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The Impact of Dormitory Program on Students' Biology Learning Activity and Autonomy

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ABSTRACT

This study examines the differences in learning activity and autonomy between Grade 11 students in the boarding and non-boarding programs at SMAN 2 Balige. Total sampling was conducted from a population of 180 students; 90 students were in the boarding program, while the remaining 90 were in the non-boarding program. Data was gathered through two questionnaires focusing on learning activity and autonomy. The findings also showed that boarding students demonstrated higher learning autonomy than their non-boarding peers, as proved by the positive and significant value of an independent paired t-test. These results carry important policy implications for leveraging the benefits of dormitory programs to enhance educational oversight and performance.

Keywords: Learning activity, Learning autonomy, Biology, Dormitory

Introduction

It is commonly thought that students gain academic advantages from living on campus, leading many schools to mandate dormitory living for first-year students, with only a few exceptions (Brown et al., 2019).However, despite these widespread beliefs, accurately assessing the impact of campus living on student performance remains challenging. Dormitory programs are designed to foster discipline and provide individualized learning opportunities that align with students' unique talents, abilities, and interests, supporting their optimal developmental growth (Abagon, 2021).Improving students' achievement positively influences their learning activity and autonomy, as higher achievement typically boosts confidence, motivation, and engagement in learning activities. Students who achieve learning aims often develop a stronger sense of responsibility and independence, leading to greater autonomy.

Active involvement in learning activities encourages students to explore concepts more deeply, reinforcing their academic performance and ability to self-direct their studies. This link between achievement, activity, and autonomy is particularly relevant in dormitory settings, where structured routines and close access to educational resources reinforce students' involvement in learning processes, helping them develop stronger self-regulation and learning autonomy. SMAN 2 Balige is located in North Sumatra and is dedicated to advancing science, technology, arts, and humanities. The dormitory program is an intentional approach to improving student outcomes (Tarigan et al., personal observation, 2015).

The program provides a supportive environment conducive to learning, enabling students to better focus on their studies while cultivating discipline and independent learning practices. In this study, data on biology learning activity and autonomy was collected, likely to measure how such programs directly impact these aspects of student development. Therefore, fostering a culture of achievement at SMAN 2 Balige raises academic success and cultivates active, autonomous learners equipped for future educational and personal growth (Tarigan et al., personal observation, 2015). Research in similar settings has shown that dormitory programs support academic achievement and improve retention and autonomy, as these environments encourage students to actively engage with their studies, seek knowledge independently, and develop skills necessary for lifelong learning (Tarigan et al., 2021).

Peer tutoring, which uses systematic peer-mediated teaching strategies, effectively enhances academic and social skills among various student groups, including those identified as at-risk (Bangun & Naphiah, 2021). For students living in dormitories, structured learning activities can limit their access to a broader range of information, contrasting with students at home, who may have more flexibility to engage with course materials (Graham et al., 2018).Parents play a crucial role in shaping their children's educational experiences in this context. By supporting their children's independence and encouraging academic responsibility, parents can help them navigate the challenges of both boarding and non-boarding environments. Boarding schools aim to foster independent behaviors in students, aligning with parental hopes for their children's academic and personal success (Chappe, 2016).Thus, the collaboration between parents and educational programs can enhance the effectiveness of peer tutoring, ensuring that all students, regardless of their living arrangements, have the opportunity to thrive academically and socially (Fosnacht et al., 2021).

Participation in school events and collaboration with dormitory staff foster a supportive community, enabling parents to quickly address any social, academic, or emotional challenges their children face. Parental engagement in a school dormitory program supports students' well-being, academic success, and overall adjustment to living away from home. Maintaining consistent communication, parents provide emotional stability, helping students manage homesickness and stress. Engaged parents reinforce academic motivation through regular check-ins and, in partnership with dorm staff, promote positive behavior and independence skills (Tarigan et al., personal observation, 2015).

