Volume 39 Nomor 1 Tahun 2024
https://ppjp.ulm.ac.id/journal/index.php/JVK/index
p-ISSN: 0215-9619
e-ISSN: 2614-7149

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# Using The Discovery Learning Model to Improve Students' Activities and Learning Outcomes in Vocational High School

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**Abstract.** The objectives of this study are to stimulate more activity and enhance student learning. In this study, the Discovery Learning methodology is applied. This study follows the method of Kemmis and McTaggart's classroom action research. Thirty students from SMK Negeri 1 Cangkringan's XII ATR 1 class served as the study's subjects. Test papers were used to gauge student learning outcomes, while observation sheets were used to estimate student activities. The percentage technique is used to look at the connection between activity and student learning outcomes. Learning success is measured using three variables: the growth of the learning activity, the grade point average, and the proportion of students who finish. The findings revealed a propensity for student activity to rise in cycles 1 and 2. The average class score grew from cycle one to cycle two by 71.5 points to 85 points. More students finished the cycle, from 60% in cycle 1 to 86.7% in cycle 2. Thus, the discovery learning paradigm can enhance class XII students' engagement and learning outcomes.

**Keywords:** discovery learning; learning activities; learning outcomes

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DOI : https://doi.org/10.20527/jvk.v39i1.18720
Received: 9 February 2024 Accepted: 18 April 2024 Published: 26 April 2024

**How to cite:** Triyono, T. (2024). Using discovery learning model to improve students' activities and learning outcomes in vocational high school. *Vidya Karya*, *39*(1), 30-37.

## INTRODUCTION

A nation's development can be judged by how well-qualified its people and resources are (Dacholfany, 2017; Widiansyah, 2018). Education is one way to raise the quality of human resources since a child can develop into a good and respectable person (Chotimah & Nisa, 2019; Haderani, 2018). As a result, all children must complete nine years of compulsory school and have access to the same educational opportunities (Sirait, 2017).

Every child is unique (Herawati, 2018), meaning they have various personality characteristics, habits, and learning models that vary from one individual to another. Therefore, a teacher should use a variety of learning models (Sukarelawan et al., 2024; Sulfemi, 2019) and not just fixate on a particular learning model.

As with the students in class XII ATR (*Agribisnis Ternak Ruminansia*) 1 SMKN 1 Cangkringan in the subject of Dairy Ruminant Livestock Agribusiness, the material applies to the milking of dairy ruminants after the teacher carries out the learning and carries out tests on the material for milking tools and materials. The test results are analyzed, and the completeness of student learning outcomes in the class is still low. Namely, 30%, or as many as 21 out of 30 students, have yet to reach the Minimum

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Completeness Criteria (*Kriteria Ketuntasan Minimal/* KKM).

Many components influence the success of the learning process, for example, learning methods (Windaresa & Suwendra, 2022) or learning models (Sriyanto, 2022). Teachers who choose the right learning model by adjusting the learning material to be taught will be able to attract the attention of students to be active in participating in the learning process (Asiyah et al., 2021) and try to explore various information and develop potential in order to achieve learning goals.

We require a cutting-edge learning model to enhance student learning outcomes in light of these issues. Applying the Discovery Learning learning model is another strategy that may be used to enhance student learning outcomes in Dairy Ruminant Livestock Agribusiness, particularly the information for milking dairy ruminants. This research aims to deploy the Discovery Model in vocational high schools to boost student learning activities and outcomes.

## METHOD

This study employs Kemmis and McTaggart's classroom action research methodology (Kemmis & McTaggart, 1988; Muthaharoh & Sukarelawan, 2023), as depicted in Figure 1.

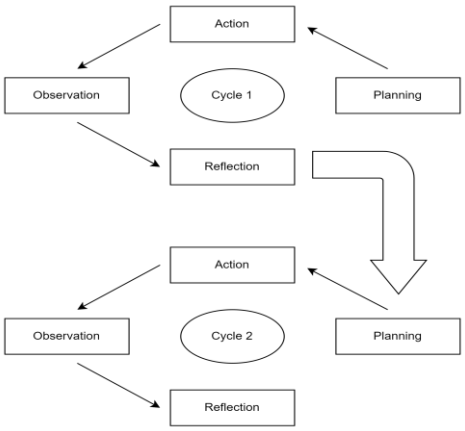


Figure 1 Kemmis & Mc.Taggart action research cycle

Three meetings are held throughout each of the two activity cycles. At SMK Negeri 1 Cangkringan in Yogyakarta, the study was carried out. Thirty XII ATR 1 students took part in the study as research respondents.

