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Drinking Coffee and Learning Approach, Not Learning Style, Support Medical Students' Block Completion

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Abstract

Purpose: This research was conducted to determine and analyse the relationship between drinking coffee, learning styles, and approaches with block completion in medical students.
Methodology: The research method used was observational analytics with 80 third-year students of the Faculty of Medicine, Universitas Muhammadiyah Surakarta (FK UMS), Sukoharjo, Central Java, Indonesia as the samples. Purposive random sampling was used to select samples who met the restriction criteria. To identify relationships and influences between variables, the collected data was analysed using Chi-square test with the alternative Fisher exact test and logistic regression test.
Results: There was a significant relationship between drinking coffee (p=0.012) and learning approach (p=0.001) with block completion, but not between learning style with block completion (p=0.594). Learning approach had a stronger relationship. The probability of block completion reaching 98.4% if students drink coffee and use a deep learning approach to prepare for the block exam.
Applications/Originality/Value: Drinking coffee and applying a deep approach to learning, support a greater block completion rate.

Introduction Section

The medical faculty lecture system uses a block system in accordance with the Indonesian Doctor Competency Standards (Standar Kompetensi Dokter Indonesia/SKDI) (KKI, 2019). Block lectures carried out by the Faculty of Medicine, Universitas Muhammadiyah Surakarta (FK UMS) in one semester generally consist of 4-6 blocks with a travel time for each block of 4-6 weeks (FK UMS, 2022). This busy system makes students run out of time and rush to complete coursework or prepare for exams.

Because of this hectic time, students try to ward off drowsiness and fatigue with various ways, one of which is by drinking drinks that contain of caffeine, such as coffee. The active component caffeine in coffee can have a psychostimulant effect. If consumed in the right amount, caffeine can improve focus, memory, and reduce fatigue and sleepiness. Based on a survey conducted in Bali, 91.9% of 491 medical students consumed coffee. For a month, students usually consume one to three glasses of coffee every day (Rizal & Afriandi, 2022).

It is also known that student's learning style and learning approach can influence block completion (Triastuti, 2022). Every student has their own style of learning. Learning style is the way students use to obtain information and apply it (Prasetyarini, Hikmat, & Thoyibi, 2021). The types of learning styles coined by Neil Fleming, include Visual, Auditory, Read/Write, and Kinesthetic (VARK) learning styles (Riezky & Akmalia, 2019). Students with a visual learning style rely on the sense of sight, students with an auditory learning style rely on the sense of hearing, students with a reading/writing learning style prefer text over images, and the kinesthetic learning style allows students to learn through physical practice (Triastuti, 2022). Learning styles can also be developed by combining several different learning styles. Students who have a strong preference for one learning style are called unimodal, while students who generally have a balanced preference for more than one learning style are called multimodal (Hardiansyah, 2014). The majority of medical students use a multimodal learning style. Based on previous research, there are differences in learning achievement between unimodal and multimodal learning styles. Students with a multimodal learning style are superior to students with an unimodal learning style (Oktarindri, 2016). This research contradicts the findings of Riezky & Akmalia (2019) that medical students with an unimodal learning style, especially auditory, pass block exams more often than those with other learning styles.

The methods a person uses to learn and achieve their goals are known as learning approaches. Learning approaches are classified into two, namely deep and surface approaches (Tamardiyah, 2017). The deep approach is based on intrinsic motivation or high curiosity with a commitment to excel in academics, as well as meaningful learning strategies. The surface approach has an instrumental learning motivation that arises as a result of external encouragement (extrinsic), while the strategy is reprocessing. A deep approach to learning can produce better quality and learning outcomes compared to a surface approach (Triastuti, 2022). The study conducted by Lisiswanti et al. (2015) proves that the majority

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of students with a high final block exam pass rate use an in-depth approach. The results of this study are not in line with the research of Kuniya et al. (2018) who stated that there was no correlation between learning styles and learning approaches with the results of the anatomy practicum exam at the Faculty of Medicine, Universitas Lampung.

