

# Learning Flow in Café: The Role of Spatial Characteristics

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## Abstract

Cafés have often been used as informal learning spaces by Indonesian college students in recent years. However, as a public space, cafes are considered by several people as not suitable for learning activities that require a high level of concentration. This research aims to identify café spatial characteristics that can affect learning activities and students' flow experience. Flow, as defined by Csikszentmihalyi (1990), refers to a state in which individuals engage in an activity with deep concentration, a sense of control, and intrinsic enjoyment, often accompanied by a loss of time awareness. The relationship between the state of flow and learning activities is also explored. The research uses a mixed-method approach. In the first stage, an exploratory qualitative study was conducted to identify key spatial factors and patterns of student learning in cafés. In the second stage, an explanatory quantitative study was carried out, using closed-ended questions derived from the qualitative findings to test the relationships between spatial characteristics, flow dimensions, and learning activities through factor analysis, regression, and correlation analysis. The analysis results show enjoyment as the dimension of flow experience students tend to encounter when studying in cafes. The findings implied that café spatial characteristics must stimulate positive emotions, prevent visual and audial distractions, and promote social interactions between learners to boost flow and smooth the learning activities.

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## INTRODUCTION

Rapid technological developments allow students to carry out academic learning activities from various places, including public spaces outside campus. In recent years, Indonesian students have been found to conduct learning activities in cafes often (Adityawirawan & Kusuma, 2021; Purwadi & Manurung, 2020). Café has been considered as one of the informal learning spaces outside campus for students (Beckers et al., 2015). Informal learning spaces are spaces where independent learning activities are carried out (Harrop & Turpin, 2013). However, several people consider cafes not conducive to carrying out learning activities, as their nature as public spaces can disrupt students' concentration (Bryant et al., 2009). In a study on the use of cafes as thinking spaces by students in Aceh, Qismullah et al. (2022) stated that one of the factors that can disrupt student learning activities in cafes is noise from inside and outside the café.

Café buildings must accommodate students' learning activities by supporting one of the most important aspects of a learning process: concentration. Concentration is when the focus of attention and complete awareness is directed to the material being studied and the study process itself (Olivia, 2010, in Erwiza et al., 2019). The flow condition is a state of concentration needed for students to have optimal learning performance. In the state of flow, a person will do or work on something with deep concentration, a sense of control, and high satisfaction to the point of forgetting their surroundings (Csikszentmihalyi, 1990).

Students have different perceptions and carry out different learning activities in each informal learning space (Wu et al., 2021). Students were found to use open or communal spaces more often when studying in groups to be

more free to interact with others. However, quiet learning spaces are more needed by students who do individual learning (Beckers et al., 2016). Previous literature has indicated that the state of flow and learning activities can be influenced by the spatial characteristics of the learning space (Csikszentmihalyi, 2014; Gottfried, 2009; Hunter & Cox, 2014; Wu et al., 2021; Zhou et al., 2022).

Despite that, no study has focused on the relationship between spatial characteristics and flow experience when students study in a cafe. Therefore, this research aims to identify the influence of spatial characteristics on the flow experience and students' learning activities while in a cafe. The authors also attempt to determine the correlation between the state of flow and students' learning activities in a cafe. The findings of this research can contribute to the development of knowledge about informal learning spaces and flow, as well as produce design criteria for cafes to accommodate students as one of their user groups.

## LITERATURE REVIEW

Informal learning is a self-directed learning activity conducted by students (Callanan et al., 2011; Harrop & Turpin, 2013). An informal learning space is a place where self-directed learning occurs. Beckers et al. (2015) categorize informal learning spaces into four types: home (private learning spaces), public spaces in the city (such as cafes and public libraries), on-campus areas, and inside school or campus buildings.

Students engage in various types of learning activities within informal learning spaces, either individually or in peer-to-peer setting. These activities can be divided into five stages: 1) delivering, 2) applying, 3) creating, 4) communicating, and 5) decision-making (Fisher, 2005, in Beckers et al., 2016). Learning in higher education is categorized into autonomous learning, interactive or small group learning between students, programmed instructional learning, and network learning (Beckers et al., 2015). Wu et al. (2021) found several factors that influence student learning activities in informal learning spaces, including flexibility, spatial hierarchy, comfort, functionality, supporting facilities, and openness. Student behavior is a key factor in designing successful informal learning spaces. These spaces should address behavioral needs such as interaction, community, retreat, and conversation (Harrop & Turpin, 2013).

