PPSDP International Journal of Education
Volume 2 (2) (Special Issue) 05-06 July 2023, 352-359
1st PPSDP International Conference on Educational Sciences (IConEds 2023)
E-ISSN 2829-5196, P-ISSN 2830-3229

Improving Student Learning Outcomes through Differentiated Learning and Adversity Intelligence

Nur Hidayat[1], Yayat Ruhiyat[1], Nurul Anriani[1]
[1]Universitas Sultan Ageng Tirtayasa, Banten, Indonesia

Corresponding author e-mail: nurhidayat@untirta.ac.id

Abstract: This study aimed to determine the impact of differentiated Learning and Adversity Intelligence on the improvement of student learning outcomes. This investigation employs a quantitative approach and a 2x2 factorial design. The research sample comprised of 100 class X students out of SMKN 1 Keramat Watu's total population of 200 students. The quantity of research samples was determined using the random sampling technique. Assessments of learning outcomes and adversity intelligence questionnaires are data collection instruments. Students are administered two types of assessments to acquire data. Fo = 7.911 and Sig = 0.005 0.05 indicated significant differences in the effect of differentiated learning on student learning outcomes with adversity intelligence. In addition, differentiated learning is more influential than CTL, as demonstrated by the scores, which ranged from 64.00 for a group of 30 students to 59.47 for a group of 20 students using differentiated learning and/or having low adversity intelligence. Differentiated learning allows students to investigate their unique abilities.

Keywords: Adversity Intelligence, Differentiated Learning, Learning Outcomes

A. Introduction

The assessment of learning outcomes is essential for assessing students' actual accomplishments, which is crucial for assessing the effectiveness of teaching practices and student learning (Alexandron et al., 2020; Wei et al., 2021). Fundamental to the concept of intended learning outcomes is the idea that lesson plans should focus on the skillsets their students need to acquire rather than whatever information their teachers happen to be planning to cover. As a result, the learning outcome model allows us to shift our attention from the role of the teacher to the outcomes of students' learning (Erikson & Erikson, 2019).

The provided education is able to direct all of the student's natural assets towards their success (Herwina, 2021). Teachers can therefore only facilitate the development of these natural strengths so that children can achieve learning independence. Teachers are responsible for ensuring that students can engage in learning by identifying their preferred method and taking their preferred learning style into

account. Therefore, differentiated learning is a solution for grouping students based on their learning style in order to meet these requirements (Dalila et al., 2022). Differentiated learning is an effective learning process that takes into account the differences between students in order to maximize their potential based on their preparedness, interests, and learning profiles (Tomlinson & Imbeau, 2010).

Differentiated learning encompasses a wide range of activities that try to satisfy the needs of all students by modifying course content, grading policies, and teaching strategies (De Jager, 2013). Research shows that using differentiation effectively can boost student motivation and academic achievement by building on students' existing knowledge in meaningful ways (Konstantinou-Katzi et al., 2013). However, many teachers, especially those who are unfamiliar with differentiation, use it incorrectly, either as a means of "scaffolding" for students who are struggling or as a means of facilitating group work (Hertberg-Davis, 2009).

In addition to the differentiated learning model, intelligence is another factor that can affect student achievement. Intelligence is something that every student possesses; the only distinction between students is their varying levels of intelligence. A necessary intelligence for students is adversity intelligence. Intelligence in the face of adversity is crucial to one's success (Ainun et al., 2022). Preliminary research shows that many teachers at SMKN 1 Keramat Watu still use the conventional teaching method, and many students struggle to finish the subject assignments given by the teacher, all of which indicate that student learning outcomes at the school are still below the minimum completeness criteria set by subject teachers. Differentiated learning has been found to significantly enhance students' learning outcomes in previous studies (Sitorus et al., 2022). This research also shows how students with high adversity intelligence fare in terms of grades, autonomy in the classroom, and desire to succeed (Safi'i et al., 2021).