The problems and obstacles faced by medical students in getting a block completion, served as a basis for researchers to conduct this research.

Method

Research Design

This study was designed using an observational analytical research type with a cross-sectional approach.

Research Sample

The research sample was 80 third-year students of the Medical Education Study Program (Program Studi Pendidikan Dokter/PSPD), FK UMS who took the Endocrine and Metabolism block. The sample selection used a purposive random sampling technique, with inclusion criteria including PSPD FK UMS students of the 2021 batch who took the Endocrine and Metabolism block, were willing to be respondents and fill out the questionnaire completely.

Variables and Operational Definitions

The independent variables in this study were drinking coffee, learning styles, and learning approaches. The dependent variable in this study was block completion. Drinking coffee is drinking a beverage that contains coffee or caffeine, even only one glass when prepare for the exam. Learning style is the way students get information and apply it. Learning approach is a person's way of completing and achieving learning goals.

Research Procedure

Primary data were obtained from the answers to the drinking coffee questionnaire, VARK, and R-SPQ-2F, while secondary data in the form of block transcripts were obtained from the Endocrine and Metabolism block coordinator.

Data Analysis

The collected data processed and analysed using the SPSS version 25 application. Bivariate analysis was carried out using the Chi-square test and the Fisher exact test as an alternative, while multivariate analysis used the logistic regression test to see the relationship and magnitude of influence between variables. This study has passed the ethical feasibility test by the Health Research Ethics Commission of Dr. Moewardi Hospital with number 1.988/X1/HREC/2023 on November 6, 2023.

Results and Discussion

Based on descriptive analysis of respondents, the characteristics of gender, age, drinking coffee, learning style, learning approach, and block completion were obtained as seen in Table 1.

Table 1. Overview of Respondent Characteristics

Variable	n	%
Gender		
Male	16	20.0
Female	64	80.0
Age (year)		
19	8	10.0
20	45	56.3
21	23	28.7
22	4	5.0
Drinking coffee		
Yes	41	51.2
No	39	48.8

Variable	n	%
Learning style		
Unimodal	66	82.5
Multimodal	14	17.5
Learning approach		
Deep approach	58	72.5
Surface approach	22	27.5
Block completion		
Complete	67	83.8
Uncomplete	13	16.3

Respondent characteristics based on gender showed that 64 student (80%) of the respondents are female. Based on age, the majority of respondents are 20 years old, namely 45 students (56.3%). Of the 80 respondents, 51.2% of students drinking coffee. The learning style used by most students is the unimodal learning style, namely 82.5%. The deep type of learning approach was owned by most students, namely 72.5%. The majority of students can complete the block with a percentage of 83.8%.

The results of the bivariate analysis regarding the relationship between drinking coffee and the block completion using Chi-square test, can be seen in Table 2.

Table 2. Analysis of Drinking Coffee with Block Completion

Drinking Coffee	Block Completion						p
	Complete		Uncomplete		Total		
	n	%	n	%	n	%	
Yes	39	48.8	2	2.5	41	51.2	
No	28	35.0	11	13.8	39	48.8	0.012
Total	67	83.8	13	16.3	80	100.0	

Table 2 showed that from 80 respondents, most students (51.2%) drank coffee to prepare for the block exam. Out of 41 students who drank coffee, 48.8% completed the block and 2.5% failed the block. While, the 39 students who did not drink coffee, 35% completed the block and 13.8% failed the block. There was a statistically significant relationship between drinking coffee and the block completion, as shown in Table 2 with a p-value <0.05.

The significant relationship between drinking coffee and the block completion obtained from this study was in line with a study conducted by Dharmadi et al. (2021) which the results showed that there was a significant relationship (p = 0.045) between coffee consumption in the night before the exam and the chance to complete the block exam. The findings of this study were associated with the role of caffeine as an adenosine receptor antagonist. This caffeine role could increase the activity of the neurotransmitter, norepinephrine and dopamine, which also could increase concentration and alertness. This mechanism was proven by Agung et al. (2022) who conducted a study on 100 students and the results showed that coffee consumption had correlation with student's learning concentration (p = 0.03). Neurotransmitter acetylcholine also can increase due to the effects of caffeine consumption, and it can trigger excitation of the hippocampus as the centre of memory processing, so that the memory will be increase. Uhya et al. (2021) also have proven that there was an effect of drinking coffee on short-term memory in medical students (p = 0.000).

