

THE IMPACT OF THE FLIPPED CLASSROOM MODEL ON STUDENT ENGAGEMENT AND ACADEMIC ACHIEVEMENT: A SYSTEMATIC REVIEW OF THE LITERATURE

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Abstract

This study aims to explore the impact of the flipped classroom model on student engagement and academic achievement through a systematic literature review. The flipped classroom model, which requires students to study materials independently outside of class and use class time for interactive activities, has become a much-discussed pedagogical innovation. Through the analysis of various relevant studies, the findings of this research show that flipped classroom significantly increases students' engagement in the learning process and has a positive impact on their academic achievement. Students feel more motivated and prepared to join class discussions, understand the material more deeply, and show improvements in academic outcomes. This conclusion highlights the importance of implementing the flipped classroom model as an effective strategy in improving education quality and student learning performance.

Keywords: Flipped Classroom Learning, Student Engagement, Academic Achievement.

Introduction

In the era of globalisation and rapid development of information technology, education faces new challenges to adopt more innovative and effective learning methods. One of the learning models that has received increasing attention is the Flipped Classroom (Merlin-Knoblich et al., 2022). Flipped Classroom is an innovative learning model that reverses the traditional classroom paradigm; learning materials are delivered to students outside of class hours via video, text or other online materials, while in-class time is utilised for more interactive activities, such as discussions, problem solving and collaborative projects. This approach aims to increase student engagement and understanding by utilising face-to-face time more effectively to deepen knowledge and application of the material learned independently (Yusuf & Taiye, 2021).

This learning model reverses the tradition of conventional learning by delivering learning content outside the classroom through videos or online materials, while in-class time is used for interactive activities such as discussion, practice and problem-solving (Kazu & Yalçın, 2022).

The flipped classroom approach is believed to increase student engagement in the learning process. Student engagement is a crucial factor in determining educational

success, as engaged students tend to have higher learning motivation, active participation, and resilience in facing learning challenges. Student engagement includes emotional, cognitive and behavioural aspects, all of which are very important in shaping a positive learning experience (Lai, 2021).

The increased use of the Flipped Classroom learning model has been seen significantly in recent years, especially in colleges and high schools. This is fuelled by technological advances that allow easy access to online learning materials, as well as the need for more flexible and efficient teaching methods. With basic learning materials independently accessed by students at home, teachers or lecturers can focus class sessions on activities that encourage critical thinking, collaboration and hands-on interaction. This not only increases student engagement, but also allows teachers to provide more personalised and timely assistance and feedback (Igcasama et al., 2023).

In addition, the Flipped Classroom model shows positive results in creating a more inclusive and adaptive learning environment. Students can learn at their own pace, repeat material they don't understand, and come to class with specific questions. In the era of the COVID-19 pandemic, this model is increasingly relevant as it supports distance and hybrid learning (a combination of online and face-to-face). Many educators report that students appear more prepared and participatory during class sessions, and they also become more independent in managing their time and learning materials. With these benefits, it is not surprising that the flipped classroom model is increasingly being adopted in various levels of education (Satparam & Apps, 2022).

With that, student academic achievement is also a major focus in evaluating the effectiveness of a learning model. Academic achievement is often measured through test results, grades and other academic achievements that reflect students' understanding of the subject matter and ability to apply it. Learning models that can improve academic achievement are highly sought after by educators and education researchers (Zen & Ariani, 2022).

Several studies have shown that Flipped Classroom has the potential to improve student engagement and academic achievement. However, the results of these studies are still varied and depend on the context, subject matter, and implementation of the model (Merugu et al., 2022). Therefore, a systematic review of the existing literature is needed to gain a more comprehensive picture of the impact of Flipped Classroom.

This research systematically reviews the existing literature related to the impact of the Flipped Classroom learning model on student engagement and academic achievement.

Research Methods

The study in this research uses the literature method. Literature research method is a technique used to collect, analyse, and synthesise information from various written sources relevant to a particular research topic. This process involves identifying

reliable sources such as books, academic journals, articles, research reports, and other documents to gain a comprehensive understanding of the subject under study. The main purpose is to review the development of existing knowledge, identify research gaps, and build a strong theoretical framework for further research. Literature research has an important role in ensuring that new studies are based on mature scientific foundations, allowing researchers to propose hypotheses that are more informed and relevant in the context of their research. (Firman, 2018); (Suyitno, 2021).

