JURNAL EDUKASI BIOLOGI
Volume 11 No 2, September, 2025, 146-161
ISSN: 2986-5484 E-ISSN: 2986-4828
DOI: 10.21831/edubio.v11i2.20421

THE RELATIONSHIP BETWEEN LEARNING EXPERIENCES IN THE HUMAN MOVEMENT SYSTEM AND STUDENTS' LEARNING OUTCOMES AND SPORTS HABITS

Milleny Aprilia Lestari[1] & Kartika Ratna Pertiwi[1,2*]
[1]Department of Biology Education, Universitas Negeri Yogyakarta, Indonesia
[2]Faculty od Medicine, Universitas Negeri Yogyakarta, Indonesia
*E-mail: kartika.pertiwi@uny.ac.id (corresponding author)

Abstract. This study aims to (1) determine students' learning experiences on the material of the human motor system; (2) determine students' learning outcomes on the material of the human motor system; (3) determine students' exercise habits; (4) determine the relationship between learning experiences on the material of the human motor system and student learning outcomes; (5) determine the relationship between learning experiences on the material of the human motor system and student exercise habits. This study employs a quantitative data analysis approach in a survey study. A sample of 124 students was selected using the Census technique. Data distribution utilised a Likert scale questionnaire for the variables of learning experience and exercise habits, and test questions for the variable of learning outcomes. Data analysis techniques employed include descriptive statistical analysis, normality tests, linearity tests, Pearson correlation tests, and cross-tabulation. The results of the study: (1) students' learning experiences are in the moderate category (39%); (2) students' learning outcomes are in the moderate category (44%); (3) students' exercise habits are in the moderate category (40%); (4) there is no relationship between learning experiences on the material of the human motor system and student learning outcomes; (5) There is a positive relationship between the experience of learning about the human movement system material and students' exercise habits with a moderate relationship (significance value 0.000 < 0.005 with a correlation degree of 0.454). Teachers can utilise this research as a means to provide contextual biology learning experiences for students, particularly in the area of movement systems.
Keywords: Exercise habits, Learning experiences, Learning outcomes, Motor system

Received: 13-11-2023 Revised: 05-09-2025 Accepted: 28-09-2025 Published: 30 -09-2025

INTRODUCTION

Adolescents aged 12-18 in this millennial era will be more exposed to sophisticated technology, which makes it easier for them to access information from various sources. However, if not used wisely, this convenience can harm their lives. One such negative influence is gaming addiction. The habit of playing games without paying attention to time can lead to decreased physical activity in adolescents, including sleep deprivation, disrupted mealtimes, and weakened immune systems (Novrialdy, 2019). According to Handoko (2022), the use of gadgets or computers has become crucial during the pandemic because the entire learning process, from material delivery and assignments to assessments, is inextricably linked to the use of devices or computers.

In 2022, Panthoja & Wibowo surveyed the physical activity and sedentary behaviour of high school students. After the pandemic, students' physical activity decreased drastically. This result is because students had become accustomed to sedentary activities during the pandemic's restrictions. During the pandemic, students spend more time sitting and lying down, whereas

before the pandemic, students engaged in daily physical activity at school, such as sports or extracurricular activities.

According to the WHO (2010), all children aged 5 to 17 should engage in daily physical activity within the context of family, school, and community activities. This physical activity includes play, sports, recreation, physical education, and planned exercise. The WHO recommends that children with insufficient physical activity gradually increase their physical activity until they reach their target, as physical activity has a positive relationship with cardiorespiratory health, metabolism, muscle strength, and increased bone density.

The human locomotor system material taught to 11th graders in the odd semester is a scientific literacy topic covering the components of the human locomotor system, the relationships between bones, types of joints, human movement, and disorders of the human locomotor system (Suwarno & Suratsih, 2018). In the process of learning about the human musculoskeletal system, meaningful learning is required, involving numerous student activities in the classroom, including critical thinking, to help students better understand the material directly (Pakpahan & Hasruddin, 2021).

Based on observations and interviews conducted with teachers and 11th-grade students of Mathematics and Natural Sciences at a public high school in Sleman Regency, it was found that the COVID-19 pandemic had a significant impact on student behaviour. Even after in-person learning was implemented, most students continued to engage in sedentary activities during the pandemic (Sari et al., 2022). Sedentary activities during online learning during the pandemic included playing with gadgets while sitting or lying down for hours. Compared to physical activity, most students engaged in these sedentary activities.