The condition in which a person engages in an activity with deep concentration, a sense of control, and high satisfaction to the extent of becoming unaware of their surroundings is known as "flow." This state allows individuals to achieve higher performance in their work (Csikszentmihalyi, 1990). Several factors and conditions that support the occurrence of flow in learning activities (Csikszentmihalyi, 1990, 2014) include:

1. Clear learning goals: Learners can envision the target they want to achieve, along with the steps needed to reach it
2. Immediate feedback: Learners can evaluate the quality of their work during the learning process
3. Enjoyment of the process: individuals find pleasure in the learning process itself
4. Balance between challenge and skill: The learner's skill level matches the difficulty of the learning activity
5. Focus on the learning activity: Learners concentrate solely on the learning material or goal, disregarding outside distractions
6. Balance between enjoyment and concentration: Learners experience enjoyment and focus simultaneously, leading to optimal learning concentration;
7. Forgetting self-limiting thoughts: Learners forget their personal limitations and others' opinions.
8. Loss of time awareness: Learners feel time passes quickly and forget to check the time while engaged in the learning activity.
9. Appreciation of the process: Learners feel satisfied by the process they undergo during learning activities.

## METHODS

This research adopts a mixed-method approach (Creswell, 2007), which begins with exploratory qualitative research, followed by an explanatory quantitative method (Groat & Wang, 2002). The exploratory method investigates "what" aspects by identifying café spatial characteristics and learning activities. Subsequently, the explanatory research addresses the "why" aspects by examining how spatial characteristics, as the independent variable, significantly influence students' flow state and learning activities as the dependent variables. This interconnection of "what" and "why" research questions demands the use of a mixed-method approach to integrate the qualitative and quantitative methods for comprehensive results (Tashakkori & Creswell, 2007). The findings can be generalized from a sample to a population using quantitative data while simultaneously gaining a deeper understanding of the phenomena through qualitative data (Hanson et al., 2005).

### Qualitative Research

The researchers distributed an online questionnaire during the qualitative research data collection phase. This questionnaire included open-ended questions, prompting respondents to provide comprehensive explanations about

the architectural aspects that support their concentration in learning, the learning activities they often perform in cafés, and their reasons for choosing to study in cafes. A non-random sampling method with a snowball sampling technique (Kumar, 2005) was employed to select the research sample. Several university students were asked to complete the questionnaire and requested to forward it to fellow students. The questionnaire was distributed from February 26, 2024, to March 18, 2024, and responses were received from 80 participants, comprising 36.3% males and 63.7% females. The questionnaire respondents were chosen randomly through the snowball sampling method. The questionnaire was shared with students from various universities, who were then asked to distribute it further to other students in their networks, particularly those who often studied in cafés or had prior experience of studying in cafés.

The qualitative questionnaire results were processed using open coding and axial coding methods. The researcher analyzed, conceptualized, and identified segments from each questionnaire response in the open coding phase. These segments were then organized into codes, sub-categories, and categories in the axial coding phase. Coding was conducted using both inductive and deductive approaches. Inductive coding involved deriving codes from the questionnaire data, while deductive coding drew on theories related to informal learning space. Following this, the researcher proceeded to the quantitative phase of the study.

### Quantitative Research

Quantitative data for this study was collected through an online questionnaire distributed to university students using non-random and snowball sampling methods (Kumar, 2005). This questionnaire aimed to identify the spatial characteristics of cafés most frequently visited by students, the learning activities conducted, and the flow experiences students encountered there. The questionnaire consisted of closed-ended questions derived from the codes generated in the qualitative research phase. Questions regarding flow experiences were based on Csikszentmihalyi's (2014) flow theory, with each question using a 6-point Likert scale (Table 1). The questionnaire was distributed from May 11, 2024, to June 8, 2024, receiving responses from 70 participants, of whom 40% were male and 60% were female. Participants for this questionnaire were chosen randomly through the snowball sampling technique. It was initially shared with students from different universities, who were then asked to pass it along to other students within their networks. Similar to the qualitative stage, the questionnaire was intended for students who had prior experience studying in cafes. There were participants who had joined the qualitative phase also took part in the quantitative survey; however, there were also different individuals recruited through the same sampling method.

**Table 1.** Sample Questions in the Quantitative Research Questionnaire

Categories	Questions								
	What are the spatial characteristics of the café you most often visit for studying?	Strongly disagree	1	2	3	4	5	6	Strongly agree
Spatial Characteristics	Modern building design		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Ergonomic tables and chairs		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	How often do you do the following learning activities while studying at the cafe?	Never	1	2	3	4	5	6	Always
Learning activities	Working on reports		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Preparing presentation materials		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	What do you think and feel while doing learning activities in the cafe?	Totally disagree	1	2	3	4	5	6	Strongly agree
Flow experience	I enjoyed the learning process that I did while studying at the cafe.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	I only focus on the assignments or learning materials when studying at the cafe.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

The author analyzes the collected data using principal components analysis and factor analysis. Principal components analysis is employed to determine principal components (latent variables) that can represent measured variables by capturing as much variability as possible from all measured variables, into several main principal components (Kusuma, 2009). In this stage, the latent variables are determined by counting eigenvalues higher than 1. Principal components analysis indicates how strongly each measured variables define the latent variables (Grimm & Yarnold, 1995), thus measurable variables can be grouped into distinct, non-overlapping dimensions. Following this, factor analysis is conducted to determine the definition of each latent variable, based on its measured variables.

