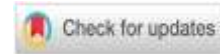




## Reducing academic burnout biology among boarding school students through LIVE (liveworksheet and videos)



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### Article Info

#### Article History:

Received 09 August 2025  
Revised 27 August 2025  
Accepted 06 October 2025  
Published 30 November 2025

#### Keywords:

Academic Burnout  
Boarding School  
Biology  
Instructional Media



### ABSTRACT

Academic burnout is a common issue among boarding school students due to demanding routines and high academic pressure, particularly in Biology classes, which involve many abstract concepts. This study aimed to examine the effectiveness of using LiveWorksheet and instructional videos in reducing the level of academic burnout among boarding school students. A one-group pre–post test design with two post-intervention measurements was employed. The sample consisted of senior high school boarding students who participated in Biology learning activities using a combination of LiveWorksheet and instructional videos. Data were collected using an academic burnout instrument and analyzed with paired sample *t*-tests. The results showed a decrease in burnout scores from a mean of 31.67 before the intervention to 25.37 in the first post-test ( $p = 0.005$ ) and 25.83 in the second post-test ( $p = 0.007$ ). These findings indicate that the combination of LiveWorksheet and instructional videos effectively reduced burnout by enhancing learning engagement, lowering cognitive load, and strengthening self-efficacy. Further research is recommended to use a control group design and long-term measurements to examine the sustainability of the intervention's effects.

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**Citation:** Rohmatulloh, G., Kusumastuti, M.N., Kusnadi, & Pratiwi, H. (2025). Reducing academic burnout biology among boarding school students through LIVE (liveworksheet and videos). *JP BIO (Jurnal Pendidikan Biologi)*, 10(2), 400-407. DOI: <https://doi.org/10.31932/jpbio.v10i2.5272>

### INTRODUCTION

Education is an integral part of human life that plays a crucial role in social life (Arwildayanto, 2018). Efforts to provide quality education are still continuously pursued by the government. These efforts are not solely the responsibility of the government; private institutions, educational organizations, and the general public also contribute to improving education. Communities that understand the value of investing in education compete to find the best schools



for their children. With high costs and luxurious facilities, these schools are able to provide excellent and quality educational services (Alifah, 2021).

It is not uncommon for parents to enroll their children in schools with a boarding school system or Islamic boarding schools (pondok pesantren). A boarding school or Islamic boarding school is an educational system that allows students to live in dormitories within the school environment, implementing an educational program that integrates the national curriculum with a distinctive boarding school curriculum (Budimansyah & Komalasari, 2019).

The intense activities in Islamic boarding schools can lead students to experience fatigue, commonly referred to as burnout. Burnout is a condition of emotional, mental, and physical exhaustion caused by prolonged activities with increasing demands, resulting in feelings of tiredness, anxiety, boredom, and loss of motivation (Afri et al., 2024). According to Schaufeli (2002), academic burnout is a condition in which individuals feel exhausted due to academic demands, develop pessimistic attitudes, lose interest in studying, and feel incompetent as learners. The indicators of academic burnout include exhaustion (fatigue due to study demands), cynicism (detachment or disinterest toward learning), and reduced professional efficacy (feelings of incompetence as a student). Afri (2024) also found that students in Islamic boarding schools tend to have higher burnout levels than students living with their parents.

Learning fatigue occurs when study activities over a certain period yield minimal or no results, often leading to wasted effort. Prolonged academic burnout may result in both physical and mental exhaustion, which in turn negatively affects learning outcomes. In the academic context, burnout reflects a decline in students' active participation in class due to pressure from study demands (Jacobs & Dodd, 2003). This decline in participation can manifest as truancy, reduced involvement in discussions, and decreased academic performance, potentially jeopardizing a student's educational progress (Fitriyadi et al., 2023).

One way to address burnout is through the use of instructional media, which is a key component in the learning process. For Grade X biology, one of the topics is viruses, a complex conceptual material covering characteristics, structure, reproduction, and roles of viruses. This topic is abstract since viruses cannot be directly observed in daily life, requiring additional media for visualization. The abstract nature of biology makes it a difficult subject. Ikbal (2021) noted that the difficulty of learning abstract biology concepts influences student achievement, while abstract materials often reduce students' interest in biology. Interest can be increased through the use of instructional media, particularly for conceptual materials, so that abstract topics become more concrete (Irfana et al., 2017).