In interviews, teachers and students stated that most students still ignored the prohibition on using gadgets during class. They often took the opportunity to use social media and access materials outside the lesson. It was also mentioned that while the teacher was explaining the material, students were busy with their own devices. Despite this, the teacher made efforts to ensure that students understood the material on the human locomotor system well through several assignments, including student worksheets and mind-mapping exercises. Furthermore, the teacher included motivational elements related to the relationship between physical activity and the material on the human locomotor system.

Assignments on the human locomotor system and motivational elements related to the relationship between physical activity and this material were found to be suboptimal. Compared to the Special Sports Class, which did not receive biology materials, the 11th graders in Mathematics and Natural Sciences should also understand the relationship between physical activity and the material they have learned about the human locomotor system. Based on this, this research was conducted to know the learning experiences of class XI students regarding the material on the human movement system, knowing the learning outcomes of class XI students regarding the material on the human movement system, knowing the students' exercise habits, knowing the relationship between learning experiences regarding the material on the human movement system and students' learning outcomes, and knowing the relationship between learning experiences regarding the material on the human movement system and students' exercise habits.

METHOD

This research is a quantitative study with a survey research variant (Cohen et al., 2018). According to Martono (2011), quantitative research involves collecting numerical data, which is then processed and analysed to obtain scientific information. In survey research, data is collected

using questionnaires as the primary source. Respondents are then asked to complete short answers in the questionnaires, after which the responses from all respondents are processed using specific quantitative analysis techniques.

The quantitative analysis technique used in this study was cross-sectional. According to Cohen et al. (2018), cross-sectional methods are employed to collect information over a relatively short period. Meanwhile, Wang & Cheng (2020) wrote in their journal that a relatively shorter time period, compared to cross-sectional methods, can be the best way to determine prevalence and study the relationship between various exposures and outcomes. By reaching a large sample size, cross-sectional methods can be conducted by administering questionnaires. Based on this, this study was conducted to examine the relationship between learning experiences in Biology on the human musculoskeletal system and students' learning outcomes and exercise habits.

This research was conducted at a public high school in Sleman Regency, which has a total of four classes in the Mathematics and Natural Sciences (MIPA) study group and a Special Sports Class (KKO) as a comparison in the research observations and interviews. The sample was taken from the entire population using a non-probability sampling technique, specifically saturation or census sampling, involving 124 students. The data collection techniques employed in this study included a Likert scale questionnaire and test questions.

Research Instruments

Data collection instruments for each variable include: (1) learning experience and exercise habits variables were measured using a Likert scale questionnaire with 20 question items and 23 question items; (2) learning outcome variables were measured using multiple-choice test questions with 25 question items. The scoring for each question item is shown in Tables 1 and 2.

Table 1. Alternative scores for the questionnaire on students' learning experiences and exercise habits

Alternative Answers	Score	
	Positive	Negative
Strongly Agree (SS)	4	1
Agree (S)	3	2
Disagree (TS)	2	3
Strongly Disagree (STS)	1	4

Table 2. Alternative scores for learning outcome test answers

Alternative Answers	Score
True	1
False	0

Five learning aspects guide the preparation of learning experience instruments, as outlined in Permendikbud Number 81A of 2013, which are presented in Table 3.

Table 3. Grid of learning experience instruments

Variable	Aspects	Number	Question Type	
			Positive	Negative
Learning Experience on Human Movement System Material	Observing	1, 2, 3, 4	1, 2, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	7, 8
	Asking	5, 6, 7, 8		
	Gathering information	9, 10, 11, 12, 13		
	Associating	14, 15, 16, 17		
	Communicating	18, 19, 20		

The arrangement of learning outcome questions is shown in Table 4.

Table 4. Grid of student learning outcome instruments

Variables	Aspect	Instrument number
Student Learning Outcomes	Remembering	1, 2, 7, 11
	Understanding	5,
	Applying	10, 16, 18, 19, 22
	Analysing	3, 4, 6, 8, 9, 12, 13, 14, 15, 17, 20, 21, 23, 24
	Evaluating	25

The compilation of the exercise habit instrument is shown in Table 5.

Table 5. Exercise habit instrument grid

Variables	Aspects	Instrument number	Question type	
			Positive	Negative
Student Exercise Habits	Exercise Habits	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	1, 2, 3, 4, 6, 7, 8, 10, 11, 12, 13, 14, 15	5, 9, 16, 17, 18, 19, 20, 21, 22, 23
	Benefits of Exercise	11, 12, 13, 14, 15		
	Daily Lifestyle	16, 17, 18, 19, 20, 21, 22, 23		

Data Analysis

Data analysis was conducted descriptively for each variable, namely Learning Experience (X), Learning Outcomes (Y1), and Exercise Habits (Y2). Descriptive data analysis aims to determine the average and standard deviation. After the results of the descriptive data analysis are known, the results are then entered into a categorisation table according to Azwar (2012) for each variable and each aspect within each variable, as presented in Table 6.