The classroom action research process consists of preliminary and action research stages. Conducting initial observations to identify problems related to activities and learning outcomes, analyzing their causes, collaborating with subject teachers to choose problem-solving strategies using the Discovery learning model in ATR learning, as well as preparing learning materials, observations, and evaluation tools were just some of the initial tasks involved. Once these tasks are completed, cycles one and two are prepared by implementing the lesson plan utilizing the discovery learning strategy. The subsequent phases include monitoring and evaluation, analysis and reflection, data analysis and interpretation, and assessing success indicators.

Observation sheets and test sheets are the instruments used in this study. The observation sheet comprises five questions designed to evaluate student activity, and its format is presented in Table 1. Student activity scores were assessed using a 4-point Likert scale, ranging from 1 (poor) to 4 (very good). The test instrument, consisting of a five-question essay, evaluates students' knowledge of dairy ruminants. The grid of exam questions used can be seen in Table 1.

Table 1 Student activity instrument format

| No | Student's Name | Activity | | | | | Total score |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | |
| 1 | | | | | | | |
| 2 | | | | | | | |
| … | | | | | | | |

Activity Description: 1 = Courage to ask questions, 2 = Answer questions, 3 = Student-teacher interaction, 4. Student-student interaction, 5. Student attention

Table 2 Instruments for achieving learning outcomes

| No | Indicator | Number of Questions |
|---|---|---|
| 1 | Mention various kinds of milking machines | 1 |
| 2 | Mention the advantages of milking machines | 1 |
| 3 | Using a herringbone milking machine | 1 |
| 4 | Using a rotary milking machine | 1 |
| 5 | Using a portable milking machine | 1 |

Activity data and student learning outcomes were examined using percentage analysis. Students who achieve a KKM score of 75 are considered to have passed. The study will likely be effective if more than 85% of the student population achieves KKM scores. Following the learning process, an assessment is conducted to determine learning outcomes. A student's activity level is deemed successful if it exceeds 65% of the total number of students enrolled in the class.

Table 3 Criteria for student learning activities (Oktova et al., 2024)

| No | Categories | Student activity score |
|---|---|---|
| 1 | Not enough | 5-8 |
| 2 | Enough | 9-12 |
| 3 | Good | 13-16 |
| 4 | Very good | 17-20 |

## RESULTS AND DISCUSSION

Results constitute a significant section of scientific articles and encompass final results without the data analysis process and results from hypothesis testing. Results can be presented using tables or graphs to elucidate the findings.

*Cycle 1*

The results of the analysis of student learning outcomes are summarized in Table 4.

Table 4 Analysis of student learning outcomes in cycle 1

| No | Categories | Score |
|---|---|---|
| 1 | The maximum score | 90 |
| 2 | The minimum score | 50 |
| 3 | The number of students | 30 |
| 4 | Number of students who completed the study (KKM) | 18 |
| 5 | The number of students who have not finished learning | 12 |
| 6 | The average value of class learning outcomes | 71.5 |
| 7 | Percentage of completeness class | 60% |

In cycle 1, the highest score was 90, and the lowest was 50. Of the 30 students, 18 had completed their studies, while 12 still needed to. Therefore, the percentage of completed students is 60%, and those who have not completed is 40%. The average class learning outcome is 71.5, with a class completion rate of 60%.

The results of student activity can be seen in Table 5.

Table 5 Student activity score-category in cycle 1

| No | Categories | The number of students | % |
|---|---|---|---|
| 1 | Not enough | 10 | 33.3% |
| 2 | Enough | 20 | 66.7% |
| 3 | Good | - | - |
| 4 | Very good | - | - |
| | Total | 30 | 100% |

Observing student activity in cycle one revealed that 30 students fell into the “less” category, comprising 10 students (33.3%), while 20 students (66.7%) were in the “sufficient” category. This distribution indicates that the activity of class XII ATR 1 students in cycle one still needs improvement, as no students met the "good" category criteria.