Herawati (2021) emphasized that creative teaching approaches affect the level of learning fatigue, with more engaging teaching models lowering student burnout. According to Salsabila (2023), instructional media serves as a communication bridge, helping minimize failures in delivering information. The choice of media should be engaging to prevent boredom.

Interactive instructional media can be implemented using applications such as LiveWorksheet, a free, web-accessible tool that allows teachers to convert printed worksheets into interactive online exercises with automatic grading features. Meanwhile, video is a form of audiovisual media that utilizes both hearing and sight, enabling students to learn by simultaneously watching and listening. Huzaifah (2023) highlighted that audiovisual media can stimulate students' interest by making learning more engaging. Similarly, Munawir et al. (2024) noted that interactive instructional media—such as animated videos, educational games, and technology-based applications—are more effective in capturing students' attention and fostering motivation.

Based on the above background, this study aims to examine the reduction of academic burnout among students in biology learning through the application of LiveWorksheet and video-based instructional media.

## RESEARCH METHODS

### Research Design

The research method employed a quantitative approach using a pre-experimental design (one-group pretest–posttest design). This study involved only one group without a comparison group. According to Arikunto (2013), in this design, observations are conducted twice—before and after the experiment. The test administered before the experiment is called the pretest, while the test administered after the experiment is referred to as the posttest. According to Sugiyono (2010), the one-group pretest–posttest design can be illustrated in Table 1.

**Table 1.** One Group Pretest-Posttest Design

Pretest	Treatment	Posttest
O <sub>1</sub>	X	O <sub>2</sub>

Description:

O<sub>1</sub> = Pretest (before treatment)

X = Implementation

O<sub>2</sub> = Posttest (after treatment)

### Population and Samples

This study involved tenth-grade students at a boarding high school located in Bogor Regency. The research site had only one tenth-grade class consisting of 30 students, all of whom participated in the study. The sampling technique used was probability sampling, ensuring that every student had the opportunity to become a sample in the study.

### Instruments

Student burnout in this study was measured using an academic burnout instrument. The academic burnout instrument was adapted from the Maslach Burnout Inventory-Student Survey (MBI-SS) (Schaufeli et al., 2002) and adjusted to the subtopics taught in each meeting. The instrument adapts and modifies the Maslach Burnout Inventory-Student Survey (MBI-SS) developed by Schaufeli (2002). The academic burnout instrument consists of 15 statements designed to measure three indicators of academic burnout. The Exhaustion indicator consists of 5 statements, the Cynicism indicator consists of 4 statements, and the Professional Efficacy indicator consists of 6 statements. The academic burnout instrument uses a Likert scale ranging from 1 to 4. The statements include both favorable items (statements that support the measured variable) and unfavorable items (statements that do not support the measured variable). Statements supporting an aspect are represented by the highest score on favorable items, while statements strongly not supporting an aspect are represented by the highest score on unfavorable items (Sugiyono, 2013). The blueprint of the academic burnout instrument can be seen in Table 2.

**Table 2.** Blueprint of the Academic Burnout Questionnaire

No	Indicator	Statement		Total
		Favorable	Unfavorable	
1	Exhaustion	-	5	5
2	Cynicism	-	4	4
3	Professional Efficacy	6	-	6
Total		6	9	15

Modified from MBI-(Schaufeli et al., 2002)



## Procedures

The academic burnout instrument was developed before conducting the study. The steps included translating the statements into Indonesian, modifying and adjusting them to match the research material, and conducting expert judgment by qualified lecturers to evaluate grammar, content depth, and scoring. A pilot test was then conducted with students to assess the validity and reliability of the instrument. The academic burnout instrument was administered to students before learning about viruses (pretest) and after each meeting covering the virus material. Following data collection, the data were analyzed, interpreted, and the research results were compiled.

## Data Analysis

The data analysis techniques used were descriptive and inferential data analysis. Descriptive statistical tests utilized the scoring results of students' responses to the academic burnout instrument. This descriptive statistical test was conducted with the assistance of SPSS version 27. The descriptive statistical analysis of academic burnout included the mean, minimum value, maximum value, standard deviation, and score analysis based on categories, which were then interpreted into sentences through categorization. The categorization criteria for academic burnout can be seen in Table 3.