Table 6. Descriptive analysis categories

Interval	Category
$M + 1{,}5SD < X$	Very high
$M + 0{,}5SD < X \leq M + 1{,}5SD$	High
$M - 0{,}5SD < X \leq M + 0{,}5SD$	Moderate
$M - 1{,}5SD < X \leq M - 0{,}5SD$	Low
$X \leq M - 1{,}5SD$	Very low

Next, quantitative data analysis was conducted to test the hypothesis, following the results of the descriptive data analysis on each variable and its respective aspects. The quantitative data analysis conducted included normality tests, linearity tests, correlation tests, and cross-tabulations. The normality test in this study used the Kolmogorov-Smirnov Test. Decision making in the Kolmogorov-Smirnov Test is as follows: if the significance value or probability value is <0.05, the distribution is not normal, and if the significance value or probability value is >0.05, the distribution is normal (Nuryadi et al., 2017).

Correlation tests are conducted to measure the degree of relationship between two variables (Cohen at al., 2018). This study employed the Product-Moment Correlation, also known as the Pearson Correlation test. Pearson correlation is conducted between two variables with normally distributed data (Cohen at al., 2018). Guidelines for interpreting the Product-Moment Correlation

coefficient, as outlined by Riduwan (2016), are presented in Table 7.

Table 7. Guidelines for interpreting correlation coefficients

Coefficient Interval	Relationship Level
0,00 – 0,199	Very high
0,20 – 0,399	High
0,40 – 0,599	Moderate
0,60 – 0,799	Low
0,80 – 1,000	Very low

Cross-tabulation is used to interpret the results of the data analysis that have been obtained. Some provisions must be considered in interpreting data based on the results of descriptive statistical analysis, namely, if it is assumed that there is one variable that acts as an influencing variable, and another as an affected variable, then the direction of the cross-tabulation percentage calculation is calculated in the same direction as the influencing variable. The interpretation of cross-tabulation is done by comparing the percentage figures in the table cells in the same direction as the influencing variable (Yuliarmi & Marhaeni, 2019), as presented in Figure 1.

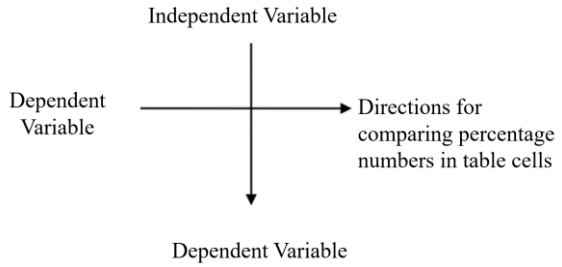


Figure 1. Direction of cross-tabulation calculation

RESULTS AND DISCUSSION

Result

The data collected in this study consisted of learning experiences on the human musculoskeletal system, student learning outcomes, and exercise habits. Each of these data sets can be seen below:

Learning Experience

The results of measuring the learning experience of the human motor system material are shown in Figure 2. Based on the pie chart, overall student learning experience can be seen that seven students (6%) are in the very low category, 33 students (26%) are in the low category, 48 students (39%) are in the medium category, 25 students (20%) are in the high category, and 11 students (9%) are in the very high category. Therefore, it can be concluded that the learning experience of students on the human movement system material in grade XI falls into the medium category, at 39%. From these results, if we examine the categorisation from each aspect —namely, observing, asking, collecting information, associating, and communicating —the percentages are presented in Table 7.

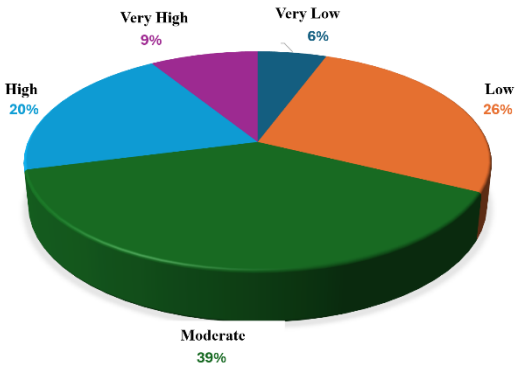


Figure 2. Pie chart of learning experience categorisation

Table 7. Learning experience categories for each aspect

Criteria	M1	M2	M3	M4	M5
Very low	8%	7%	3%	9%	4%
Low	17%	33%	42%	13%	11%
Moderate	45%	23%	25%	56%	63%
High	19%	34%	23%	11%	14%
Very high	11%	3%	7%	12%	9%

Description:
M1 = Observing Aspect
M2 = Asking Aspect
M3 = Information Gathering Aspect
M4 = Associating Aspect
M5 = Communicating Aspect

Learning outcomes

The results of measuring student learning outcomes are presented in Figure 3.