Results and Discussion

The Impact of Flipped Classroom on Student Engagement

The Flipped Classroom learning model has a significant impact on student engagement in various aspects. Firstly, it encourages students to be more independent in their learning process. By requiring students to study basic materials outside of class through videos, articles or other online learning resources, students are more proactive and responsive to the material being learnt. It also allows them to learn at their own pace and learning style, so they can better understand the material before it is reviewed in class discussions (Rajput et al., 2022); (Sitopu et al., 2024); (Guna et al., 2024); (Fawait et al., 2024).

Secondly, during class sessions, the time usually spent on lectures can be allocated to more interactive activities such as group discussions, problem solving, and collaborative projects. Thus, students get greater opportunities to actively participate, ask questions, and discuss with classmates as well as the teacher. This not only increases direct engagement in the classroom but also encourages the development of important social and collaborative skills (Yılmaz, 2022).

Thirdly, with learning focusing more on hands-on activities and practical applications, students tend to be more motivated and enthusiastic about learning. They can see the relevance and practical application of what they are learning, which is often difficult to achieve with traditional, more passive learning methods. This increased motivation, in turn, can be reflected in improved academic performance and a deeper understanding of the subject matter (Oh et al., 2022); (Syakhrani & Aslan, 2024); (Judijanto et al., 2024).

Finally, Flipped Classroom also allows teachers to provide more personalised and timely feedback. During interactive class sessions, teachers can observe and assess students' understanding directly, as well as provide tailor-made guidance according to individual needs. This helps to ensure that each student gets the attention needed to overcome their difficulties and encourage them to improve. With the combination of these various factors, Flipped Classroom successfully creates a more dynamic and engaged learning environment, which has a positive impact on student engagement and achievement (Huang et al., 2022).

The Impact of Flipped Classroom on Academic Achievement

Academic achievement is a measure that shows the level of success or achievement of a student in the field of education, which is usually assessed through various indicators such as test scores, cumulative grade point average (GPA), class rank, academic awards, and achievements in extracurricular activities related to the field of study (Polat & Karabatak, 2022). Academic achievement not only reflects a student's intellectual ability to understand and apply subject matter, but also includes other factors such as study skills, self-discipline, motivation, and ability to manage time. Evaluation of academic achievement is often used by educational institutions to assess student progress, provide feedback, and establish effective curriculum and teaching strategies (Sartika & Fransiska, 2024); (Iksal et al., 2024).

Measurement methods are approaches or techniques used to collect, analyse, and evaluate data or information in order to assess performance, conditions, or certain variables. In the context of research or evaluation, measurement methods can include the use of instruments such as questionnaires, tests, interviews, observations, and technological devices (Jr et al., 2023). This method aims to obtain accurate, valid, and reliable data so that the measurement results can be used for analysis, decision-making, and planning purposes. The selection of the right measurement method is very important to ensure that the data collected truly reflects what is intended to be measured, so that the final results are reliable and have high use value (Lo & Hew, 2021); (Irwan et al., 2024); (Juliani & Aslan, 2024).

Academic achievement is influenced by various interrelated factors, both from within the individual and from the surrounding environment. Internal factors include cognitive abilities, motivation, interest, self-discipline, and learning skills of a student (Velasco et al., 2021). Meanwhile, external factors include teaching quality, family environment, social support, school facilities, and the curriculum implemented. Emotional aspects such as self-confidence and stress levels also play an important role in influencing academic achievement. In addition, effective learning practices, educational policies, and economic and cultural conditions can also influence a student's academic success. The complex interaction between these factors determines the extent to which students can achieve and maintain high academic achievement (Almagro et al., 2023).

Flipped Classroom is an innovative teaching method that reverses the traditional process of learning, where students learn the subject matter outside the classroom through videos or reading materials, while in-class time is used for discussion, question and answer, and practical application of concepts. This method has a significant impact on academic achievement in various ways. Firstly, the flipped classroom allows students to study at their own pace at home, providing an opportunity for them to understand the material in depth before actively participating in classroom activities. Students can

replay video lessons as needed, reducing pressure and facilitating better individual understanding, which can ultimately improve academic outcomes (Onyema et al., 2021).