Parental engagement in their children's education is crucial to their early academic achievements (Ahmad et al., 2017). This aligns with the conclusions drawn by Bronkema &

Bowman (2017) in their research, which examined the extent and consequences of five forms of parental involvement on the academic performance of elementary school children, taking into account factors such as race/ethnicity, socioeconomic status, and parental educational background (Kamal et al., 2022). Parents who actively communicate with dormitory academic personnel have a significant role in shaping their children's personalities and fostering their social development. Good learning management in a boarding school triggers students to use their time efficiently for learning. Students are more prepared before studying in class. Students can access the materials from the library and computer room without going to the school to find internet sources. The school prepares all the learning materials. This habit greatly affects the mindset and emotional reactions in decision-making (Gymnastiar et al., 2023). Therefore, the existence of the boarding program will push students to carry out all activities independently.

Life in the dormitory requires students to obey and enforce the ethical rules in the dorm area. The use of rules is one thing that is important in supporting the process of learning independence, especially in determining what is right and what is wrong (Ayeni & Adelabu, 2011). Besides that, the educational process in boarding always takes place in physical, social, and intellectual environments. The physical environment consists of the natural environment, which is a place that provides and supports the process of education (Batara & Orpia, 2022). There is a scarcity of research that delves into the effects of residing in dormitories on students' educational achievements. Specifically, there is a complete absence of studies exploring the relationship between students' learning outcomes and their level of autonomy and involvement in dormitory programs, as highlighted by Zakiya & Amarta (2023).Notably, no research has been identified that addresses this matter in the context of students in North Sumatra, especially in Balige.

Various groups of students experience different impacts from their living environments. Residing in student dormitories offers advantages that can improve educational outcomes. Students who live on campus typically have shorter commuting times to attend classes, allowing them to allocate more time for studying and independently managing their schedules to complete coursework and assignments. This increased time management may positively influence their educational performance, as Lukens et al. (2022) noted. Empirical evidence supports this notion; for instance, Nelson et al. (2016) conducted a survey involving 100 college students, averaging about 23 years old, and found a statistically significant correlation between commute time to the college campus and students' educational outcomes, as measured by their cumulative GPA. An intriguing discovery from this study is that students residing in college dormitories or with roommates tend to achieve higher GPAs than those living with their parents.

Residing in student dormitories also comes with certain drawbacks. Residential students may miss the presence and care of their parents, which can have a moral and emotional impact on the student. Additionally, having less available study time due to the demands of dormitory life may adversely affect academic performance, as Abagon (2022) highlighted. Consequently, there may be adverse educational outcomes stemming from differences in students' maturity levels and the positive influence of parents.

Previous studies indicate that students living in campus dormitories often achieve higher academic performance than their off-campus counterparts. This is likely because they benefit from readily available campus resources, including study facilities, academic support services, and quiet learning environments. The structured living and learning environment of dormitories can also contribute to better time management and reduced distractions, allowing students to focus more effectively on their studies (Setijanti et al., 2023).

Considering the previous research discussed, the primary aim of this study was to examine the effects of the dormitory program at SMAN 2 Balige in North Sumatra on students' learning activities and their level of autonomy. This research assesses whether the structured dormitory environment could foster greater academic involvement and self-regulation among students. The study was designed around two key hypotheses, which are (a) there was a

significant effect of the dormitory program on students' learning activities; and (b) there was a significant effect of the dormitory program on students' learning autonomy.

Methods

Research Design

The form of this research was comparative research, which intended to determine the effect of dormitory development programs on students' learning activities and autonomy by conducting a survey. In this study, the variables consisted of the dependent variable, which is learning activities and autonomy (Y), and the independent variable, the dormitory program (X). Several strategies can be implemented to ensure that dormitory and non-dormitory classes have similar abilities, which is essential for accurately assessing the impact of the dormitory development program on students' learning activities and autonomy. First, pre-assessing both groups' academic skills and autonomy levels will help establish a baseline, allowing researchers to identify any pre-existing differences (Campbell et al., 1963; Cohen et al., 2017).

The research design used in this study was quasi-experimental, with pre and post-tests for each class (dormitory and nondormitory class) to measure the learning activities and autonomy of students living in dormitories and nondormitory schools. Reducing the risk of moderator variables, balanced sampling, and pre-assessment are essential to ensure dormitory and non-dormitory classes have comparable abilities. Selecting participants with similar academic backgrounds or conducting a pre-test to match students based on initial abilities minimizes any pre-existing differences between the groups. Additionally, using the same curriculum and teaching methods across both groups ensures consistent learning experiences, while random assignment, if feasible, further reduces bias (Campbell et al., 1963).