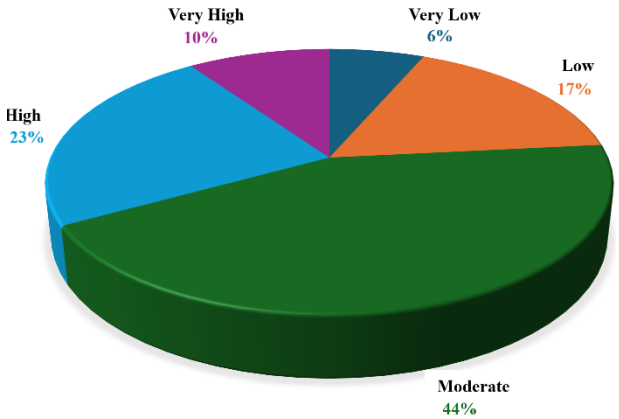


Figure 3. Pie chart of learning outcome categorisation

Based on Figure 3, overall student learning outcomes can be seen that eight students (6%) are in the very low category, 21 students (17%) are in the low category, 54 students (44%) are in the moderate category, 29 students (23%) are in the high category, and 12 students (10%) are in the very high category. Therefore, it can be concluded that the learning outcomes of class XI students fall into the moderate category, at 44%. From these results, if we examine the

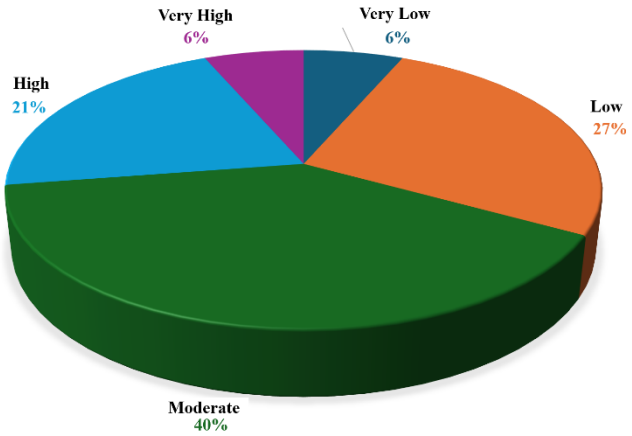
categorisation of each aspect used —namely, remembering, understanding, applying, analysing, and evaluating —the percentages are presented in Table 8.

Table 8. Learning outcome categories for each aspect

Criteria	Remembering	Understanding	Applying	Analysing	Evaluating
Very low	18%	0%	6%	7%	9%
Low	82%	36%	23%	15%	0%
Moderate	0%	0%	63%	52%	91%
High	0%	65%	0%	17%	0%
Very high	0%	0%	9%	10%	0%

Exercise Habits

The results of measuring students' exercise habits are shown in Figure 4.



Gambar 4. Diagram lingkaran kategori kebiasaan olahraga

Based on Figure 4, overall, students' exercise habits can be seen to be in the very low category of 8 students (6%), low as many as 33 students (27%), moderate as many as 49 students (40%), high as many as 26 students (21%), and very high as many as eight students (6%). Therefore, it can be concluded that the exercise habits of grade XI students fall into the moderate category, at 40%. From these results, if we examine the categorisation of each aspect used, namely exercise habits, benefits, and daily lifestyle, the percentages are presented in Table 9.

Table 9. Categories of exercise habits for each aspect

Criteria	Exercise Habits	Benefit	Daily Lifestyle
Very low	4%	3%	6%
Low	29%	36%	21%
Moderate	34%	18%	43%
High	27%	35%	25%
Very high	7%	9%	6%

This study aims to determine the learning experience of the human movement system material for class XI students, to find out the learning outcomes of class XI students, to find out the students' exercise habits, to find out the relationship between the learning experience of the human movement system material and the students' learning outcomes, and to find out the relationship between the learning experience of the human movement system material and the

students' exercise habits. The data from the analysis of learning experiences, learning outcomes, and exercise habits are known. The next step is to determine the relationship between the learning experience variable (X) and the learning outcome variable (Y_1), as well as the relationship between the learning experience variable (X) and the learning outcome variable (Y_2). The exercise habit variable (Y_2) is evident in the normality test and correlation test, as shown in the Pearson Correlation test and cross-tabulation in Tables 10, 11, and 12.