The quantitative research analysis then proceeds with regression and correlation analysis. Regression analysis examines how spatial characteristics significantly influence flow experiences and learning activities. Spatial characteristics are independent variables, while flow experience and learning activities are dependent variables. The dimensions of spatial characteristics that significantly influence the dimensions of flow experiences and learning activities are identified by examining the P-value. Relationships with  $p < 0.05$  were considered highly significant, indicating a strong correlation or effect, while relationships with  $0.05 \leq p < 0.1$  were considered weakly significant, reflecting a moderate but noteworthy effect. In correlation analyses, which typically involve many pairs of variables, only relationships with  $p < 0.05$  were considered significant to reduce the risk of false positives and to maintain the reliability and consistency of interpretations. In contrast, regression analyses generally involve a smaller number of independent and dependent variables, making the observed phenomena easier to explain. Therefore, relationships with  $0.05 \leq p < 0.1$  were also reported in regression analysis as weakly significant, since these values can still provide meaningful insights into variable relationships despite a weaker effect.

## RESULTS AND DISCUSSION

### Factor Analysis of Spatial Characteristics, Flow Experience, and Students' Learning Activities in Cafés

The factor analysis of the spatial characteristics of cafés most frequently visited by students resulted in eight dimensions: privacy and serenity; design and comfort; openness and natural elements; layout; supporting facilities; background music; warmth; and spatial intimacy. The dimensions of background music, warmth, and spatial intimacy were excluded from further analysis due to having a Cronbach's alpha value below 0.6. The particular value indicates a low level of reliability.

**Table 2.** Summary Statistics of Spatial Characteristics from Cafés Frequently Visited by Students

Measurable Variables	Privacy and Serenity	Design and Comfort	Openness and Natural Elements	Layout	Supporting Facilities	Background Music	Warmth	Spatial Intimacy
Cronbach's Alpha	0.847	0.813	0.866	0.779	0.889	0.513	0.599	0.214
Mean	4.334	4.900	4.926	4.696	5.464	3.864	4.086	3.236
Variance	4.284	3.137	3.018	2.602	2.497	1.721	1.640	1.532
Cum. Percent	15.867	27.486	38.663	48.300	57.547	63.922	69.994	75.668

**Table 3.** Results of Factor Analysis of Spatial Characteristics from Cafés Frequently Visited by Students

Measurable Variables	Privacy and Serenity	Design and Comfort	Openness and Natural Elements	Layout	Supporting Facilities	Background Music	Warmth	Spatial Intimacy
Privacy	0.845	0.105	0.078	0.078	0.222	-0.009	-0.012	0.041
Serene space	0.790	0.262	0.154	-0.044	0.088	-0.120	-0.075	0.245
Room separation	0.766	0.111	0.114	0.139	0.091	0.038	0.091	-0.055
Natural interior elements	0.635	-0.022	0.158	0.286	0.040	0.079	0.116	-0.048
Spacious gap between seats	0.618	0.069	0.244	0.238	0.311	0.160	0.102	-0.134
Calm colors	0.148	0.730	-0.072	0.073	0.172	0.130	0.179	-0.008
Neutral colors	0.074	0.717	0.202	0.175	0.039	-0.057	-0.050	0.050
Minimalist design	-0.018	0.692	0.115	0.500	0.088	-0.134	-0.054	0.137
Good artificial lighting	0.356	0.628	0.186	0.037	0.245	0.309	0.172	0.152
Seat availability	0.492	0.521	0.170	0.098	0.306	0.067	0.210	-0.291
Outdoor space	0.054	0.042	0.875	0.211	0.005	0.026	-0.012	-0.070
Good natural lighting	0.250	0.218	0.813	-0.105	0.006	0.081	0.161	0.090
Open space	0.226	-0.038	0.609	0.050	0.446	0.342	-0.155	-0.157
The existence of trees	0.335	0.116	0.604	0.324	0.312	-0.037	0.157	0.052
Air circulation	0.456	0.193	0.570	0.070	0.411	0.177	0.088	0.227
Corner seating area	0.290	0.006	0.236	0.756	0.036	0.258	0.218	0.058
Indoor space	0.100	0.399	-0.016	0.672	0.168	0.106	-0.086	-0.051
Seating layout	0.366	0.256	0.048	0.667	0.237	0.155	0.255	0.006
Simple design	0.115	0.243	0.184	0.574	-0.008	-0.235	0.050	0.457
Wi-Fi availability	0.260	0.123	0.097	0.194	0.841	0.103	0.139	0.130
Power outlets availability	0.205	0.370	0.152	0.083	0.776	0.048	0.052	0.042
Background music	-0.063	0.080	0.076	0.106	0.221	0.884	-0.038	-0.003
Upper floor space	0.490	0.045	0.280	0.167	-0.289	0.573	0.040	0.104
Wood material	0.092	-0.053	0.072	0.050	0.096	-0.076	0.892	0.047
Warm atmosphere	0.047	0.454	0.058	0.181	0.042	0.085	0.678	-0.018
Intimacy	0.123	0.164	0.066	0.164	0.255	0.176	0.062	0.822
Small room	-0.347	-0.261	-0.244	-0.169	-0.265	-0.234	-0.042	0.550