Controlling for external factors by providing equal access to online resources, library hours, and quiet study spaces for dormitory and non-dormitory students helps minimize any impact of resource availability on their study habits or learning outcomes. This ensures that differences in biology learning activity and autonomy observed in the research are more likely due to the dormitory program rather than to resource disparities. All grade eleven students consisted of 90 students from the dormitory program, and the remaining 90 students were from non-dormitory programs. The dependent variables in our study were students' learning activity and autonomy. We decided to distribute the questionnaires in person rather than sending them through the Internet or mail. This approach allowed us to collect responses immediately since we did not have to wait for respondents to send back the filled questionnaires by mail or provide electronic responses.

Clear and objective questions and the use of validated scales were designed to ensure that the questionnaire measurements were not subjective. We formulate questions that are specific, measurable, and free from ambiguity, avoiding personal or interpretative language that could lead to varied responses. We employ standardized and validated scales, such as Likert scales, which help quantify responses and reduce subjectivity by offering consistent answer options. The instruments were tested on other students before being implemented in the research sample to determine the validity and reliability of using SPSS.

Instrument Test

The questionnaire method was used to obtain data regarding students' learning activities and autonomy. The instrument was tested on 180 students in grade eleventh class at SMAN 2 Balige. The research instruments used were learning activity and autonomy. Questionnaires are prepared based on research variables and research indicators with an instrument measurement scale using a Likert scale. The criteria for the results of the questionnaire were determined by the Likert scale. The collected data was also analyzed using an independence t-test. Instrument testing includes validity and reliability.

The learner autonomy questionnaire was arranged according to Steinberg & Morris (2001).There were three domains/indicators of students' learning autonomy assessed: (a) emotional autonomy, (b) behavioral autonomy, and (c) cognitive autonomy. In this study, 20

statements were employed to assess students' autonomy, following the guidelines based on Dewey's (2002) principles that emphasize learning through active engagement. Student learning activities were categorized into indicators, which included (a) visual activities include reading, examining pictures and videos, observing, and watching videos or other people working; (b) listening activities, which involved listening to the teacher's explanations during class; (c) writing activities included answering questions, taking tests, and completing questionnaires; (d) mental activities involve reflection, memory recall, problem-solving, and decision-making; (e) emotional activities covered aspects like interest, courage, and calmness.

Instrument testing was done by testing the validity and reliability of 40 students. All items tested were valid with $p > 0.05$. In terms of reliability testing, Cronbach's alpha was used. The values of Cronbach's alpha for learning activity and autonomy instruments were found to be 0.853 and 0.859, respectively, exceeding 0.6. This indicated that the program's instruments were reliable for measuring these constructs (Sugiyono, 2015).

Research Participant

This research was conducted at SMAN 2 Balige, located on Jalan Kartini Soposurung in Balige. The study population consisted of eleventh-grade students, with 180 students at SMAN 2 Balige. The sample for this study was selected through a total sampling method involving all six classes within this grade level. The boarding students do not spread in non-boarding classes. Class XI IA 1-3 belongs to the boarding class ($n = 90$), and Class XI IA 4-6 belongs to the non-boarding class ($n = 90$), each with 30 students.

Data Analysis

For the data analysis in this study, several requirements were tested, including normality and homogeneity. The collected data was analyzed using an independent t-test. The interpretation of the results follows the normality test - this test was conducted to determine whether the data followed a normal distribution. If the p value from the normality test is greater than 0.05 ($p > 0.05$), the null hypothesis (H_0) will be accepted, indicating that the data can be considered to follow a normal distribution. If the p value is less than 0.05 ($p < 0.05$), the null hypothesis (H_0) will be rejected, indicating that the data do not follow a normal distribution.

In this case, the homogeneity test used *Levene*'s test to assess whether the variances among different data groups were homogeneous or not. If the homogeneity test indicates that all data groups have homogeneous variances, it suggests that the variability within the groups is roughly equal. In summary, if the p value from the normality test is greater than 0.05, it implies that the data is normally distributed. If the homogeneity test shows that the variances among groups are roughly equal, the assumption of homogeneity of variances is met. These tests are important for ensuring the validity of statistical analyses, such as the independent t-test, which relies on these assumptions. The normality and homogeneity test result based on the *Shapiro-Wilk* test showed that all groups of data distribution were normal and homogeneously distributed. A summary of the normality and homogeneity test is presented in Table 1.