Table 10. Normality test result

No	Connection	Significance	Interpretation
1.	X and Y_1	0.751	Normal
2.	X and Y_2	0.104	Normal

Based on Table 10, it is evident that the relationship between X and Y_1 has a significance value of 0.751 < 0.05, and the relationship between X and Y_2 has a significance value of 0.104 < 0.05, indicating that the data is normally distributed. Since the entire dataset is normally distributed, the analysis employed is a parametric analysis.

Table 11. Linearity test results

No	Connection	Significance	Interpretation
1.	X and Y_1	0.2	Linear
2.	X and Y_2	0.513	Linear

Based on Table 11, it is evident that the relationship between X and Y1 has a significance value of 0.2, which is greater than 0.05, and the relationship between X and Y2 has a significance value of 0.513, which is also greater than 0.05. This result indicates a linear relationship between variables X and Y1, as well as between X and Y_2.

Table 12. Results of the Pearson correlation test

No	Correlation	Sig. (2-tailed)	Degree of Correlation	Interpretation
1.	X and Y_1	01128	01137	Uncorrelated
2.	X and Y_2	01000	01454	Correlated

Based on Table 12, the correlation value between X and Y_1 is 0.128, which is greater than 0.05, with a correlation coefficient of 0.137. Therefore, it can be concluded that there is no correlation between X and Y_1. Meanwhile, the correlation value between X and Y_2 is 0.000 < 0.05, with a correlation coefficient of 0.454, indicating a moderate positive correlation between X and Y2.

To interpret the results of the data analysis, a cross-tabulation test was used, as shown in Tables 13 and 14.

Based on the data in Table 13, the cross-tabulation between the learning experience (X) and learning outcomes (Y_1) variables predominantly falls in the moderate category, indicating that students with moderate levels of learning experience also tend to have moderate learning outcomes. This result is consistent with the descriptive analysis.

Based on the data in Table 14, the cross-tabulation between the learning experience (X) and exercise habits (Y_2) is predominantly in the moderate category, indicating that students with moderate levels of learning experience also exhibit moderate influence on their exercise habits. This result is consistent with the descriptive analysis.

Table 13. Cross-tabulation between learning experience and learning outcomes

		LO					Total
		VL	L	M	H	VH	
LE	VL	0 (0.0%)	2 (1.6%)	1 (0.8%)	2 (1.6%)	2 (1.6%)	7 (5,6%)
	L	0 (0.0%)	8 (6.5%)	18 (14.5%)	6 (4.8%)	1 (0.8%)	33 (26,6%)
	M	6 (4.8%)	9 (7.3%)	20 (16.1%)	10 (8.1%)	3 (2.4%)	48 (38,7%)
	H	1 (0.8%)	2 (1.6%)	11 (8.9%)	6 (4.8%)	5 (4.0%)	25 (20,2%)
	VH	1 (0.8%)	0 (0.0%)	4 (3.2%)	5 (4.0%)	1 (0.8%)	11 (8,9%)
Total		8 (6,5%)	21 (16.9%)	54 (43.5%)	29 (23.4%)	12 (9.7%)	124 (100.0%)

Notes:

LE = Learning experience
LO = Learning outcome
VL = Very low
L = Low
M = Moderate
H = High
VH = Very high

Table 14. Cross-tabulation between learning experience and exercise habits

		EH					Total
		VL	L	M	H	VH	
LE	VL	3 (2.4%)	4 (3.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	7 (5.6%)
	L	2 (1.6%)	15 (12.1%)	10 (8.1%)	6 (4.8%)	0 (0.0%)	33 (26.6%)
	M	2 (1.6%)	12 (9.7%)	18 (14.5%)	12 (9.7%)	4 (3.2%)	48 (38.7%)
	H	1 (0.8%)	2 (1.6%)	10 (8.1%)	9 (7.3%)	3 (2.4%)	25 (20.2%)
	VH	0 (0.0%)	0 (0.0%)	3 (2.4%)	7 (5.6%)	1 (0.8%)	11 (8.9%)
Total		8 (6.5%)	33 (26.6%)	41 (33.1%)	34 (27.4%)	8 (6.5%)	124 (100.0%)

Notes:

LE = Learning experience
EH = Exercise habits
VL = Very low
L = Low
M = Moderate
H = High
VH = Very high