In the classroom, the flipped classroom provides opportunities for increased interaction and collaboration between students and teachers. As classroom time is utilised for activities that involve discussion, problem-solving and hands-on application, students are encouraged to think critically and apply the knowledge they have acquired. This active interaction increases student engagement and motivation, which are important factors in improving academic achievement. Teachers can also give more attention to students who need extra help, and provide more personalised and timely feedback (Polat & Karabatak, 2022).

The flipped classroom also develops independent learning skills and responsibility in students, which are important in long-term academic achievement. With this model, students learn to manage their time and seek additional learning resources if needed, which helps them become more independent and motivated learners. These skills are not only beneficial in the academic context but also prepare them for future challenges in higher education or work environments (Debbağ & Yıldız, 2021). Therefore, these changes have the potential to result in improvements in overall academic outcomes.

However, the success of flipped classroom implementation in improving academic performance depends on a number of factors, including the quality of materials provided, the readiness of technology, and the adaptability of both students and teachers to new teaching methods. Challenges such as unequal access to technology and barriers to acceptance of new methods can affect its effectiveness (Raju et al., 2021). Thus, to achieve the expected increase in academic achievement, schools need to ensure adequate infrastructure and support, as well as provide training to teachers to design and manage effective flipped classrooms.

Integration of Student Engagement and Academic Achievement

The integration of student engagement with academic achievement is one of the main focuses in modern education as student engagement is often considered an important indicator of academic success. Student engagement refers to the extent to which students actively participate in learning activities, emotionally, cognitively and behaviourally. When students are actively engaged, they tend to be more focused and motivated to achieve better results. This is important because engaged students tend to show greater interest in the subject matter, largely due to a sense of belonging and perceived relevance in their learning context (Querido et al., 2023).

Student engagement can materialise through a variety of methods, including direct interaction in class, participation in discussions, cooperation in groups, and involvement in projects or assignments. In this context, teachers play a critical role by creating learning environments that encourage such engagement. They can use a

variety of strategies, such as project-based learning or case studies, which link teaching materials to real-world situations, thus making learning more meaningful and interesting for students. With higher engagement, students are more motivated to achieve better academic performance and have a deeper understanding of the teaching materials (Huang et al., 2022).

Furthermore, the integration of students' engagement in learning not only has an impact on their academic achievement, but also on the development of social and emotional skills. Engaged students tend to have better abilities in co-operating, communicating effectively and resolving conflicts. These skills are valuable not only in academic contexts but also in their daily lives and future careers. In other words, encouraging student engagement has broader long-term benefits than simply improving test scores or academic grades (Nhac, 2021).

However, to optimise the integration of student engagement and academic achievement, schools and educators need to consider various challenges that may arise. For instance, not all students can be engaged in the same way, given individual differences in learning styles, interests and readiness. Therefore, a personalised approach may be required to tailor learning methods that suit each student's unique needs and characteristics. By providing personalised and adaptive attention, educators can more effectively facilitate engagement which ultimately positively impacts student academic outcomes (Samaila et al., 2021).

Furthermore, it is important for educators to continuously evaluate and adapt their teaching strategies to remain relevant and effective in improving student engagement. Educational technology, such as the use of online learning platforms and interactive tools, can be one of the solutions to improve student engagement. These technologies can provide a more dynamic and interactive learning experience, facilitate collaboration, and enable faster and more measurable feedback. By utilising technology, educators can create engaging and flexible learning environments that encourage active student engagement (Cao & Swada, 2021).

Meanwhile, parental and community involvement also plays an important role in supporting student engagement and academic achievement. Collaboration between home and school can help create alignment in educational goals and provide the support students need at home. Parental involvement in school activities and regular monitoring of children's learning progress can strengthen student morale and motivation. In addition, communities that care about education can also provide a wider range of resources and learning opportunities for students (Xu et al., 2021).

In a broader perspective, education policies that support and facilitate student engagement are also crucial. Governments and policymakers should focus on providing adequate funding, teacher training and programmes designed to improve overall student engagement. For example, professional development programmes for teachers that focus on effective and inclusive teaching strategies can help create more

engaging and challenging learning spaces for students. Thus, comprehensive and systematic policies are needed to create optimal learning environments (Pasaribu & Wulandari, 2021).