B. Methods

This study employed a quantitative methodology to test hypotheses and establish causal correlations among variables (Degeng, 2000). The design of the study is a factorial design 2x2, a variation of the between-group design in which two or more treatment variables are used to investigate the independent variables and their concurrent influence on a result (Creswell, 2014). Other specialists assert that this study also employs a factorial design in a non-equivalent control group design, specifically a 2 x 2 factorial design (Degeng, 2000). Class X students from SMKN 1 Keramatwatu in the 2022/2023 academic year comprised the population and samples for this study.

The research sample consists of 100 class X students out of a total population of 200. Researchers utilised a random sampling method to determine the number of research samples.

Table 1. Factorial Design 2x2

Adversity Intelligence (B)	**Learning Model (A)**		**∑ Total**
	Differentiated Learning (A1)	**CTL (A2)**	
High (B1)	A1B1	A2B1	∑A1B1+A2B1
Low (B2)	A1B2	A2B2	∑A1B2+A2B2
∑ Total	AIB1+AIB2	A2B1+A2B2	

Note:
A : Learning Model
A1 : Differentiated Learning
A2 : CTL
B : Adversity Intelligence
B1 : High
B2 : Low
Y : Learning outcomes

A1B1: The group of students with high Adversity Intelligence taught using Differentiated Learning. A1B2: The group of students with low Adversity Intelligence taught using Differentiated Learning. A2B1: The group of students with high Adversity Intelligence taught using CTL.
A2B2: The group of students with low Adversity Intelligence taught using CTL

The data collection instruments include learning outcome assessments and adversity intelligence questionnaires. Students were given two sorts of tests to collect the data. The researcher instructed students to take a test on electrical installation subjects for the pretest. In treatment, researchers employ the learning models of differentiated learning and CTL to improve learning outcomes. The posttest consisted of a comparable examination of electrical installation topics as the pretest. The researcher used pre-test and post-test scores to analyze the data. The scholar then compiled test results into a summary. The questionnaire used to evaluate the resilience intelligence of students.

C. Result and Discussion

Table 2. Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	Df	Sig.
Standardized Residual for Y	.070	100	.200*	.984	100	.276

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Table 3. Homogeneity Test

Levene's Test of Equality of Error Variances[a]

Dependent Variable: Learning Outcomes

F	df1	df2	Sig.
1.868	3	95	.140

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.
a. Design: Intercept + A + B + A * B

Table 4. Description of Statistic

Dependent Variable: Learning Outcomes

Learning model	Adversity Intelligence	Mean	Std. Deviation	N
Differentiated Learning	High	64,00	16.669	30
	Low	59.47	19.098	20
	Total	61.28	17.632	50
Contextual Teaching Learning (CTL)	High	63.29	13.446	35
	Low	52.40	13.065	15
	Total	60.02	14.128	50
Total	High	61.52	15.021	65
	Low	59.03	17.551	35
	Total	60.65	15.908	100

Table 5. The Test of ANOVA 2 Ways

Tests of Between-Subjects Effects

Dependent Variable: Learning Outcomes

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1530.540[a]	3	510.180	12.082	.108
Intercept	320285.623	1	320285.623	1307.054	.000
A	339.042	1	339.042	7.911	.005
B	225.975	1	225.975	7.922	.001
A * B	1331.383	1	1331.383	1.433	.322
Error	23524.210	96	245.044		
Total	392897.000	100			
Corrected Total	25054.750	99			

a. R Squared = .035 (Adjusted R Squared = .032)

Total	392897.000	100			
Corrected Total	25054.750	99			

a. R Squared = .035 (Adjusted R Squared = .032)

Before moving further with the inferential analysis, researchers ran a test to make sure their data was normal and consistent. The normality test is supported by the data in Table 2. The Kolmogorov-Smirnov test and the Shapiro-Wilk test both show that this is the case with significance levels of 0.200> 0.05 and 0.276> 0.05, respectively. In addition, the information used in the studies is consistent. Table 3 displays the results of the homogeneity test using Levene's test, demonstrating that the value of Sig. 0.140 > 0.05 is statistically significant.