Discussion

Students' Learning Experiences on the Human Movement System

The results of the descriptive analysis of students' learning experiences with the human motor system material fall into the moderate category. The learning experience variable (X) falls into the moderate category, with 48 students (39%) out of a total of 124 students. The results of the analysis of student learning experiences, based on the 5M aspect categories, indicate that the 'communicating' aspect has a significantly higher value compared to the other aspects. The order

from the highest to the lowest categorisation is as follows: communicating in the moderate category, associating in the moderate category, observing in the moderate category, gathering information in the low category, and asking in the high category. All three aspects — communicating, associating, and observing — are in the moderate category. One aspect that needs to be considered is the gathering of information, which falls into the low category. According to Yusra (2021), information is essential for effective decision-making. A journal written by Rohmiyati (2018) states that the development of the times has brought mass media that fulfils the needs of fantasy, entertainment, and information, giving rise to a new network called social media. Social media has become extremely popular, making interaction and information accessible quickly and easily for all groups (Rasyid, 2023).

A review of interviews with teachers and students in the background of this study reveals that students often exploit the ban on device use during lessons to access social media and other resources outside of the learning materials. This fact aligns with the data analysis, which indicates that students' low information gathering performance is not due to their inability to gather information related to learning materials on social media and the internet, but rather because the information students access on social media and the internet is outside of the learning materials during the lessons, even during class time.

This high level of device use among students is also a result of the lockdown during the COVID-19 pandemic. During the pandemic, device use has become crucial because the entire learning process is conducted and monitored online (Handoko, 2022). Of course, such a policy during the pandemic will inevitably have an impact, namely, student dependence on devices. This dependence persists even when learning returns to offline learning. Therefore, teachers should provide guidance to students rather than prohibit them from using devices in class (Miranda & Wibowo, 2023). Teachers can, for example, assign students assignments related to material that effectively utilises social media and the internet, rather than prohibiting them from using devices altogether in class. In fact, prohibitions often have the opposite effect.

Student Learning Outcomes on the Human Movement System Material

The results of the descriptive analysis of student learning outcomes on the material of the human locomotor system are in the moderate category. The learning outcome variable (Y_1) falls into the moderate category, with 54 students (44%) of the total 124 students. Of the five aspects of Bloom's Taxonomy used in this study, the evaluating aspect has a much higher value compared to the other aspects. The order from highest to lowest category is as follows: evaluating in the moderate category, remembering in the low category, understanding in the high category, applying in the moderate category, and analysing in the moderate category. This result indicates that students' abilities are considered quite capable of high-level critical thinking when viewed from the evaluation aspect, which falls within the moderate scope compared to other aspects, with the highest level. However, it is worth noting that students' abilities in the remembering aspect (C1) fall into the second-lowest category, after the evaluating aspect (C5). The remembering aspect is a fundamental aspect of knowledge that requires students to recall lessons that have been taught. The low recall aspect indicates that students' memory falls into the low category, meaning they tend to forget materials that have been studied in the past. If students' memorisation skills are consistently low, this can impact their critical thinking skills, as memorisation is a fundamental aspect that is directly related to critical thinking skills.

In their journal, Aini et al. (2018) wrote that students' critical thinking skills in biology can be improved by conditioning the learning process, minimising memorisation and instead focusing

on providing students with problems. This conditioning of the learning process and the focus on providing students with problems are the teacher's role and responsibility. This result ensures that students not only perceive biology as boring because the entire material is memorised, but also that they are stimulated to learn biology because their critical thinking skills are trained (Mahardita & Pratama, 2022). Furthermore, Faris et al. (2025) stated that learning outcomes are determined by the conscious and well-planned interaction between teachers and students, aimed at improving student abilities, both inside and outside the classroom. Therefore, it can be assumed that the learning outcomes of students in this moderate category are. Particularly in the aspect of memory, which is relatively low, this may also be due to a lack of interaction between the teacher and students, preventing them from properly absorbing the material delivered by the teacher. Many things may occur based on the interaction between students and teachers. It could be that students are not comfortable with the teacher's teaching method, or the teacher also does not approach students intensively. Therefore, teachers need to evaluate and improve the learning approach provided to students in the classroom to increase interaction, which will also have a positive impact on improving student learning outcomes, especially in terms of students' memory and critical thinking skills.

Sports Habits of Science Students

The results of the descriptive analysis of students' exercise habits are in the moderate category. The exercise habit variable (Y_2) falls into the moderate category, with 49 students (40%) out of a total of 124 students. In the analysis of students' exercise habits in these three aspects, it is evident that the daily lifestyle aspect has a significantly higher value compared to the other two aspects. The daily lifestyle in the moderate category is in first place, followed by benefits in the low and high categories, which are in second and third place, respectively. Finally, exercise habits in the medium and low categories are in fourth and fifth place. From the order of these aspect categories, it can be seen that students' daily lifestyle plays the most significant role when compared to their concern for the benefits of exercise and discipline in exercising. However, examining the benefits aspect in the low and high categories reveals that some students do not understand or may not care about the benefits of exercise, while others do. However, if inferred from the data obtained, it is possible that students who understand the benefits of exercise only understand them to a certain extent but do not apply their exercise habits to achieve these benefits (Isnaini & Rahayu, 2023).