The dimension of privacy and serenity consists of spatial characteristics that support privacy, low noise levels, and stimulate tranquility. The measurable variables related to design style, aesthetics, and furniture comfort are included in the dimension of design and comfort. The dimension of openness and natural elements encompasses aspects that create an open environment and support student interaction with the natural surroundings. Additionally, the spatial characteristics related to the seating arrangement of café visitors form the layout dimension. The dimension of supporting facilities comprises characteristics related to the availability of facilities that support information and communication technology. The background music dimension relates to the presence of music played by the café management. Spatial characteristics that contribute to a warm atmosphere in the café form the warmth dimension. Finally, the spatial intimacy dimension includes characteristics that foster a close and personal ambiance (Table 3).

**Table 4.** Summary Statistics of Students' Flow Experience When Studying in Cafés

Measurable Variables	Enjoyment	Focus	Anxiety and Boredom
Cronbach's Alpha	0.895	0.840	0.750
Mean	4.673	3.821	2.607
Variance	4.816	3.275	1.950
Cum. Percent	32.105	53.941	66.943

**Table 5.** Results of Factor Analysis of Students' Flow Experience When Studying in Cafés

Measurable Variables	Enjoyment	Focus	Anxiety and Boredom
Time seems to pass quickly	0.808	0.165	-0.012
Happiness	0.798	0.098	-0.180
Satisfaction	0.779	0.366	-0.208
Enjoyment of the learning process	0.744	0.381	-0.258
The quality of work is evaluated independently	0.695	0.317	0.077
Forgetting to check the time	0.667	0.260	0.050
Disregarding others' views	0.542	0.123	0.254
Self-confidence in achieving learning goals	0.542	0.630	-0.233
The learning goals are clearly understood	0.524	0.422	0.135
Forgetting other things unrelated to the learning activities	0.079	0.899	-0.035
Focus on the study materials	0.427	0.789	0.017
Full concentration on learning activities	0.534	0.669	-0.171
Forgetting one's limitations	0.303	0.560	0.456
Anxiety	-0.076	-0.094	0.881
Boredom	-0.048	-0.003	0.805

**Table 6.** Summary Statistics of Student Learning Activities in Cafés

Measurable Variables	Enjoyment	Focus	Anxiety and Boredom
Cronbach's Alpha	0.928	0.839	0.748
Mean	3.953	3.182	3.538
Variance	6.208	2.767	2.340
Cum. Percent	36.516	52.790	66.556

**Table 7.** Results of Factor Analysis of Student Learning Activities in Cafés

Variable	Task Completion	Visual Learning	Analytical Learning
Reading other study materials	0.902	0.025	0.186
Learning study materials	0.886	-0.009	0.209
Preparing presentation materials	0.830	0.186	0.169
Reading book	0.797	-0.037	0.307
Working on paper	0.770	0.044	0.315
Summarizing	0.751	0.011	0.240
Working on tasks with electronic devices	0.675	0.174	-0.035
Reading journals	0.672	0.063	0.476
Working on research	0.660	0.027	0.210
Working on tasks without electronic devices	0.515	0.217	0.078
Designing	0.118	0.930	-0.039
Performing graphic editing	0.266	0.778	-0.141
Drawing	-0.047	0.769	0.148
Modeling	0.006	0.746	0.455
Working on a thesis project	0.203	0.085	0.828
Calculating with an application	0.362	0.024	0.681
Working on a report	0.509	0.140	0.552

The factor analysis of students' flow experience when studying in cafés produced three latent variables: enjoyment; focus; and anxiety and boredom. The enjoyment dimension includes conditions where students feel pleasure and become immersed in their learning activities. States that indicate students achieve a high concentration level during study activities are grouped under the focus dimension. Finally, feelings of anxiety and boredom form the anxiety and boredom dimension (Table 5).

Based on the results of factor analysis, the variable of learning activities has three dimensions. The task completion dimension refers to various activities that support the learning process of a subject and the completion of academic assignments. The dimension of visual learning includes activities focused on creating and developing visual elements or graphic representations. Finally, the analytical learning dimension comprises learning activities involving in-depth problem-solving analysis (Table 7).