Following the observation stage, reflection on student learning outcomes was conducted. The observations indicated that the criteria for success in cycle one had not been met. Student

learning mastery had not reached 85% of the total students, and the proportion of students with activity levels in the "good" category was below 65%. Based on the reflection results from cycle 1, it was evident that the criteria for research success had not been achieved, necessitating the continuation of cycle 2.

Cycle 2

The analysis of student learning outcomes is summarized in Table 6.

Table 6 Analysis of student learning outcomes in cycle 2

| No | Categories | Score |
|---|---|---|
| 1 | The maximum score | 100 |
| 2 | The minimum score | 70 |
| 3 | The number of students | 30 |
| 4 | Number of students complete study (KKM) | 26 |
| 5 | The number of students has not finished learning | 4 |
| 6 | The average value of class learning outcomes | 85 |
| 7 | Percentage of completeness class | 86.7% |

In cycle 2, the highest score was 100, and the lowest was 70. The number of students who completed their studies was 26 students, and four still needed to complete their studies. The average value of class learning outcomes is 85, and the percentage of class completeness is 86.67%.

The results of observing student activity can be seen in Table 7.

Table 7 Student activity score-category in cycle 2

| No | Categories | The number of students | % |
|---|---|---|---|
| 1 | Not enough | - | - |
| 2 | Enough | - | - |
| 3 | Good | 14 | 46.7% |
| 4 | Very good | 16 | 53.3% |
| | Total | 30 | 100% |

Observing student activity in cycle 2 revealed that 14 students (46.7%) were in a good category, and 16 (53.3%) out of 30 were in the very good category. This distribution indicates high activity levels among class XII ATR 1 students in cycle 2, as no students fell into the "less" or "sufficient" categories.

After going through the observation stage, reflection was carried out on student learning outcomes. The observations' results show that the criteria for success in action in cycle 2 have been achieved. Student learning mastery has reached 85% of students, and student activity in the good category has reached 65%. Based on the reflection results from cycle 2, it was evident that the research success criteria had been met, eliminating the need for further cycles.

The completion of two cycles of classroom action research through Discovery Learning aimed to enhance student learning activities and outcomes at SMK Negeri 1 Cangkringan. Analysis of student learning outcomes showed improvements, with increases in the highest and lowest scores achieved by students. The highest score rose from 90 to 100, and the lowest increased from 50 to 70. Additionally, there was an increase in the number of students who achieved learning mastery, from 18 to 26, constituting 27%. Consequently, there was an increase in the average classical learning outcomes by 13.5 points, from 71.5 to 85. These findings align with those reported by other studies (Puspitasari & Nurhayati, 2019; Sangeroki et al., 2022; Setiyowati & Panggayuh, 2019).

Comparisons were also made regarding student learning activity levels. The number of students with an activity level in the Good category increased by 46.7%, and the Very Good category increased by 53.3%. At the same time, there was a decrease in the number of students who had a level of activity in the less category by 33.3%, and students in the Fair category decreased by 66.7%. This study is in line with the findings

reported by other studies (Fakhriza, 2022; Pramono & Us, 2018; Suardi et al., 2022).

The discovery learning model can increase student activity because this method has advantages. For example: 1) Helping students to develop, prepare, and master skills in cognitive processes; 2) Learners acquire knowledge individually so that it can be understood and settles in their minds; 3) Can generate motivation and enthusiasm for learning students to study harder; 4) Providing opportunities to develop and advance according to individual abilities and interests; 5) Strengthen and increase self-confidence with self-discovery processes because learning is centered on students with a very limited teacher's role.

The Discovery Learning model's application can not only enhance student activity and learning outcomes but also improve critical thinking skills (Lieung, 2019; Putra & Amalia, 2020), Mathematical Literacy Ability (Pernandes & Asmara, 2020), Problem-Solving Ability (Hendri & Kenedi, 2018), motivation (Adeninawaty et al., 2018; Susmiati, 2020), self-confidence (Suryanti, 2017), Creative Thinking (Juniarso, 2020).

Moreover, the effectiveness of applying the Discovery Learning model spans various educational levels, from elementary school (Ana, 2018; Prasetyo & Abduh, 2021) to junior high school (Ardianto et al., 2019; Inde et al., 2020), senior high school (Atika et al., 2018; Ratnawati & Sulisworo, 2021), and even universities (Batubara, 2020; Heryani & Setialesmana, 2017).