Thus, the integration of student engagement with academic achievement is a key element in education that impacts not only on academic achievement, but also on students' social and emotional development. By enhancing student engagement through various adaptive and relevant teaching methods, utilising educational technology, and engaging parents and communities, educators can create a supportive and effective learning environment. In addition, support from adequate education policies and professional development programmes for teachers also play an important role in achieving this goal. Overall, a holistic and collaborative approach to improving student engagement can result in positive long-term impacts on students' academic achievement and personal development.

Conclusion

The flipped classroom model has a significant positive impact on student engagement and academic achievement. It allows students to explore learning materials independently outside of class through videos and online resources, allowing class time to be utilised for collaborative activities, in-depth discussions and problem solving. This approach not only increases students' engagement in the learning process by making them more active and responsible, but also supports deeper understanding and practical application of the material learnt. As a result, students show improvements in learning motivation and academic outcomes.

In addition, the flipped classroom model also provides greater flexibility of learning time, allowing students to learn according to their own pace and learning style. Through the literature review, it was found that students feel more motivated and prepared to participate in class discussions because they have learnt the material beforehand. It also reduces test and assessment anxiety, as students have the opportunity to clarify and reinforce their understanding more effectively during class sessions. Thus, the flipped classroom model not only enriches the learning experience but also improves students' overall engagement and academic achievement.

References

- Almagro, R., Montepio, H., & ... (2023). E-Learning Educational Atmosphere and Technology Integration as Predictors of Students' Engagement: The Case of Agribusiness Program. ... of Students' Engagement ..., Query date: 2024-10-27 05:52:43. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4892466
- Cao, L., & Swada, J. (2021). Effects of implementing flipped classroom elements and dynamic in-class discussion on student performance. *Journal of Food Science Education*, Query date: 2024-10-27 05:52:43. <https://doi.org/10.1111/1541-4329.12211>

- Debbağ, M., & Yıldız, S. (2021). Effect of the flipped classroom model on academic achievement and motivation in teacher education. *Education and Information Technologies*, Query date: 2024-10-27 05:52:43. <https://doi.org/10.1007/s10639-020-10395-x>
- Fawait, A., Siyeh, W. F., & Aslan, A. (2024). ISLAMIC EDUCATION MANAGEMENT STRATEGIES IN IMPROVING THE QUALITY OF LEARNING IN MADRASAS. *Indonesian Journal of Education (INJOE)*, 4(2), 657~665-657~665.
- Firman, F.-. (2018). PENELITIAN KUALITATIF DAN KUANTITATIF. Query date: 2024-05-25 20:59:55. <https://doi.org/10.31227/osf.io/4nq5e>
- Guna, B. W. K., Yuwantiningrum, S. E., Firmansyah, S, M. D. A., & Aslan. (2024). Building Morality and Ethics Through Islamic Religious Education In Schools. *IJGIE (International Journal of Graduate of Islamic Education)*, 5(1), 14–24. <https://doi.org/10.37567/ijgie.v5i1.2685>
- Huang, Y., Silitonga, L., & Wu, T. (2022). Applying a business simulation game in a flipped classroom to enhance engagement, learning achievement, and higher-order thinking skills. *Computers & Education*, Query date: 2024-10-27 05:52:43. <https://www.sciencedirect.com/science/article/pii/S0360131522000653>
- Igcasama, R., Amante, E., Benigay, D., & ... (2023). A Paradigm Shift in Education: Impact of Flipped Classrooms on High School Mathematics Conceptual Mastery. ... *Journal of Education ...*, Query date: 2024-10-27 05:52:43. <https://multijournals.org/index.php/excellencia-imje/article/view/214>
- Iksal, I., Hayani, R. A., & Aslan, A. (2024). STRENGTHENING CHARACTER EDUCATION AS A RESPONSE TO THE CHALLENGES OF THE TIMES. *Indonesian Journal of Education (INJOE)*, 4(3), 761~774-761~774.
- Irwan, I., Arnadi, A., & Aslan, A. (2024). DEVELOPING CRITICAL THINKING SKILLS OF PRIMARY SCHOOL STUDENTS THROUGH INDEPENDENT CURRICULUM LEARNING. *Indonesian Journal of Education (INJOE)*, 4(3), 788~803-788~803.
- Jr, L. L., Chan, A., Sabarillo, N., & ... (2023). Design, implementation, and evaluation of an online flipped classroom with collaborative learning model in an undergraduate chemical engineering course. *Education for Chemical ...*, Query date: 2024-10-27 05:52:43. <https://www.sciencedirect.com/science/article/pii/S1749772823000088>
- Judijanto, L., Shodiqin, R., & Aslan. (2024). SOCIAL SOLIDARITY IN THE DIGITAL AGE: CHALLENGES AND OPPORTUNITIES. *Prosiding Seminar Nasional Indonesia*, 2(3), 357–368.
- Juliani, J., & Aslan, A. (2024). THE BASICS OF CURRICULUM DEVELOPMENT: CURRICULUM FROM THE ASPECTS OF IMTAQ AND IPTEK. *International Journal Of Humanities, Social Sciences And Business (INJOSS)*, 3(2), 299–309.
- Kazu, İ., & Yalçın, C. (2022). A meta-analysis study on the effectiveness of flipped classroom learning on students' academic achievement. *E-International Journal of Educational ...*, Query date: 2024-10-27 05:52:43. <https://dergipark.org.tr/en/download/article-file/2119733>
- Lai, H. (2021). Understanding what determines university students' behavioral engagement in a group-based flipped learning context. *Computers & Education*,