**Table 3.** Criteria for Academic Burnout Score Categories

Category	Score Range Formula	Score Range
high	$X > \text{Mean} + 1.\text{SD}$	$> 45$
medium	$\text{Mean} - 1.\text{SD} \leq X \leq \text{Mean} + 1.\text{SD}$	$30 \leq X < 45$
low	$< \text{Mean} - 1.\text{SD}$	$< 30$

(Azwar, 2012)

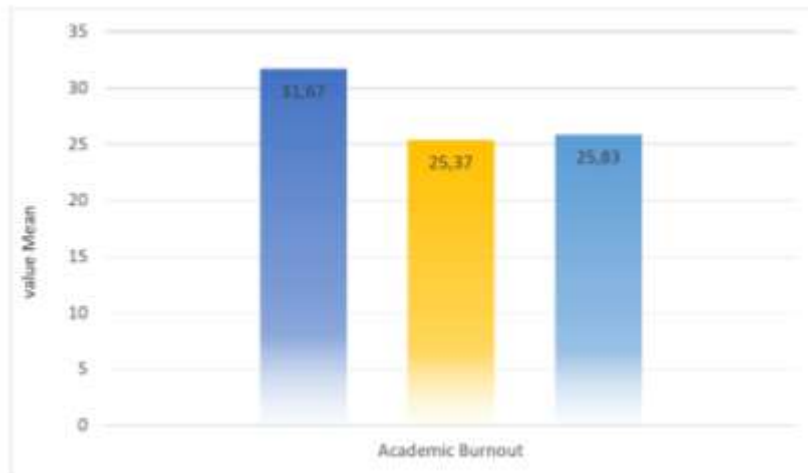
After the academic burnout test data were grouped into several categories, a percentage calculation analysis was carried out to determine the categories and responses to the academic burnout questionnaire. Inferential statistical tests consisted of prerequisite and hypothesis testing. Before conducting hypothesis testing, prerequisite tests were carried out, namely normality and homogeneity tests. If the obtained data were normally distributed, parametric hypothesis testing (paired t-test) was conducted, whereas if the data were not normally distributed, non-parametric testing (Wilcoxon test) was conducted.

## RESULTS

Recapitulation of Scoring and Descriptive Analysis in Table 4. Based on Table 4, the highest score was obtained in the pretest, while the lowest scores were found in Session I and Session II. The comparison of mean academic burnout scores for each session can be seen in Figure 1.

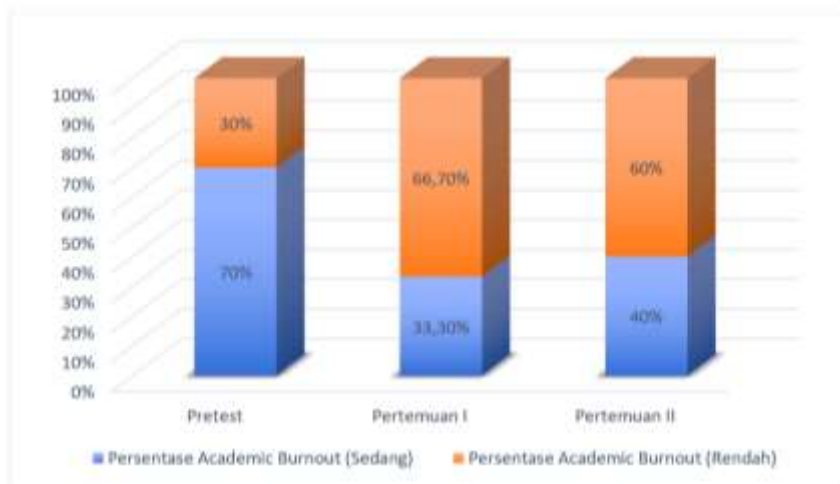
**Table 4.** Recapitulation of Scoring and Descriptive Analysis of Academic Burnout

Data	N	Highest Score	Lowest Score	Mean	Standar Deviation	Category
Pretest		44	15	31,67	6.759	medium
Session I	30	38	15	25,37	7.554	low
Session ii		36	15	25,83	6.654	low



**Figure 1.** Comparison of Mean Academic Burnout Categories per Session

Based on Figure 1, the highest average academic burnout category occurred in the pretest and then showed a decrease in the average score in each subsequent session. Next, a comparative analysis of the frequency distribution of academic burnout categories in each session can be seen in Figure 2.



**Figure 2.** Comparison of Academic Burnout Category Distribution per Session

As shown in Figure 2, there is a difference in the percentage of medium and low academic burnout categories in each session. The percentage of the medium category in the pretest was the highest frequency, but it decreased in subsequent sessions. The results of the inferential analysis for the academic burnout variable can be seen in Table 5.