## CONCLUSION

The research results and discussions demonstrate that the Discovery Learning approach has proven effective in increasing student activity and learning outcomes in state vocational high schools. Through two action research cycles, there was a significant increase in student activity and learning outcomes, reflected in increased student test scores and graduation rates. These findings underscore the effectiveness of the Discovery Learning approach in enriching the learning experience of vocational high school students.

In addition, it is essential to note that the application of Discovery Learning not only influences student learning outcomes but can also provide other positive impacts, such as increasing critical thinking skills, mathematical literacy, problem-solving abilities, motivation, and self-confidence. These findings indicate that this learning approach can enrich students' learning experience. However, this research has several limitations, including the scope of learning subjects being limited to one school and the use of classroom action research methods, which can produce subjective bias. Therefore, future research can expand the scope of learning subjects and use more diverse research methods to gain a deeper understanding of the effectiveness of the Discovery Learning approach in a broader educational context.

## REFERENCES

Adeninawaty, D., Soe'oed, R., & Ridhani, A. (2018). Penerapan model pembelajaran discovery learning strategi think talk write dalam meningkatkan motivasi dan hasil belajar menulis teks ulasan kelas viii smP. *Diglosia: Jurnal Kajian Bahasa, Sastra, Dan Pengajarannya*, *1*(2), 75–88. https://doi.org/10.30872/diglosia.v1i2.11

Ana, N. Y. (2018). Penggunaan model pembelajaran discovery learning dalam peningkatan hasil belajaran siswa di sekolah dasar. *Jurnal Imiah Pendidikan Dan Pembelajaran*, *2*(1), 21–28. https://doi.org/10.23887/jipp.v2i1.13

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Ardianto, A., Mulyono, D., & Handayani, S. (2019). Pengaruh model discovery learning terhadap hasil belajar matematika siswa kelas vii smp. *Jurnal Inovasi Matematika*, *1*(1), 31–37. https://doi.org/10.35438/inomatika.v1i1.136

Asiyah, N., Prihandono, T., & Yushardi. (2021). Peningkatan aktivitas dan ketuntasan hasil belajar fisika dengan model pembelajaran kooperatif tipe stad disertai media animasi 3d. *Jurnal Pembelajaran Fisika*, *1*(2), 178–184.

Atika, D., Nuswowati, M., & Nurhayati, S. (2018). Pengaruh metode discovery learning berbantuan video terhadap hasil belajar kimia siswa sma. *Jurnal Inovasi Pendidikan Kimia*, *12*(2), 2149–2158. https://doi.org/10.15294/jipk.v12i2.15474

Batubara, I. H. (2020). Pengaruh model pembelajaran guided discovery learning terhadap hasil belajar pengembangan silabus pembelajaran matematika pada masa pandemic covid 19. *Jurnal Penelitian, Pendidikan Dan Pengajaran: JPPP*, *1*(2), 13. https://doi.org/10.30596/jppp.v1i2.4948

Chotimah, C., & Nisa, K. (2019). Peran manajemen sumber daya manusia dalam meningkatkan mutu pendidikan di ma bertaraf internasional amanatul ummah pacet. *Prosiding Seminar Nasional Multidisiplin*, 125–128. https://ejournal.unwaha.ac.id/index.php/snami/article/view/679

Dacholfany, M. I. (2017). Inisiasi strategi manajemen lembaga pendidikan islam dalam meningkatkan mutu sumber daya manusia islami di indonesia dalam menghadapi era globalisasi. *At-Tajdid*, *1*(1), 1–13. http://ojs.ummetro.ac.id/index.php/attajdid/article/view/330/264

Fakhriza, H. (2022). Penerapan model pembelajaran discovery learning untuk meningkatkan hasil belajar siswa kelas x tkro di smkn 2 amuntai. *Pendidikan Profesi Guru (PPG) Untuk Merealisasikan Guru Profesional Di Era Sosiety 5.0*, 267–284. https://e-proceedings.iain-palangkaraya.ac.id/index.php/PPGAI/article/view/848