### Regression Analysis of Spatial Characteristics' Influence on Flow Experiences in Cafés

The influence of spatial characteristics (independent variables) on flow experiences and learning activities (dependent variables) is examined at this stage (Table 8). Regression analysis on the enjoyment dimension reveals two spatial characteristic variables with a P-value less than 0.1: layout (P-value = 0.053) and privacy and serenity (P-value = 0.042). A P-value less than 0.1 indicates that these two dimensions significantly influence the enjoyment dimension. The regression value of the privacy and serenity dimension is negative, at -0.231, suggesting that the influence of privacy and serenity on enjoyment is negative or inversely related.

**Table 8.** Regression Analysis Results of Café Spatial Characteristics' Influence on the Experience of Enjoyment

Variabel Laten	Estimate	Std Error	t Ratio	Prob> t
Intercept	2.737	0.716	3.820	0.000
Privacy and Serenity	-0.231	0.111	-2.080	0.042
Design and Comfort	0.091	0.165	0.550	0.584
Openness and Natural Elements	0.106	0.121	0.880	0.384
Layout	0.266	0.135	1.970	0.053
Supporting Facilities	0.132	0.146	0.900	0.370

A subsequent regression analysis was conducted to determine the influence of spatial characteristics on the focus dimension (Table 9). The results show that none of the spatial characteristic dimensions have a P-value below 0.1. This suggests that no café spatial characteristic dimension significantly influences the focus dimension.

**Table 9.** Regression Analysis Results of Café Spatial Characteristics' Influence on the Experience of Focus

Variabel Laten	Estimate	Std Error	t Ratio	Prob> t
Intercept	2.086	0.943	2.210	0.031
Privacy and Serenity	-0.183	0.146	-1.250	0.216
Design and Comfort	0.228	0.217	1.050	0.298
Openness and Natural Elements	0.024	0.159	0.150	0.882
Layout	0.237	0.178	1.330	0.187
Supporting Facilities	0.033	0.193	0.170	0.865

In the regression analysis on the anxiety and boredom dimension, one variable was found with a P-value less than 0.1 (Table 10). This variable is the privacy and serenity dimension (P-value = 0.084). This indicates that the quality of privacy and serenity significantly influences the experience of anxiety and boredom.

**Table 10.** Regression Analysis Results of Café Spatial Characteristics' Influence on the Experience of Anxiety and Boredom

Variabel Laten	Estimate	Std Error	t Ratio	Prob> t
Intercept	2.582	1.065	2.430	0.018
Privacy and Serenity	0.290	0.165	1.760	0.084
Design and Comfort	-0.174	0.201	-0.860	0.391
Openness and Natural Elements	-0.159	0.217	-0.730	0.466
Layout	0.148	0.245	0.610	0.547
Supporting Facilities	-0.055	0.180	-0.310	0.759

### Regression Analysis of Spatial Characteristics' Influence on Students' Learning Activities in Cafés

The next regression analysis was applied to the dimensions of learning activities (dependent variable) to examine their significant associations with spatial characteristics (independent variable). The regression analysis on task

completion (Table 11) reveals two latent variables of spatial characteristics that significantly influence task completion: layout (P-value = 0.004) and supporting facilities (P-value = 0.059).

**Table 11.** Regression Analysis Results of Café Spatial Characteristics' Influence on Task Completion

Variabel Laten	Estimate	Std Error	t Ratio	Prob> t
Intercept	-0.230	0.981	-0.230	0.816
Privacy and Serenity	-0.091	0.152	-0.600	0.550
Deisgn and Comfort	0.045	0.226	0.200	0.844
Openness and Natural Elements	-0.074	0.166	-0.450	0.657
Layout	0.558	0.185	3.020	0.004
Supporting Facilities	0.385	0.200	1.920	0.059

The regression analysis of the spatial characteristics' influence on visual learning activities resulted in none of the spatial characteristic dimensions significantly affecting the visual learning dimension. This is due to the absence of any dimensions with a P-value less than 0.1 (Table 12).

**Table 12.** Regression Analysis Results of Café Spatial Characteristics' Influence on Visual Learning

Variabel Laten	Estimate	Std Error	t Ratio	Prob> t
Intercept	0.811	1.331	0.610	0.544
Privacy and Serenity	0.058	0.206	0.280	0.780
Deisgn and Comfort	-0.158	0.306	-0.510	0.609
Openness and Natural Elements	0.029	0.225	0.130	0.896
Layout	0.111	0.251	0.440	0.661
Supporting Facilities	0.408	0.272	1.500	0.138

The regression analysis on the analytical learning dimension (Table 10) shows one latent variable of spatial characteristics that significantly influence the layout dimension (P-value = 0.016).