The results in Table 4 indicate that the differentiated learning model was implemented differently, thereby answering the first study question. This is evidenced by pre- and post-treatment test score differences between the experimental and control groups. Differentiated learning and adversity intelligence were used on the experimental class. Scores ranged from 64.00 for a group of 30 students to 59.47 for a group of 20 students using differentiated instruction and/or having low adversity intelligence. This illustrates that a combination of differentiated learning and adversity intelligence in the face of hardship leads to improved academic performance. Table 5 also shows that a two-way ANOVA test reveals a significant difference in the effects of differentiated learning on the learning outcomes of students with adversity intelligence, with Fo = 7.911 and Sig = 0.005<0.05. This agreed with what Sitorus et al. (2022) had discovered. Because it encourages students to actively seek knowledge in accordance with their own learning styles, this differentiated learning model has a substantial impact on enhancing learning outcomes. Students learn in classes organized around similar preferences for how they best retain information, with guidance from their instructors.

Research questions about how CTL impacts the learning outcomes of high school students with high and low adversity intelligence are answered in Table 4. A total of 35 pupils were tested, and the average score was 63.29, while the average score for those who used CTL or who had low adversity intelligence was 52.40. The results show that CTL combined with a high level of adversity intelligence improves students' academic performance. Furthermore, the application of CTL significantly affected the learning results, as shown in Table 5 by the two-way ANOVA test with values of Fo = 7.922 and Sig = 0.001<0.05. As a result, CTL is a useful tool. Students' progress on "My Living Area"-related objectives is affected by the CTL pedagogical approach. Learners are encouraged to draw connections between what they know and how it might be used in the actual world through the use of the teaching and learning concept of "contextualization" (Hutauruk et al., 2020).

The final research question looks into whether there is a significant interaction effect between differentiated learning and adversity intelligence on student learning outcomes. Descriptive and inferential analysis, adversity intelligence, students'

mean scores, and a two-way ANOVA on differential learning and CTL were used to answer the research objectives. The analysis of variance suggests two potential results. This proves that students with a high variety intelligence benefit more from differentiated learning than through CTL. Composing lessons for students who have a firm understanding of adversity intelligence is easier when using differentiated learning. Learning outcomes for students with low adversity Intelligence level are significantly different when using differentiated learning compared with when using CTL (mean SW = 64.00, Sig. (2-tailed) = 0.005<0.05). The learning outcomes of students with high and low adversity intelligence are improved by using differentiated learning models. Table 5 shows that when analysing the relationship between differentiated instruction and students' achievement, there is no evidence of a significant interaction effect (Sig. 0.332 > 0.05). The findings support this (Ainun et al., 2022). Adversity intelligence has a little but positive effect on students' electrical installation skill.

D. Conclusions

This study has increased our knowledge of how CTL and differentiated instruction might help students of varying adversity intelligences grow their skills. The outcomes of students with both high and low adversity intelligence increased after applying differentiated learning and CTL. This kind of tailored instruction has a significant effect on student achievement because it motivates them to actively seek knowledge in a way that suits their individual learning styles. Classes are structured so that students with similar learning styles can work together under the direction of teachers to master course material. When compared to differentiated learning, CTL does not do as much to help children succeed academically in and out of the classroom. Vocational high school students are the sole population studied in this study; future research at a more advanced academic level is desired.