Haderani, H. (2018). Tinjauan Filosofis tentang fungsi pendidikan dalam hidup manusia. *Jurnal Tarbiyah : Jurnal Ilmiah Kependidikan*, *7*(1), 41–49. https://doi.org/10.18592/tarbiyah.v7i1.2103

Hendri, S., & Kenedi, A. K. (2018). Pengembangan perangkat pembelajaran matematika berbasis discovery learning untuk meningkatkan kemampuan pemecahan masalah siswa kelas viii smp. *Jurnal Inspirasi Pendidikan*, *8*(2), 10–24. https://doi.org/10.21067/jip.v8i2.2635

Herawati, H. (2018). Memahami proses belajar anak. *Bunayya : Jurnal Pendidikan Anak*, *4*(1), 27–48. https://doi.org/10.22373/bunayya.v4i1.4515

Heryani, Y., & Setialesmana, D. (2017). Kontribusi penggunaan model discovery learning terhadap peningkatkan kemampuan koneksi dan komunikasi matematik pada mahasiswa program studi pendidikan matematika angkatan 2015-2016. *Jurnal Siliwangi: Seri Pendidikan*, *3*(1), 190–196. https://doi.org/10.37058/jspendidikan.v3i1.189

Inde, K. H., Kaleka, M. B. U., & Ilyas, I. (2020). The effect of discovery learning model on learning outcome of grade-vii students of Smpn 5 Nangapanda. *Journal of Science*

*Education Research*, *4*(1), 11–14. https://doi.org/10.21831/jser.v4i1.34233

Juniarso, T. (2020). Model discovery learning terhadap kemampuan berpikir kreatif mahasiswa. *ELSE (Elementary School Education Journal) : Jurnal Pendidikan Dan Pembelajaran Sekolah Dasar*, *4*(1), 36. https://doi.org/10.30651/else.v4i1.4197

Kemmis, S., & McTaggart, R. (1988). *The action research planner*. Deakin University Press.

Lieung, K. W. (2019). Pengaruh model discovery learning terhadap keterampilan berpikir kritis siswa sekolah dasar. *Musamus Journal of Primary Education*, *1*(2), 073–082. https://doi.org/10.35724/musjpe.v1i2.1465

Muthaharoh, S., & Sukarelawan, M. I. (2023). Improving high school students' research skills through light diffraction experiments using the problem-based learning model. *Jurnal Riset Dan Kajian Pendidikan Fisika*, *10*(2), 64–71. https://doi.org/10.12928/jrkpf.v10i2.566

Oktova, R., Azizah, S. N., & Sukarelawan, M. I. (2024). Pengembangan modul pembelajaran Peluruhan Radioaktif untuk mata kuliah Fisika Atom dan Inti pada Program Studi S-1 Pendidikan Fisika. *Berkala Fisika Indonesia : Jurnal Ilmiah Fisika, Pembelajaran Dan Aplikasinya*, *15*(1), 1–8. https://doi.org/10.12928/bfi-jifpa.v15i1.28232

Pernandes, O., & Asmara, A. (2020). Kemampuan literasi matematis melalui model discovery learning di smp. *Jurnal Pendidikan Matematika Raflesia*, *5*(1), 140–147. https://doi.org/10.33369/jpmr.v5i1.10724

Pramono, D. S., & Us, T. (2018). Penggunaan metode discovery learning untuk meningkatkan keaktifan dan kompetensi siswa pada pelajaran perawatan kelistrikan kendaraan ringan. *Jurnal Pendidikan Teknik Otomotif*, *24*(2), 108–118. https://journal.student.uny.ac.id/index.php/otomotif-s1/article/view/12225/11779

Prasetyo, A. D., & Abduh, M. (2021). Peningkatan keaktifan belajar siswa melalui model discovery learning di sekolah dasar. *Jurnal Basicedu*, *5*(4), 1717–1724. https://doi.org/10.31004/basicedu.v5i4.991

Puspitasari, Y., & Nurhayati, S. (2019). Pengaruh model pembelajaran discovery learning terhadap hasil belajar siswa. *JURNAL PENDIDIKAN DAN KEWIRAUSAHAAN*, *7*(1), 93–108. https://doi.org/10.47668/pkwu.v7i1.20

Putra, E. D., & Amalia, R. (2020). Upaya meningkatkan kemampuan berpikir kritis mahasiswa melalui pembelajaran discovery learning berbasis assessment learning. *Journal of Education and Learning Mathematics Research (JELMaR)*, *1*(1), 57–64. https://doi.org/10.37303/jelmar.v1i1.17

Ratnawati, H., & Sulisworo, D. (2021). Efektivitas e-learning berbasis lms google classroom dengan strategi discovery learning materi fluida statis sma. *Jurnal Penelitian Pendidikan Fisika*, *6*(2), 137–145.