- Query date: 2024-10-27 05:52:43.
<https://www.sciencedirect.com/science/article/pii/S0360131521001676>
- Lo, C., & Hew, K. (2021). Student engagement in mathematics flipped classrooms: Implications of journal publications from 2011 to 2020. *Frontiers in Psychology*, Query date: 2024-10-27 05:52:43. <https://doi.org/10.3389/fpsyg.2021.672610>
- Merlin-Knoblich, C., Chase, L., Smith, J., & ... (2022). A comparison of student engagement in flipped, active lecture, and online counseling courses. *Journal of Creativity in ...*, Query date: 2024-10-27 05:52:43. <https://doi.org/10.1080/15401383.2020.1822245>
- Merugu, S., Reddy, R. A., Pamulaparthi, R., & ... (2022). Active learning pedagogy— Impact on student engagement, scholastic performance in STEM Courses. ... *Learning and Internet of ...*, Query date: 2024-10-27 05:52:43. https://doi.org/10.1007/978-981-19-1906-0_53
- Nhạc, H. (2021). EFFECTS OF FLIPPED CLASSROOM ON STUDENTS'ACADEMIC ACHIEVEMENT IN LEGAL ENGLISH LEARNING CONTEXT. ... : *A Journal on Language and Language Teaching*, Query date: 2024-10-27 05:52:43. <https://e-journal.usd.ac.id/index.php/LLT/article/view/3542>
- Oh, J., Chan, Y., Kong, A., & Ma, H. (2022). Animation students' engagement and motivation through peer teaching: Online flipped classroom approach. *Archives of Design Research*, Query date: 2024-10-27 05:52:43. <https://ira.lib.polyu.edu.hk/handle/10397/94694>
- Onyema, E., Choudhury, T., Sharma, A., & ... (2021). Effect of flipped classroom approach on academic achievement of students in computer science. *Data Driven Approach ...*, Query date: 2024-10-27 05:52:43. https://doi.org/10.1007/978-981-15-9873-9_41
- Pasaribu, T., & Wulandari, M. (2021). EFL TEACHER CANDIDATES'ENGAGEMENT IN MOBILE-ASSISTED FLIPPED CLASSROOM. ... *Online Journal of Distance Education*, Query date: 2024-10-27 05:52:43. <https://dergipark.org.tr/en/pub/tojde/article/961774>
- Polat, H., & Karabatak, S. (2022). Effect of flipped classroom model on academic achievement, academic satisfaction and general belongingness. *Learning Environments Research*, Query date: 2024-10-27 05:52:43. <https://doi.org/10.1007/s10984-021-09355-0>
- Querido, D., Yazon, A., & ... (2023). Effectiveness of interactive classroom tool: A quasi-experiment in assessing students' engagement and performance in mathematics 10 using classpoint. *Applied ...*, Query date: 2024-10-27 05:52:43. <https://journals.researchsynergypress.com/index.php/aqa/article/view/1601>
- Rajput, P., Ravulakollu, K., & ... (2022). An enhanced learning approach for increasing student engagement, motivation and learning using gamification in blended teaching. ... *Enhanced Learning*, Query date: 2024-10-27 05:52:43. <https://doi.org/10.1504/IJTEL.2022.120558>
- Raju, R., Bhat, S., Bhat, S., D'Souza, R., & ... (2021). Effective usage of gamification techniques to boost student engagement. ... *of Engineering Education ...*, Query date: 2024-10-27 05:52:43. https://journaleet.in/download-article.php?Article_Unique_Id=JEET669&Full_Text_Pdf_Download=True