Reference

Ainun, R. A., Rosidah, & Hamda. (2022). The Effect of Learning Style, Emotional Intelligence, and Adversity Quotient on the Second-grade Students' Mathematics Learning Achievement of Islamic Senior High School. *EduLine: Journal of Education and Learning Innovation*, *2*(2), 88–98. https://doi.org/10.35877/454ri.eduline746

Alexandron, G., Wiltrout, M. E., Berg, A., & Ruipérez-Valiente, J. A. (2020). Assessment that Matters: Balancing Reliability and Learner-centered Pedagogy in MOOC Assessment. *ACM International Conference Proceeding Series*, 512–517. https://doi.org/10.1145/3375462.3375464

Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (4th ed.). Singapore: Sage Publication.

Dalila, A. A., Rahmah, S., Liliawati, W., & Kaniawati, I. (2022). Effect of Differentiated Learning in Problem Based Learning on Cognitive Learning Outcomes of High School Students. *Jurnal Penelitian Pendidikan IPA*, *8*(4), 2116–2122. https://doi.org/10.29303/jppipa.v8i4.1839

De Jager, T. (2013). Guidelines to Assist the Implementation of Differentiated Learning Activities in South African Secondary Schools. *International Journal of Inclusive Education*, *17*(1), 80–94. https://doi.org/10.1080/13603116.2011.580465

Degeng, I. N. S. (2000). *Research Methodology*. Malang: Pascasarjana Universitas Negeri Malang.

Erikson, M. G., & Erikson, M. (2019). Learning Outcomes and Critical Thinking Good Intentions in Conflict. *Studies in Higher Education*, *44*(12), 2293–2303. https://doi.org/10.1080/03075079.2018.1486813

Hertberg-Davis, H. (2009). Myth 7: Differentiation in the Regular Classroom Is Equivalent to Gifted Programs and Is Sufficient. *Gifted Child Quarterly*, *53*(4), 251–253. https://doi.org/10.1177/0016986209346927

Herwina, W. (2021). Optimize Student Needs and Learning Outcomes with Differential Learning. *Perspektif Ilmu Pendidikan*, *35*(2), 175–182. https://doi.org/10.21009/pip.352.10

Hutauruk, I., Gaol, R. L., Mahulae, S., & Tanjung, D. S. (2020). Pengaruh Model Pembelajaran Contextual Teaching and Learning (CTL) terhadap Hasil Belajar Siswa pada Tema Daerah Tempat Tinggalku. *Primary: Jurnal Pendidikan Guru Sekolah Dasar, 9*(6). http://dx.doi.org/10.33578/jpfkip.v9i6.8035

Konstantinou-Katzi, P., Tsolaki, E., Meletiou-Mavrotheris, M., & Koutselini, M. (2013). Differentiation of Teaching and Learning Mathematics: An Action Research Study in Tertiary Education. *International Journal of Mathematical Education in Science and Technology*, *44*(3), 332–349. https://doi.org/10.1080/0020739X.2012.714491

Safi'i, A., Muttaqin, I., Sukino, Hamzah, N., Chotimah, C., Junaris, I., & Rifa'i, M. K. (2021). The Effect of the Adversity Quotient on Student Performance, Student Learning Autonomy and Student Achievement in the COVID-19 Pandemic Era: Evidence from Indonesia. *Heliyon*, *7*(12). https://doi.org/10.1016/j.heliyon.2021.e08510

Sitorus, P., Simanullang, E. N., Manalu, A., Laia, I. S. A., Tumanggor, R. M., & Nainggolan, J. (2022). Effect of Differentiation Learning Strategies on Student Learning Results. *Jurnal Penelitian Pendidikan IPA*, *8*(6), 2654–2661. https://doi.org/10.29303/jppipa.v8i6.2114

Tomlinson, C. A., & Imbeau, M. B. (2010). *Leading and Managing a Differentiated Classroom*. USA: ASCD.

Wei, X., Saab, N., & Admiraal, W. (2021). Assessment of Cognitive, Behavioral, and Affective Learning Outcomes in Massive Open Online Courses: A Systematic Literature Review. *Computers and Education*, *163*(December 2020), 104097. https://doi.org/10.1016/j.compedu.2020.104097