When consumed in moderate amounts (less than 400 mg), coffee was known to improved physical condition, reduce feelings of tiredness and drowsiness, and help improved cognitive function, including alertness, memory, and concentration. Drinking coffee has become a habit among college students that can help them stay focused, especially when they were sleep deprived or when preparing for exams (Br Ginting, Astiarani, Santi, & Vetinly, 2022). According to Manoppo (2020), improving cognitive function was very important to prepared for the block exam, which indirectly affects the block exam completion.

The relationship between learning styles and block completion was analysed using the Fisher exact test because the multimodal learning style group that did not complete the block had an expected count value < 5, which means that the Chi-square test cannot be performed. The results of the bivariate analysis regarding the relationship between learning style and the block completion can be seen in Table 3.

Table 3. Analysis of Learning Styles with Block Completion

Learning Style	Block Completion						p
	Complete		Uncomplete		Total		
	n	%	n	%	n	%	
Unimodal	55	68.8	11	13.8	66	82.5	0.594

Multimodal	12	15.0	2	2.5	14	17.5
Total	67	83.8	13	16.3	80	100.0

Table 3 showed that from 80 respondents, most students (82.5%) use the unimodal learning style. Out of 66 students with unimodal learning style, 68.8% completed the block and 13.8% failed the block. While, the 14 students with multimodal learning style, 15% completed the block and 2.5% failed the block. There was no relationship between the learning style and block completion, as shown in Table 3, with the p value > 0.05.

Analysis result of the relationship between learning styles and block completion obtained insignificant result. This result in line with the study conducted on 82 students of dentistry study programme Universitas Muhammadiyah Yogyakarta (PSKG UMY), by Kurniasih & Azzahraa (2020). The result showed that there was no significant relationship between learning styles and multiple-choice questions (MCQ) exam results (p = 0.392). In addition, Saswati's (2023) research found that there was no significant correlation between VARK learning styles and academic achievement (p = 0.694).

The absence of a relationship between learning styles and block completion of students in the FK UMS may be caused by the students' inability to understand their learning styles and the applications of their styles were not in accordance with the learning activities (Saswati, 2023). As was known, the lecture system at FK UMS used learning activities such as skills labs and tutorials, which require students to be able to use all learning styles in order to achieve learning goals (FK UMS (2022); Saswati (2023)). Therefore, the students which only used one type of learning style were less able to maximize the process of absorbing information from the learning activities (Kurniasih & Azzahraa (2020); Saswati (2023)). However, basically, whatever learning styles the students used, as long as they can maximize the learning style used, the student would still be able to achieve or complete the exam (Dariyanti, Manafe, Sihotang, & Folamauk, 2021).

The category of the surface approach learning group that did not complete the block had an expected count value < 5, which means that the Chi-square test cannot be performed and the Fisher exact test was used as an alternative. The results of the bivariate analysis regarding the relationship between learning approach and the block completion can be seen in Table 4.

Table 4. Analysis of Learning Approach with Block Completion

Learning Approach	Block Completion						p
	Complete		Uncomplete		Total		
	n	%	n	%	n	%	
Deep approach	54	67.5	4	5.0	58	72.5	0.001
Surface approach	13	16.3	9	11.3	22	27.5	
Total	67	83.8	13	16.3	80	100.0	

Table 4 showed that from 80 respondents, most students (72.5%) have a deep approach learning approach. Out of 58 students with a deep approach learning approach, 67.5% completed the block and 5% failed the block. While, the 22 students with a surface approach learning approach, 16.3% completed the block and 11.3% failed the block. There was a statistically significant relationship between the learning approach and block completion, as shown in Table 4 with a p value < 0.05.