**Table 5.** Recapitulation of Inferential Analysis Results for the Academic Burnout Variable

No	Data	Normality Test	Homogeneity Test	Hypothesis Test	Conclusion
1	Pretest	0.313	0.367	0.005	Significantly Different
	Session I	0.005			
2	Pretest	0.313	0.021	0.007	Significantly Different
	Session II	0.021			

Based on Table 5, the normality test results for each session show that some data were normally distributed while others were not. For Session I and Session II, the data were not normally distributed, so a non-parametric test (the Wilcoxon test) was used. All hypothesis test results indicated a significant difference between sessions. The t-test results showed a significant decrease in academic burnout between the pretest and the first post-test ( $p = 0.005$ ), as well as between the pretest and the second post-test ( $p = 0.007$ ). Although there was a slight increase in burnout scores in the second post-test compared to the first post-test, the scores remained below the initial score.

## DISCUSSION

The results of this study demonstrate that the combination of LiveWorksheet and video as learning media can reduce the level of academic burnout among boarding school students in Biology subjects. The decrease from 31.67 (high category) to 25.37 in the first measurement, and remaining at 25.83 in the second measurement, indicates a positive effect of the intervention on learning well-being. The findings show that the implementation of LiveWorksheet and video learning media reduces academic burnout by increasing learning motivation, active participation, and positive perceptions toward the taught material. This aligns with Maslach & Leiter (2016), who state that academic burnout is often triggered by boredom, high learning pressure, and a lack of variety in teaching methods. The use of interactive, technology-based media has proven effective in minimizing such boredom.

Meanwhile, the use of video media supports the learning process by visualizing complex Biology concepts. According to Mayer (2009), multimedia learning that combines text and visuals can improve understanding and information retention, consistent with the dual coding theory. In the context of boarding school students with busy schedules, educational videos allow them to review material as needed, reducing stress caused by limited face-to-face learning time.

The reduction in academic burnout in this study is also influenced by a more varied learning environment. As stated by Schaufeli et al. (2002), variation in teaching methods and media can reduce the risk of emotional exhaustion and increase the sense of personal accomplishment. The combination of LiveWorksheet and videos provides flexible and adaptive learning alternatives suited to students' learning styles, meeting individual needs amid the often monotonous life in boarding schools.

Using LiveWorksheet enables students to work on exercises independently or collaboratively with instant feedback. This medium offers a more engaging learning experience by combining text, images, and direct interaction, aligning with the principles of active learning (Bonwell & Eison, 1991). Such interactivity promotes higher cognitive engagement, keeping students focused and positively challenged.

The effectiveness of this intervention can be explained through several mechanisms. First, increased learning engagement. LiveWorksheet allows students to complete interactive exercises with immediate feedback, which has been proven to boost motivation and active participation (Hernanto et al., 2023). Engagement is important because high engagement is negatively associated with burnout (Madigan et al., 2023).

Second, cognitive load reduction. Instructional videos help visualize complex Biology concepts, facilitating comprehension. Multimedia design principles such as segmenting and signaling can optimize the learning process and reduce feelings of overwhelm (Brame, 2021; Hubbard et al., 2022).

Third, increased self-efficacy and reduced academic anxiety. Access to repeatable learning materials (videos) and independent practice (LiveWorksheet) gives students a sense of control over their learning process. Gu (2023) shows that high self-efficacy can mediate the relationship

between academic stress and burnout, making this strategy relevant for boarding school students with tight schedules and high academic pressure.

These findings are consistent with the meta-analysis of Madigan et al. (2023), which emphasizes that active learning and technology-supported interventions can reduce student burnout. Although there was a slight increase in burnout scores from the first to the second post-test, the values remained significantly lower than before the intervention, indicating a fairly sustained short-term effect.

## CONCLUSION

The implementation of LiveWorksheet and video has proven to be an effective learning medium to reduce burnout in a boarding school environment. These findings reinforce the view that innovations in digital learning media can be an effective strategy to reduce academic burnout. Teachers are encouraged to integrate interactive technology and multimedia into Biology learning, particularly in boarding school settings, to create a more enjoyable, challenging, and meaningful learning atmosphere. Further research is recommended to use a design with a control group and long-term measurements to evaluate the durability of the intervention's effects.

## ACKNOWLEDGMENT

The author would like to express deep gratitude to the parents, mother and father, husband, children, elder and younger siblings, research supervisor, as well as the principal and Biology teacher of SMA Qurann Asy Syahid.

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