**Table 13.** Regression Analysis Results of Café Spatial Characteristics' Influence on Analytical Learning

Variabel Laten	Estimate	Std Error	t Ratio	Prob> t
Intercept	0.257	1.183	0.220	0.829
Privacy and Serenity	0.276	0.183	1.500	0.138
Deisgn and Comfort	0.185	0.272	0.680	0.498
Openness and Natural Elements	-0.298	0.200	-1.490	0.141
Layout	0.554	0.223	2.480	0.016
Supporting Facilities	0.008	0.241	0.030	0.973

### Correlation Analysis Between Learning Activity and Flow Experience in Cafes

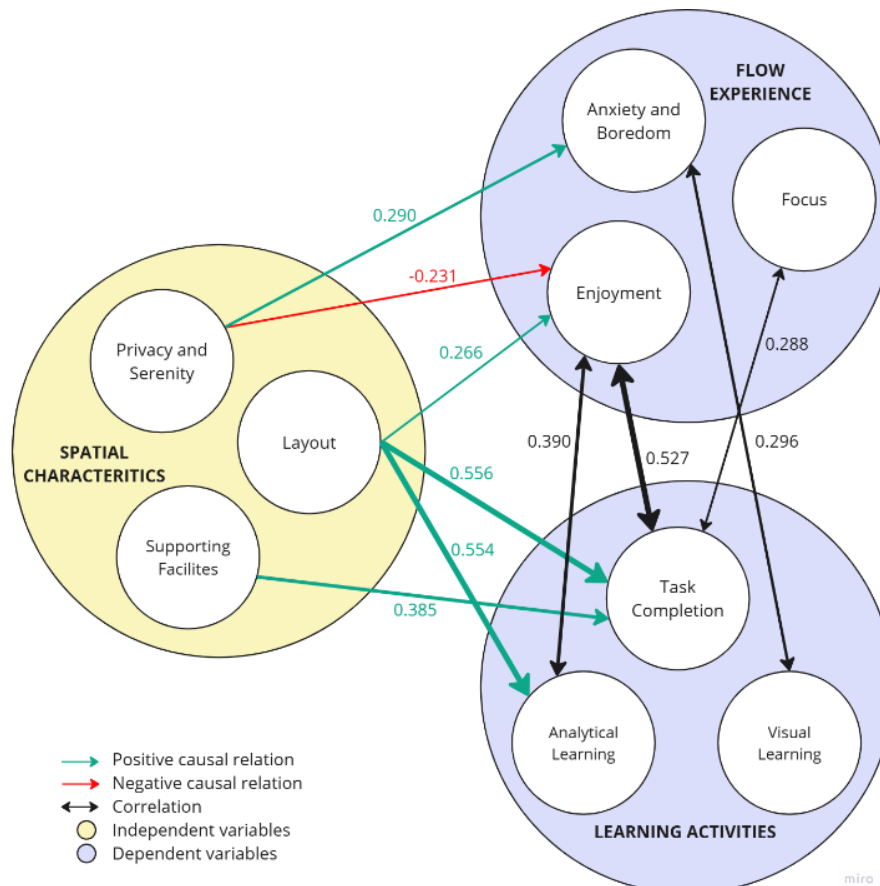
The authors then conducted a correlation analysis to determine the relationship between learning activities and flow experience among students when studying in cafés. The analysis results indicate four pairs of latent variables with a P-value less than 0.05, indicating a significant correlation (Table 14). The four relationships are: enjoyment and task completion (P-value = <.0001); enjoyment and analytical learning (P-value = 0.001); focus and task completion (P-value = 0.016); and anxiety and boredom with visual learning (P-value = 0.013).

**Table 14.** Results of Correlation Analysis between Learning Activity and Flow Experience

Variable	by Variable	Correlation	Count	Lower 95%	Upper 95%	Signif Prob
Visual Learning	Task Completion	0.227	70.000	-0.009	0.438	0.059
Analytical Learning	Task Completion	0.643	70.000	0.480	0.763	<.0001
Analytical Learning	Visual Learning	0.241	70.000	0.007	0.451	0.044
Enjoyment	Task Completion	0.527	70.000	0.334	0.678	<.0001
Enjoyment	Visual Learning	0.037	70.000	-0.200	0.269	0.763
Enjoyment	Analytical Learning	0.390	70.000	0.171	0.573	0.001
Focus	Task Completion	0.288	70.000	0.057	0.490	0.016
Focus	Visual Learning	-0.023	70.000	-0.256	0.214	0.854
Focus	Analytical Learning	0.132	70.000	-0.107	0.356	0.277
Focus	Enjoyment	0.722	70.000	0.587	0.818	<.0001
Anxiety and Boredom	Task Completion	-0.115	70.000	-0.341	0.123	0.343
Anxiety and Boredom	Visual Learning	0.296	70.000	0.066	0.497	0.013
Anxiety and Boredom	Analytical Learning	0.001	70.000	-0.234	0.236	0.993
Anxiety and Boredom	Enjoyment	-0.132	70.000	-0.356	0.107	0.278
Anxiety and Boredom	Focus	-0.029	70.000	-0.262	0.207	0.812

## Discussion

The hypothesis model of the research is constructed based on the results of regression and correlation analysis. This hypothesis model illustrates the significant influence and correlations between spatial characteristics, flow experience, and learning activities (Fig. 1). The numbers next to each relationship arrow represent the regression and correlation weights. The regression weight is the coefficient that indicates the magnitude and direction of the spatial characteristics' influence (independent variable) on flow experience and learning activities (dependent variables). The correlation weight is the coefficient that indicates the strength and direction of the relationship between flow experience and learning activities.



