran Mahasiswa Jurusan Akuntansi UPBJJ UT Mataram."

Subsequent to the preliminary session, the instructor commenced the systematic delivery of the material by employing the Direct Instruction approach. The concepts were articulated in a straightforward manner. The learning indicators employed as a point of reference in this study were as follows:[21]

1. The following text is intended to provide a comprehensive overview of the subject matter. The utilization of Android-based applications enables students to comprehend and articulate the sequence of the planets within the solar system.
2. Through the implementation of discussion activities, students can develop an understanding of the characteristics that define each planet within the solar system.
3. Students have the ability to articulate the distinguishing characteristics of each planet in the solar system by leveraging Android-based applications.
4. Students have the ability to articulate the distinguishing characteristics of each planet in the solar system by leveraging Android-based applications.

When the guided practice session begins, the teacher invites students to apply the concepts that have been explained. He gives them a simple task that allows them to identify the components of the Solar System and understand their movement patterns. The teacher goes around, making sure each student understands and providing direction and correction if anyone is having difficulty.

Then, the teacher provides opportunities for students to work independently. They are given more complex exercises, testing their ability to apply the concepts they have learned. Some students are seen thinking hard, while others begin to find patterns in the planetary movements they have just learned about. The teacher remains on standby, ready to provide assistance if needed.

At the conclusion of the session, the instructor administered a post-test comprising multiple-choice and short-answer questions to evaluate the students' understanding of the material. The post-test questions replicated those from the pre-test, with the objective of evaluating the efficacy of the Direct Instruction learning model in the experimental class The following learning objectives have been established The following text is intended to provide a comprehensive overview of the subject matter. The utilization of Android-based applications enables students to comprehend and articulate the sequence of the planets within the solar system, Through the implementation of discussion activities, students can develop an understanding of the characteristics that define each planet within the solar system, Students have the ability to articulate the distinguishing characteristics of each planet in the solar system by leveraging Android-based applications, Students have the ability to articulate the distinguishing characteristics of each planet

[21] Dita Tri Widiyani, Fitri Amalia, and Agus Milu Susetyo, "Indikator Pembelajaran Efektif Dalam Pembelajaran Daring (Dalam Jaringan) Pada Masa Pandemi COVID-19 dI SMAN 2 Bondowoso," *Jurnal Fakultas Keguruan Dan Ilmu Pendidikan*, 2016.

in the solar system by leveraging Android-based applications. The same approach was applied to the control class, but the control class did not use the Direct Instruction learning model; rather, it used conventional learning. Following the administration of the post-test to both the experimental class and the control class using the control group method, the results indicated that a significant proportion of students in the experimental class who were taught using the Direct Instruction learning model demonstrated mastery of the material, while students in the control class who used the conventional learning model exhibited less satisfactory results. In order to comprehend the findings of the research, it is necessary to examine the following tables.

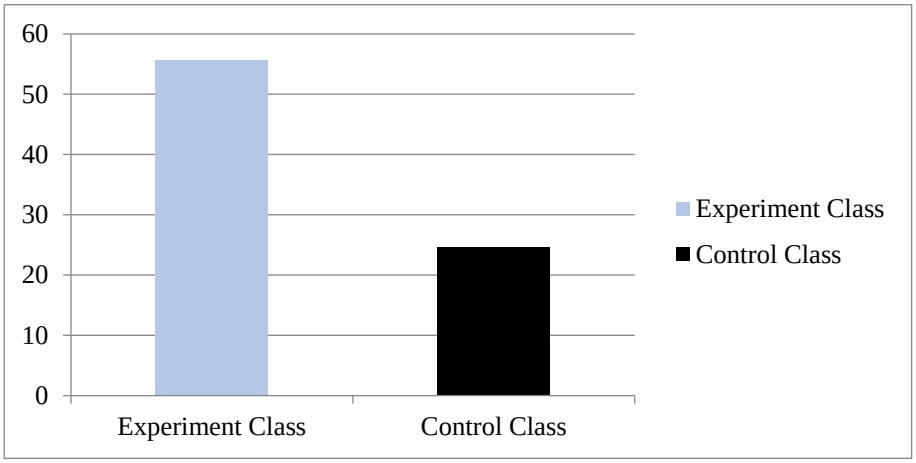

Diagram 1. NGain Average Score of Pretest and Posttest of Control and Experimental Classes

The data presented in the above diagram is the mean pre-test and post-test scores obtained from experimental classes that employed the Direct Instruction model and control classes that utilized conventional learning methods.