- Samaila, K., Masood, M., & Chau, K. (2021). Enhancing student's engagement and ICT skills through modified flipped classroom model. ... *Conference on Education, Query date: 2024-10-27 05:52:43*. https://www.researchgate.net/profile/Abdullahi-Yunusa/publication/351478515_THE_MODERATING_EFFECTS_OF_GENDER_AND_AGE_ON_STUDENTS'_SATISFACTION_AND_LEARNING_WITHIN_AN_E-LEARNING_ENVIRONMENT_IN_NIGERIA/links/60bb472892851cb13d7aafa1/THE-MODERATING-EFFECTS-OF-GENDER-AND-AGE-ON-STUDENTS-SATISFACTION-AND-LEARNING-WITHIN-AN-E-LEARNING-ENVIRONMENT-IN-NIGERIA.pdf#page=96
- Sartika, E., & Fransiska, F. W. (2024). UNDERSTANDING THE STUDENTS' ENGLISH LEARNING ACHIEVEMENT AND HOME ENVIRONMENT SUPPORTS DURING SCHOOL CLOSURE TO RESPOND TO PANDEMIC AT PRIVATE MADRASAH TSANAWIYAH AT-TAKWA SAMBAS. *International Journal of Teaching and Learning*, 2(4), 939–953.
- Satparam, J., & Apps, T. (2022). A systematic review of the flipped classroom research in K-12: Implementation, challenges and effectiveness. ... *of Education, Management and Development ...*, *Query date: 2024-10-27 05:52:43*. <https://core.ac.uk/download/pdf/492972995.pdf>
- Sitopu, J. W., Khairani, M., Roza, M., Judijanto, L., & Aslan, A. (2024). THE IMPORTANCE OF INTEGRATING MATHEMATICAL LITERACY IN THE PRIMARY EDUCATION CURRICULUM: A LITERATURE REVIEW. *International Journal of Teaching and Learning*, 2(1), 121–134.
- Suyitno. (2021). METODE PENELITIAN KUALITATIF KONSEP, PRINSIP DAN OPERASIONALNYA. *Query date: 2024-05-25 20:59:55*. <https://doi.org/10.31219/osf.io/auqfr>
- Syakhrani, A. W., & Aslan, A. (2024). THE IMPACT OF INFORMAL FAMILY EDUCATION ON CHILDREN'S SOCIAL AND EMOTIONAL SKILLS. *Indonesian Journal of Education (INJOE)*, 4(2), 619–631.
- Velasco, C. G., Ruiz, I. F., & ... (2021). Does the teaching-learning model based on the flipped classroom improve academic results of students at different educational levels? *Revista ...*, *Query date: 2024-10-27 05:52:43*. <https://redined.educacion.gob.es/xmlui/handle/11162/208706>
- Xu, L., Yu, S., Chen, S., & Ji, S. (2021). Effects of the flipped classroom model on student performance and interaction with a peer-coach strategy. *Educational Studies, Query date: 2024-10-27 05:52:43*. <https://doi.org/10.1080/03055698.2019.1701991>
- Yilmaz, F. K. (2022). An investigation into the role of course satisfaction on students' engagement and motivation in a mobile-assisted learning management system flipped classroom. *Technology, Pedagogy and Education, Query date: 2024-10-27 05:52:43*. <https://doi.org/10.1080/1475939X.2021.1940257>
- Yusuf, B., & Taiye, M. (2021). A flipped learning environment: A disruptive approach for traditional classrooms. *International Journal of Education, Psychology ...*, *Query date: 2024-10-27 05:52:43*. <https://www.academia.edu/download/93937120/ijepc.pdf>

Zen, Z., & Ariani, F. (2022). Academic achievement: The effect of project-based online learning method and student engagement. *Heliyon*, Query date: 2024-10-27 05:52:43. [https://www.cell.com/heliyon/fulltext/S2405-8440\(22\)02797-9](https://www.cell.com/heliyon/fulltext/S2405-8440(22)02797-9)