**Fig. 1.** Hypothesis Model of Significant Influence and Correlations between Spatial Characteristics, Learning Activities, and Flow Experiences (Source: author)

Enjoyment is the most common experience students report when studying in a café. The enjoyment dimension scored an average (mean) of 4.673 out of 6, based on responses to a quantitative questionnaire (Table 5). This finding corresponds to one of the core dimensions of flow as conceptualized by Csikszentmihalyi (1990, 2014), namely intrinsic enjoyment that sustains motivation in learning activities. Factor analysis revealed that students' experiences of enjoyment while studying in a café include: time seems to pass quickly; happiness; enjoyment of the learning process; satisfaction; the quality of work is evaluated independently; forgetting to check the time; disregarding others' views; self-confidence in achieving learning goals; and the learning goals are clearly understood (Table 5). Oldenburg (1989) highlighted that one characteristic of a café as a 'third place' is the welcoming and enjoyable atmosphere it offers to visitors. The third place serves as a public area where voluntary, informal, and enjoyable gatherings occur outside the home (first place) and workplace (second place). In line with these findings, Purwadi and Manurung (2020) found that the joy and relaxation experienced in cafés can stimulate knowledge production and creativity among students, which reflects the flow condition where positive emotions and deep involvement enhance performance and creativity.

The enjoyment dimension as part of the flow experience is not only determined by individual perceptions of learning goals, but is also shaped by the atmosphere of the café itself. Atmosphere, which emerges from the interplay of spatial elements, has been shown to influence users' emotional responses and behaviors in space (Steigemann, 2017). In the context of cafés, a relaxed atmosphere contributes to lowering stress levels and encourages more active

social interactions (Hunter & Cox, 2014; Zhou et al., 2022). Elements such as walls, partitions, and booth seating backs can also provide a sense of enclosure that supports the perception of personal space and comfort (Ayalp et al., 2017; Waxman, 2006). These conditions help explain why students often report positive emotions such as happiness and satisfaction while studying in cafés.

The enjoyment experience significantly affected task completion and analytical learning activities (Table 14). Making judgments and solving problems is a key skill required for completing tasks and engaging in analytical learning. As previously discussed, cafés' cheerful and welcoming atmosphere fosters enjoyment through positive emotions, such as happiness, satisfaction, and confidence in achieving learning goals. The ability to make judgments and solve problems is likely to improve when positive emotions are high (Tyng et al., 2017). When these abilities improve, learners better understand the steps needed to reach their learning goals. This increases the potential for enjoyment in the learning process as well (Csikszentmihalyi, 2014). Therefore, students' levels of enjoyment while studying are linearly related to the continuity of task-completion activities.

Layout is a spatial characteristic factor that significantly influences the experience of enjoyment when students study in a café. The layout dimension is formed by four measurable variables based on factor analysis (Table 3): corner seating area; indoor space; seating layout; and simple design. These four measurable variables create a functional physical structure in the café, accommodating students' learning activities and supporting concentration (Wu et al., 2021). Indoor space and corner seating can help prevent and minimize noise. A simple design results in a space with minimal visual distractions. Additionally, a well-arranged layout allows flexibility in choosing seating for individual and group study. Therefore, a functional physical layout in cafés can reduce distractions and help maintain study concentration. Enjoyment and engagement in the learning process are more likely to occur when external factors do not disrupt attention and concentration (Csikszentmihalyi, 2014). This finding aligns with previous research, which shows that café users who require privacy tend to choose areas with some form of physical protection, such as seating bordered by walls or architectural elements on at least one side (Waxman, 2006). Such settings allow students to maintain a sense of calm and concentration, while still benefiting from the stimulating environment of a public space.

On the other hand, the privacy and serenity dimensions appeared as a detracting factor for the enjoyment dimension. Intense quietness can trigger concentration accompanied by feelings of anxiety and pressure (Cox, 2018). Therefore, high levels of privacy and quietness in cafés tend to decrease the enjoyment experienced by students when studying, leading to feelings of anxiety and boredom. Previous studies have also found that student's motivation to study can increase when they are around others who are also studying. Students who study in cafés often seek a relaxed atmosphere (Cox, 2018; Hunter & Cox, 2014). Both situations are difficult to experience in a space with intense quietness and privacy, as students cannot see or hear the presence of others engaged in learning. Such a feeling contrasts with the experience of enjoyment during studying, which includes feelings of happiness, confidence, and satisfaction (Csikszentmihalyi, 2014).