Sangeroki, N. G., Kaparang, D. R., & Rompas, P. T. D. (2022). Penerapan metode pembelajaran discovery learning untuk meningkatkan hasil belajar dasar desain grafis siswa smk. *Edutik : Jurnal Pendidikan Teknologi Informasi Dan Komunikasi*, *2*(3), 319–331. http://ejurnal.unima.ac.id/index.php/edutik/article/view/5254

Setiyowati, P., & Panggayuh, V. (2019). Pangaruh model pembelajaran discovery learning menggunakan video scribe sparkol terhadap hasil belajar siswa smk perwari tulungagung tahun ajaran 2017/2018. *JOEICT (Jurnal OfEducation and Information Communication Technology)*, *3*(1), 12–21. https://doi.org/10.29100/joeict.v3i1.694.g521

Sirait, S. C. (2017). Tanggung Jawab pemerintah untuk memberikan pendidikan kepada anak terlantar dalam perspektif undang-undang perlindungan anak. *DE LEGA LATA: Jurnal Ilmu Hukum*, *2*(1), 158–182. https://doi.org/10.30596%2Fdll.v2i1.1146

Sriyanto. (2022). Improving students' physics learning outcomes through the snowball throwing type of cooperative learning model. *Berkala Fisika Indonesia : Jurnal Ilmiah Fisika, Pembelajaran Dan Aplikasinya*, *13*(2), 65–74. https://doi.org/10.12928/bfi-jifpa.v13i2.23720

Suardi, S., Wahyuni, M. S., & Harianto, H. (2022). Peningkatan keaktifan belajar siswa dengan aplikasi mentimeter.com dalam pembelajaran daring model discovery learning pada siswa kelas x jurusan otkp smkn 2 simpang empat tanah bumbu tahun pelajaran 2021/2022. *Jurnal MediaTIK : Jurnal Media Pendidikan Teknik Informatika Dan Komputer*, *5*(1), 28–34. https://doi.org/10.26858/jmtik.v5i1.31358

Sukarelawan, M. I., Indratno, T. K., & Ayu, S. M. (2024). *N-gain vs stacking : analisis perubahan abilitas peserta didik dalam desain one group pretest-posttest*. Suryacahya.

Sulfemi, W. B. (2019). Model pembelajaran kooperatif mind mapping berbantu audio visual dalam meningkatkan minat, motivasi dan hasil belajar ips. *Jurnal PIPSI (Jurnal Pendidikan IPS Indonesia)*, *4*(1), 13. https://doi.org/10.26737/jpipsi.v4i1.1204

Suryanti, S. (2017). Peningkatan kepercayaan diri dan kemampuan pemecahan masalah mahasiswa pada mata kuliah matematika diskrit melalui discovery learning. *DIDAKTIKA : Jurnal Pemikiran Pendidikan*, *22*(1), 64–73. http://journal.umg.ac.id/index.php/didaktika/article/view/148

Susmiati, E. (2020). Meningkatkan motivasi belajar bahasa indonesia melalui penerapan model discovery learning dan media video dalam kondisi pandemi covid-19 bagi siswa smpn 2 gangga. *Jurnal Paedagogy*, *7*(3), 210. https://doi.org/10.33394/jp.v7i3.2732

Widiansyah, A. (2018). Peranan sumber daya pendidikan sebagai faktor penentu dalam manajemen sistem pendidikan. *Cakrawala*, *18*(2), 229–234. https://doi.org/10.31294/jc.v18i2.4347

Windaresa, L. P., & Suwendra, I. W. (2022). Penerapan metode explicit instruction untuk meningkatkan aktivitas dan prestasi belajar pendidikan agama hindu dan budi pekerti. *Jurnal Widya Sastra Pendidikan Agama Hindu*, *4*(2), 120–126. https://doi.org/10.36663/wspah.v4i2.285