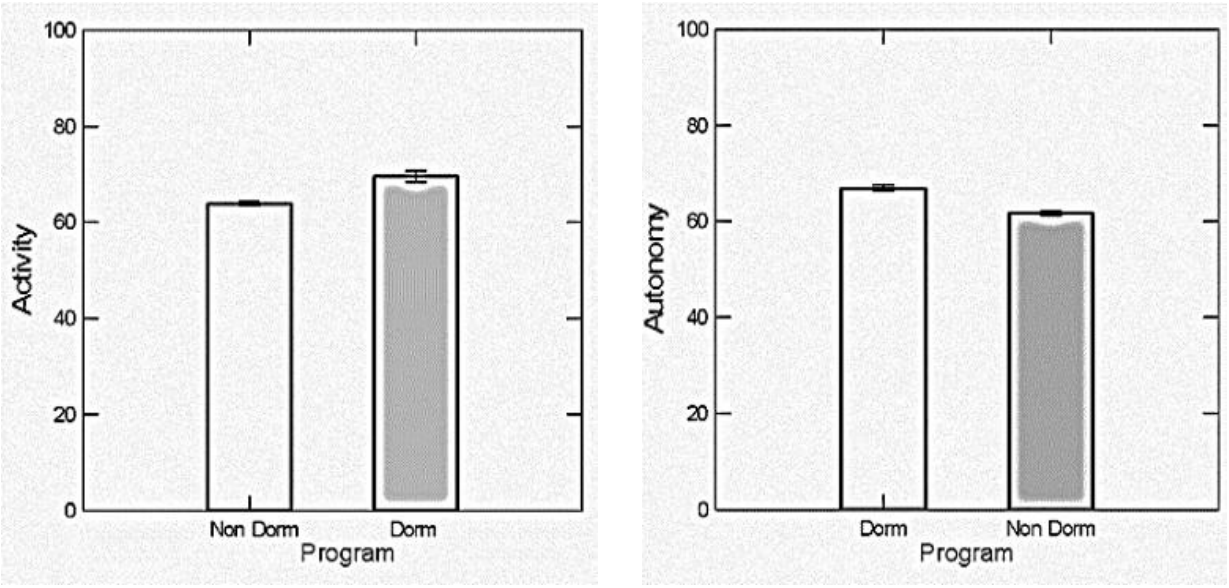
Table 1. The differences in homogeneity and normality of sample

Sample	class	*n*	homogeneity	normality
dormitory class	XI-IA 1-3	90	0.797	0.082
non-dormitory class	XI IA 4-6	90		0.072

Results and Discussion

All data gathered were analyzed using the SPSS 25.0 for statistical analysis. The analysis showed students who took the dorm program (70.911 ± 10.57) and students who did not take the dorm program (62.141 ± 3.73), as presented in Figure 1. The dormitory program significantly affected the students' learning activity, with p = 0.000. H0 was rejected, and H_a accepted that the boarding program significantly influences student learning activities for biology lessons in semester one.

Students' learning autonomy who took the program dormitories (70.337 ± 6.12) and students' learning autonomy who did not take the program dormitories (62.817 ± 5.23) indicated a significant effect on the student's learning autonomy with p = 0.000 as presented in Figure 1. H_0 was rejected, and H_a accepted. The average value of students' learning independence boarding program provided higher results than the independence of students who do not live in a dorm.



(A) **(B)**

Figure 1. The effect of dormitory program on (A) students' learning activity p = 0.00, (B) autonomy p = 0.00 in biology lesson grade XI IA SMAN 2 Balige n = 180. The error bar indicates standard error. Data was measured by using a two-tailed t-test.

A good learning environment is a safe physical, psychological, social, and moral environment (Alfiahas et al., 2020). Therefore, students concentrate more during learning, focus on learning, learn to live together, and avoid negative things such as smoking, drugs, promiscuity, and congestion. The learning time is scheduled systematically. After studying in the class, students can read any sources in the computer room and library. Therefore, the lessons learned in class can be remembered for a long time without disturbing the new information taken from the environment.