Nevertheless, the need for privacy does not eliminate the importance of social presence. Students who study individually often prefer seating arrangements that create personal units supporting privacy and personal space (Hunter & Cox, 2014; Wu et al., 2021). At the same time, both individual and group learners value the presence of other students in the same space, as it fosters a sense of social belonging and community with shared academic goals (Harrop & Turpin, 2013; Hunter & Cox, 2014). This suggests that an optimal space with the visibility and audibility of others engaged in similar activities.

The layout dimension also has the highest regression weight on analytical learning and task completion activities (Fig. 1). Both activities require analytical and problem-solving skills, which are complex cognitive activities. The human brain has a limited cognitive load capacity, so complex cognitive activities need to be performed in environments with minimal distractions to support brain function (Rock, 2009, in Kolfschoten et al., 2014). The layout dimension consists of spatial characteristic variables that minimize visual and auditory distractions, thus significantly facilitating smooth analytical learning and task completion activities. This also explains the significant influence of the supporting facility dimension on task completion activities (Table 11). This dimension includes variables such as Wi-Fi and power outlet availability. The measurable variables that form the task completion dimension represent learning activities that need to be facilitated by technologies like laptops and the Internet (Table 7). Therefore, supporting facilities play a significant role in minimizing technical disruptions that could hinder task completion.

Interestingly, none of the spatial characteristic dimensions showed a significant influence on students' focus and visual learning experiences. This finding suggests that these aspects of the flow experience may be more strongly determined by internal factors, such as individual motivation, prior knowledge, cognitive capacity, or the nature of the learning material, rather than by the physical layout or facilities of the café. Csikszentmihalyi (Csikszentmihalyi, 2014) emphasized that flow arises from the balance between task challenge and individual skill, implying that certain dimensions of flow, are less sensitive to environmental cues. Therefore, although cafés provide functional and

stimulating spaces for students, optimizing focus and visual learning may require complementary strategies, such as personal study techniques, technological aids, or task-specific materials, beside spatial design considerations.

## Recommendations

Based on the findings, several recommendations can be made for different stakeholders. For café managers and designers, it is important to provide flexible layouts with corner seating, simple design, and sufficient facilities such as Wi-Fi and power outlets to minimize distractions and technical disruptions. A balanced atmosphere can also be achieved through careful arrangement of seating layouts and managing seating capacity, so that the space is neither too crowded nor overly quiet. Such balance allows students to maintain personal space while still benefiting from the motivating presence of others.

For educators and curriculum makers, these insights suggest acknowledging cafés as complementary informal learning spaces where students can engage in both individual and peer learning activities. Recognizing this potential may open opportunities for collaboration between educational institutions and cafés near campuses, so that students' learning activities are supported beyond the classroom.

## CONCLUSION

This study identified cafe spatial characteristics that influence students' flow experiences and learning activities. Layout, privacy, and serenity were found to be spatial qualities that affect enjoyment experiences, as well as feelings of anxiety and boredom. Additionally, layout and supporting facilities influence task completion and analytical learning activities. Specific dimensions of flow experiences and learning activities were also related, such as focus and task completion, enjoyment and task completion, and enjoyment with analytical learning.

Enjoyment was identified as the flow experience that tends to emerge when students study in cafes. This characteristic of cafes as 'third places' that stimulate ease and joy can boost learning creativity and productivity. The layout dimension was found to impact the experience of enjoyment significantly. The arrangement of the measurable variables within this dimension—such as corner areas, indoor spaces, seating layout, and simple design—can minimize visual and auditory distractions while studying, preventing students' concentration from being disrupted. However, the café building design still needs to support social interaction, allowing students to perceive the presence of other learning activities in the same space. Additionally, providing supportive facilities like power outlets and Wi-Fi is crucial for smoothly completing tasks.

This study has several limitations. Broader generalizations of the findings are limited, due to the use of a snowball sampling strategy with a modest number of participants. Future investigations could benefit from employing larger and more diverse samples to confirm the results. Furthermore, three dimensions of spatial characteristics (background music, warmth, and spatial intimacy) were excluded from further analysis due to low reliability values. Future research may revisit these dimensions with larger or more targeted samples, or by employing other measurement methods, to explore their potential influence on flow experiences in café learning settings.

The findings from this study suggest that informal learning spaces not only serve as physical structures that accommodate learning activities but also need to support specific psychological states conducive to learning. The spatial characteristics that influence students' flow experiences and learning activities should be specially considered by designers aiming to create cafes targeting students and learners as users. These findings may also serve as a reference for higher education institutions seeking to enhance their students' learning experiences by providing informal learning facilities.

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