The moderate and low exercise habits indicate that most students have not yet adopted a regular exercise pattern, supported by a daily lifestyle that is ranked first. This statement suggests that students' predominantly sedentary daily lifestyles play a greater role than their exercise habits. They may engage in minimal exercise, or even no exercise at all, due to a lack of interest and motivation. This predominantly sedentary lifestyle is also a consequence of the COVID-19 pandemic, which, in a sense, has "trained" students to adopt a sedentary lifestyle and reduced their interest in exercise. Similar research findings from a journal by Laksono et al. (2021) emphasise that individual lifestyles, including exercise habits and clean and healthy living, have changed significantly before and after the pandemic. The most obvious reduction in physical activity is dietary patterns. In contrast, work, school, and social activities have had to be conducted remotely during the pandemic, resulting in a decrease in overall physical activity levels.

Studies on health literacy in science learning indicate the need for greater attention (Puspita & Subiantoro, 2022). Grade 11 students in Mathematics (and, in general, in science) have the opportunity to learn about health literacy, including exercise habits, particularly in the human

musculoskeletal system. Compared to students in the Social Studies-based Sports Special Class (KKO), as well as students from other majors who do not receive Biology, students in the Mathematics and Natural Sciences major should have a much better understanding of the impact of a sedentary lifestyle and a greater appreciation of the importance of exercise habits for its many benefits, one of which is improved cognitive abilities. In this regard, teachers play a crucial role in increasing motivation and, of course, providing good examples for students on how to apply the knowledge of the human musculoskeletal system in everyday life, namely maintaining health by adopting the habit of exercising. Teachers can not only motivate students by encouraging them, but can also explain and provide examples. If students want their cognitive abilities to develop well while maintaining their physical and spiritual well-being, one way they can achieve this is by becoming accustomed to exercising regularly.

The Relationship between Learning Experiences on Human Movement System Material and Student Learning Outcomes

The results of the Pearson Correlation test indicate that learning experience in the human motor system material has no relationship to student learning outcomes. A cross-tabulation reveals that the number of students with moderate learning experience who achieve moderate learning outcomes is significantly higher than that of students with other outcomes. This finding is consistent with the statistical analysis of the learning experience and learning outcome variables, both of which fall into the moderate category. However, there are also a considerable number of students with low learning experiences but moderate learning outcomes. There are also a considerable number of students with high learning experiences but moderate learning outcomes. The cross-tabulation analysis reveals differences among students. According to the theory proposed by Meriyati (2015), these differences represent unique characteristics of individual students. Meriyati states that student characteristics have a positive relationship with learning outcomes. These characteristics must be recognised and understood by teachers so they can guide students towards meaningful learning (Situmorang et al., 2025). Student characteristics reflect behavioural patterns and abilities that result from both innate and social environments, influencing student activities (Meriyati, 2015). Student characteristics are one of the internal factors that determine learning outcomes, as they originate within the student. Irwandi (2020) wrote in his book that two factors determine learning outcomes: internal and external factors. Internal factors encompass psychological aspects, both innate and acquired through experience, including talent, intelligence, interests, attitudes, needs, habits, motivation, and physical and psychological maturity. Meanwhile, external factors include environmental factors, customs, culture, learning facilities, knowledge, and technology. These two factors influence each other, and the quality of each factor will influence learning outcomes.

According to a research journal by Afriyanti (2021), one of the most important factors in science learning outcomes is study habits. This study found that the stronger a student's study habits, the higher their learning outcomes. Likewise, if students' study habits are poor, their learning outcomes will also be poor. Study habits are the most important factor determining learning outcomes because they shape students' learning behaviour, leading to repeated learning over time, which eventually becomes permanent and automatic. These study habits do not form automatically; they require deliberate effort to cultivate. Furthermore, according to Prasela et al. (2020) in their journal, in schools, the role of teachers as educators plays a crucial and significant role in helping students achieve learning outcomes in accordance with the curriculum used. Furthermore, according to Kurniawati et al. (2019), in the educational aspect, information and

communication technology provides an opportunity to improve the quality of student learning (including learning outcomes) and the quality of teachers' teaching, as access to various sources of information is now widely available to everyone.