According to the findings of the aforementioned calculation of the NGain score, the mean value for the experimental class is 56% or less, indicating its classification as "quite effective." Conversely, the mean value for the control class is 24.6% or less than 40%, thus leading to its classification as ineffective. Consequently, it can be concluded that the implementation of the direct instruction model has been demonstrated to be a highly effective strategy for enhancing student learning outcomes.

The subsequent stage in this inquiry is to execute an independent sample t-test, the purpose of which is to ascertain whether the observed discrepancy in the effectiveness of the direct instruction model and the conventional model is statistically significant.

Tabel 3. Uji Independent T-test NGain Skor

Kelas		Kolmogorov-smirnov			Shapiro-wilk		
		Statistic	Df	Sig	Statistic	Df	Sig
Ngain_Persen	Eksperiment	.166	20	.148	.940	20	.235
	Control	.155	20	.200	.904	20	.050

Based on the normality test results displayed in the table, the significance value (Sig.) in the Shapiro-Wilk test for the NGain Percent value in the Experimental Class is 0.23, while in the Control Class it is 0.050. Because both Sig. values exceed the 0.05 limit, it can be concluded that the data in this study follow a normal distribution. Thus, the requirement to apply the independent sample t-test to the N-gain score has been met.[22]

Tabel 3. Output Group Statistics

Group Statistics

Kelas		N	Mean	Std. Deviation	Std. Error Mean
NGain_Persen	Eksperimen	20	55.7103	15.85048	3.54427
	Kontrol	20	24.5615	9.71282	2.17185

According to the data in the group records table, the homogeneous (mean) NGain Percent value for the Experimental Class was recorded as 55.7103, which if rounded to 56%. Referring to the table of categories of interpretation of the effectiveness of the N-Gain value (%), the direct instruction method can be categorized as quite effective in increasing the learning that will occur for students class VI of Sumurlaban II State Elementary School in IPAS subjects with solar system material.[23]

Meanwhile, the homogeneous average (Mean) NGain Pesen value for the Control Class shows a figure of 24.5615, which after rounding becomes 265%. according to the category of interpretation of the effectiveness of the N-Gain value (%), the conventional learning method is declared ineffective in increasing the learning that will occur in grade VI students of SDN Sumurlaban II on the same material.

The results of the T-test and Gain Pre-test and Post-test have been calculated using the SPSS application. As demonstrated in the preceding assessment table, the Direct Instruction learning model has been shown to be sufficiently effective in enhancing student learning outcomes

[22] Andi Quraisy, "Normalitas Data Menggunakan Uji Kolmogorov-Smirnov Dan Saphiro-Wilk," *J-HEST Journal of Health Education Economics Science and Technology* 3, no. 1 (2022), https://doi.org/10.36339/jhest.v3i1.42.

[23] Moh. Irma Sukarelawan, Tono Kus Indratno, and Suci Musvita Ayu, *N-Gain vs Stacking* (2024).

in science subjects related to the Solar System (Experimental class) in Class VI SDN Sumurlaban II when compared to the conventional learning model (Control Class).

CONCLUSION

According to the calculation of the NGain score, the experimental class that employed the Direct Instruction model demonstrated an average NGain of 56%, which surpassed the established effectiveness threshold (>40%). This finding indicates that the experimental class was deemed to be quite effective in enhancing learning outcomes. Conversely, the control class that employed the conventional learning method attained an average NGain of 24.6%, falling short of the effectiveness threshold (<40%), thereby rendering it ineffective. The normality test with Shapiro-Wilk demonstrated a significance value of 0.23 for the experimental class and 0.050 for the control class, which met the requirements (Sig. value > 0.05) to conduct an independent sample t-test to identify significant differences between groups. The findings of this study indicate that the implementation of the Direct Instruction model is more efficacious in enhancing student learning outcomes in the IPAS Solar System material taught in class VI SDN Sumurlaban II than the conventional learning approach.

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