There was a significant relationship between learning approaches and block completion obtained in this study. This result was in line with the study conducted by Rabbiyanti & Malik (2023) on medical students at Universitas Tarumanegara which showed that the majority of medical students have a deep approach learning and tend to get more satisfying learning outcomes. In addition, this study also found a significant relationship between learning approaches and learning outcomes (p = 0.014). This result supported by research by Mauwalla et al. (2022) which proves that there was a significant impact of learning approaches on completion of computer-based test of competency exam for medical professional programme (UKMPPD CBT) (p = 0.000).

This finding describes that majority of medical students using a deep learning approach to support their learning. This was triggered by the implementation of a problem-based learning curriculum whose learning system was centred on students, so that it automatically helps them achieve meaningful learning. Students with a deep approach were more interested in studying the material thoroughly and considering its application, graduating with good grades, and having broad knowledge were very important to them. In contrast, students who use a surface approach only memorize, do not prioritize broad understanding, and were only interested in studying because of fear of failing the exam (Mauwalla, Anisa, & Firmansyah (2022); Rabbiyanti & Malik (2023)).

Logistic regression test was used in the multivariate analysis of this study. The results of the bivariate analysis showed that only the variables of drinking coffee and learning approaches could be analysed using the logistic regression test, while the learning style variable did not meet the requirements because the p value > 0.25.

Table 5. Multivariate Analysis

Variable	Coefficient	S.E.	Wald	df	p	OR	CI 95%	
							Min	*Max*
Drinking coffee	2.233	0.878	6.466	1	0.011	9.327	1.668	52.139
Learning approach	2.408	0.742	10.520	1	0.001	11.107	2.593	47.578
Constant	-0.507	0.565	0.804	1	0.370	0.602		

The results of the statistical analysis of Table 5 showed that drinking coffee and learning approaches together have a relationship with block completion. The variable that has a stronger relationship with block completion was the learning approach, with an OR of 11.1, while drinking coffee has an OR 9.3. Students who had a deep approach learning have an 11.1 times greater chance to complete the block compared to students who have a surface approach learning approach. Students who drank coffee to prepare for the block exam have a 9.3 times greater chance to complete the block compared to students who did not drink coffee while prepared for the block exam. From the multivariate analysis, the probability of students who drinking coffee and have a deep approach to learning to get a block completion was calculated based on the Eq. (1).

$$p = \frac{1}{(1+exp(-y))} \quad (1)$$

Whereupon:

$$y = constant + a1(1) + a1(2) + \ldots + ax(x) \quad (2)$$

y = -0.507 + 2.233(drinking coffee) + 2.408(deep approach)
y = -0.507 + 2.233(1) + 2.408(1)
y = 4.134

Thus, the probability was:
p = 1/(1+exp(-y))
p = 1/(1+exp(-4.134))
p = 0.984234

From the calculation above, the probability of students who drinking coffee and have a deep learning approach was 98.4% can complete the block.

Based on the multivariate analysis, the results of the study showed that together the variables of drinking coffee and learning approach had a relationship with block completion, although the variables of the learning approach were more closely related to block completion. This was showed that the students who have a deep learning approach and were able to apply it, can help them achieve the learning goals and the expected results (Mauwalla, Anisa, & Firmansyah, 2022). Drinking coffee with its effects that can increase fitness, reduce fatigue and drowsiness, and control cognitive function, can help students in their learning process, so it can increase the possibility of complete the block (Br Ginting, Astiarani, Santi, & Vetinly (2022); Manoppo, 2020).

Conclusions

The findings of this study revealed that there was a relationship between drinking coffee and learning approaches with block completion. Together, drinking coffee and learning approaches have a significant relationship with block completion, but learning approaches have a stronger relationship with block completion. Students who drinking coffee and use a deep learning approach have a 98.4% chance can complete the block. Further research is expected to use qualitative research methods with interview techniques so that the information obtained from respondents is more in-depth, expand the research sample by increasing the number of respondents, and can reveal other factors that influence block completion besides drinking coffee and learning approaches.

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