Experience can be a factor in determining student learning outcomes, but the most powerful factor influencing learning outcomes is student study habits. This result is because not everyone with learning experience will practice that experience to form habits. Untrained experience is weak, while students' study habits, honed over time, will make them accustomed to and understand the lesson content well, resulting in good learning outcomes. While these study habits can come from within, support from family and the community is also crucial. One such support is the school environment. Teachers play a crucial role in motivating students to cultivate study habits, ensuring not only learning experiences but also the ability to cultivate them. This motivation is not just about words; teachers can also be motivators by providing a comfortable and engaging learning environment for students. One way teachers can do this in today's era is by utilising information technology, which is popular with many students, to create engaging learning tools and assignments.

The Relationship between Learning Experiences on Human Movement System Material and Students' Exercise Habits

The results of the Pearson Correlation test indicate that learning experience regarding the human musculoskeletal system has a positive relationship with students' exercise habits. The data analysis of the relationship between the two variables is indicated by a correlation degree or r value of 0.454 with a significance value of 0.000. As we know in the Pearson Correlation test, to obtain a positive relationship value, the requirement is that the significance value must be <0.005. Furthermore, a correlation degree of 0.454 indicates that the relationship between the two variables is at a moderate level. According to the analysis results, it is evident that the higher a student's learning experience, the more likely they are to have good exercise habits. Conversely, the lower the student's learning experience, the lower their exercise habits tend to be. In the descriptive analysis section, the learning experience variable (X) falls into the moderate category, with 48 students (39%) out of a total of 124 students.

Similarly, the exercise habits variable (Y2) falls into the moderate category, with 49 students (40%) out of a total of 124 students. Therefore, based on the data analysis results, it can be concluded that the two variables have a positive relationship with a moderate level of correlation. A cross-tabulation reveals that the majority of students with moderate learning experiences also have moderate exercise habits. This finding is consistent with the statistical analysis, which revealed that both learning experiences and exercise habits fell into the moderate category. However, there were also students with moderate learning experiences but high exercise habits. There were also students with high learning experiences but moderate exercise habits. A significant number of students even had low learning experiences but high exercise habits. These differences among students indicate that each student has unique characteristics.

Furthermore, differences in exercise interests can also explain why some students have low learning experiences but high exercise habits, or vice versa. Overall, the majority of students have moderate learning experiences and moderate exercise habits. According to a journal article by Antonius & Pramono (2022), several factors influence exercise interest, including physical, psychological, family, and environmental factors. Furthermore, the relationship between learning experiences on the human musculoskeletal system and students' exercise habits suggests that learning experiences on the human musculoskeletal system have an impact on students' exercise

habits. Research conducted by Mahardika (2021) indicates that regular exercise, leading to a healthy and strong physique, positively impacts students' ability to participate in the learning process, develop logical and critical thinking skills, and achieve optimal problem-solving abilities. This relationship between the two factors, in turn, impacts student motivation and learning outcomes.

Learning experiences about the human musculoskeletal system can increase students' awareness of the importance of maintaining healthy exercise habits. If students' learning experiences are poor, they will automatically lose their awareness of the importance of exercise habits. If these exercise habits can be consistently practised and improved, not only will they improve their physical health, but also their ability to learn in the classroom, leading to optimal learning outcomes. Despite differences in learning experiences and student interests in exercise, students will still perform significantly better if they can apply their learning experiences to exercise habits. In this case, teachers at school play an important role in increasing students' motivation and interest, enabling students to develop their learning experiences through exercise habits that promote physical health and enhance their learning abilities in the classroom.

CONCLUSION

Based on the research that has been conducted, it can be concluded that: (1) The learning experience of class XI students regarding the material on the human movement system is in the moderate category. The aspect of communication is in first place, with a moderate category, while the aspect of collecting information is in last place, with a low category. (2) The learning outcomes of class XI students regarding the material on the human movement system are in the moderate category. The aspect of evaluating is in first place with a high category, while the aspect of remembering is in second place with a low category. (3) The exercise habits of class XI MIPA students are in the moderate category. The aspect of daily lifestyle is in first place, categorised as moderate, while the aspect of exercise habits is in last place, categorised as low. (4) There is no relationship between the learning experience of the material on the human movement system and student learning outcomes. This result is because learning experience is not the only factor that influences student learning outcomes. It is widely acknowledged that the most significant factor influencing student learning outcomes is learning habits. (5) There is a relationship between the learning experience of the material on the human movement system and students' exercise habits. The form of the relationship between the two is positive, categorised as moderate. This result suggests that the higher the learning experience, the more effective the student's exercise habits. Conversely, the lower the learning experience, the lower the student's exercise habits.

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