Additional data about the students' learning time was collected by administering questionnaires. The result stated that the percentage of students' learning time in the dorm program was higher (80.03%) than in the non-dorm program (69.75%). Students in dorm programs have more time to study than those from non-dorm programs. Non-boarding students have more time at home but do not use the time to learn efficiently before studying in class. Students in dorm classes can access the materials without waiting for the schedule as in the non-dormitory program because the dormitory region was provided with internet sources. All the learning materials could be prepared at home before going to school. This habit greatly affects the mindset and emotional reactions when making a decision. Therefore, the existence of the boarding program will push students to carry out all activities independently.

Parental involvement is an important element in the early academic success of non-dormitory students (Ahmad et al., 2017). Hoover-Dempsey & Sandler (1995) highlight that parental involvement significantly shapes children's development and educational achievements through various mechanisms, including modeling, reinforcement, and instruction. Parents who enjoy reading are more likely to influence their children to develop a similar interest in reading. Parents mediate everyday experiences with homework, offering guidance and instructions for completing assignments. They can also reinforce positive learning behaviors by incentivizing academic efforts and accomplishments. The main educational outcome of parental involvement lies in developing their children's skills and knowledge (Hoover-Dempsey & Sandler, 1995). Such involvement fosters the child's sense of efficacy, enhancing their belief in their ability to succeed in school. The dormitory program had a simultaneous influence on learning activity and autonomy. The research result showed significant differences in students' learning activity and autonomy in dormitories compared with students who did not live there.

This was proved by the value of students' biology semester progress report cards, which showed higher biology scores regarding students' learning activity and autonomy when choosing dormitory programs. Students' learning activities for those who lived in dormitories have been scheduled so that information acquisition is also limited. Students in boarding classes could study with focus because they were not required to work to help their parents and because of other obstacles experienced at home. Boarding school programs provided the students with the development of independent behavior; the parents tried to convey the purpose and hope that the child becomes a person who works well at school and at home.

In this scenario, having less study time due to other commitments may have an adverse impact on academic performance. This viewpoint finds support in the research conducted by Riglin et al. (2013) who conducted a longitudinal study of young people in England, focusing on the effects of part-time employment among school students during the last year of compulsory education. The results of this study suggest that working part-time during this period negatively influences educational achievements and subsequent educational participation.

There are concerns about the quality of meals served in student dormitories, with claims of inadequate hygiene and nutrient content. Research indicates a healthy diet significantly enhances students' cognitive function and academic performance. Specifically, certain vitamins and minerals are known to play a crucial role in brain development and learning. Additionally, proper hydration is essential, as even a slight 2% drop in body fluid can lead to difficulties in problem-solving and maintaining focus when reading text or working on a computer screen.

Boarding schools have shown higher scores in learning autonomy, aligning with the findings of Brown et al. (2019), who established that boarders tend to exhibit greater learning autonomy than non-boarders. In the boarding school environment, students often have higher self-efficacy when managing their time for learning within the dormitory area. This increased sense of control over their study time may contribute to their academic success. Non-boarding students often have additional responsibilities at home, which can divert their attention away from schoolwork. For instance, they may need to address household chores such as fetching water, cooking for the family, and washing dishes and clothes, all of which can come at the expense of their academic pursuits.

Conclusion

The study found that students in the dormitory program demonstrated higher learning activity and autonomy than non-dormitory students. Statistical analysis confirmed significant positive effects of the dorm environment on academic engagement, with dorm students benefiting from a structured setting that supports focus and independent study. The dorm program's schedule, resource access, and reduced household responsibilities likely contribute to these advantages. Parental involvement for non-dorm students helps but does not fully

offset these benefits. Boarding programs support self-discipline and independent learning, which are essential for academic success.

The researcher recommends that to enhance learning activity and autonomy; students should establish structured study routines and use available resources effectively. For non-boarding students, creating a dedicated, quiet study space at home and setting regular study hours can help reduce distractions from household responsibilities. Utilizing school facilities such as libraries and computer labs can also provide a focused environment conducive to study. Boarding students are encouraged to utilize the scheduled study times, resources fully, and internet access provided in the dormitory to develop independent study habits. Additionally, students are advised to practice effective time management to balance academic and personal responsibilities and to seek support from teachers and mentors for academic planning and guidance. Embracing these practices fosters a disciplined approach to learning, promoting academic success and self-reliance.

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