



Physical and social factors influencing university students' preferences for informal learning spaces

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Abstract

This research examines the physical and social characteristics influencing college students' preferences for cafés as informal study spaces. Additionally, it explores students' learning habits, use of learning spaces, and perspectives on café learning environments. The study employed a quantitative approach, surveying 772 students from universities in a designated district. Researchers applied the Beckers & Dewulf framework model to assess the relationships between eight factors affecting students' choice of informal learning spaces. The results revealed a positive correlation among the eight factors, which were grouped into two dimensions: amenity quality, naturalness, ICT facilities, interior design, student autonomy, customer presence, friend's presence, and sense of belonging. High-tech equipment and a sense of belonging were found to have the greatest influence on students' preferences for specific cafés. This research provides valuable insights for educators, offering a deeper understanding of the learning habits of the new generation of students and how they engage with informal learning spaces.

Keywords: Informal learning space; physical characteristic; social characteristic; university students.

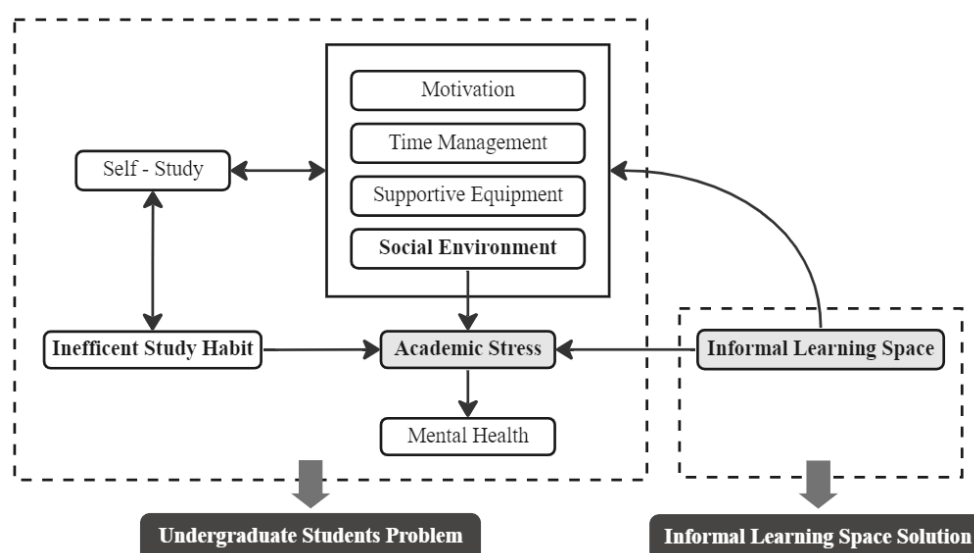
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1. INTRODUCTION

The ability to think, learn, and understand one's thoughts, as well as others' reactions, is a key indicator of good mental health, which underpins overall well-being (Thang et al., 2022). However, approximately one-fifth of university students experience a mental disorder lasting at least a year, making youth mental health a global public health concern (Auerbach et al., 2016). The prevalence of mental health symptoms varies across continents, with 20% in America, 40% in Europe, and a significant 70% in Asia. Dessauvague et al. (2022) found that most studies on mental health issues focus on anxiety, depression, and stress. Thang et al. (2022), after surveying 1,788 students at the University of Foreign Languages, concluded that academic stress, stemming from concerns about studies, was the leading cause of mental health problems compared to other factors. Nham et al. (2020) identified inefficient study habits as a key contributor to academic stress. Okita (2011) suggested that social interaction helps students organize their ideas, evaluate their understanding, and identify weaknesses in their logic. However, in Vietnam, social interaction in learning environments is limited, as many institutions lack public spaces that encourage such interactions. Figure 1 illustrates the flow of problems and solutions faced by undergraduate students.

Figure 1

Undergraduate students problem and solution flow



Supporting the point of view noted above, Thuy (2020) developed a model basis for factors affecting students' self-study ability in the field of higher education. According to the obtained results from the research paper of Thuy (2020), there are four independent variables (self-learning motivation, self-learning time management, self-learning environment, and self-learning support facilities) related to and derived from the learning space solution. Thuy (2020) proposed solutions for the above four problems to improve the students' self-study ability by investing in developing facilities and promoting more self-learning activities.

In particular, Beckers et al., (2016) developed a model of influential factors affecting preferred group & self-study space or an informal learning space (ILS); researchers showed that ILS is the optimal space for group & self-study, social interaction - the combination of physical and social. Findings showed that students preferred choosing ILS due to the physical characteristics such as learning support facilities, besides that they also agree social characteristics in ILS can promote motivation, learning performance, and productivity in their learning process (Bloomfield et al., 2022; Asamoah & Oduro-Ofori 2024; Hartikainen et al., 2023; Beckers et al., 2016). In 2021, Adityawirawan & Kusuma (2021) re-examined the model framework of Beckers et al., (2016) on 419 students in Indonesia also found similar results, showing that students who choose the study

space as ILS mostly consider factors such as motivation, time management, learning environment, and learning support facilities - there are similarities in the results of Thuy (2020).

In the study of Beckers et al., (2015), researchers supposed that “home” belongs to the group of informal private learning spaces that will support privacy in learning; however, there is a lack of social dimension characteristic which is one of the significant motors promoting learning motivation. Beckers and Dewulf's study suggests three types of spaces that encourage higher education students' use of self-control and social interaction in their learning process including school buildings, campuses, and city/community. Besides, in another study "The Social Infrastructure of Co-spaces Trend in Digital Economy" in 2020, researchers found the intersection of each type of spatial property (Home, Work, Social), cafe', co-working space, or co-studying space is the optimal place to combine work and social interaction. Moreover, the previous research papers showed that informal learning space should have the following properties: “Mobility, Flexibility, and Accessibility” (Weijs-Perrée et al., 2019; O'Neill, 2013). Most of the libraries in Vietnam are located on university campuses, operating during office hours (8 a.m. - 5:30 p.m.) and closed on Sundays, hence it is not available to every student who wants to study on their own after school. Therefore, in this study, researchers choose a cafe' as an informal learning space to survey students in preference of choosing an outdoor informal learning space.

1.1. Purpose of study

Considering the aforementioned concerns, the current research attempted to (i) explore the impact of the following factors: amenity quality (comfort), naturalness, interior design layout, ICT facilities, students' autonomy, customer's presence, friend's presence and sense of belonging on the student's preference of choosing informal learning space in seven universities under the National University system located in Thu Duc District, HCMC, and (ii) explore the relationship between gender, study year, and living situation affecting the preference of choosing informal learning spaces.

1.2. Literature review

1.2.1. Informal study space

An “informal learning space” is described as any area where learning can take place, as long as it is outside the classroom (Brown & Lippincott, 2003). Additionally, Ellis & Goodyear (2016) indicated that it is a space where students gather, generally outside of planned class hours, without teacher instruction. According to Jamieson (2009), an informal learning space is a collection of networks for interaction and experience that encompasses the physical environment, from inside to outside venues like classrooms, cafés, plazas, or libraries. The information that is imparted in this ILS is not given by the teacher to his students but rather is created by each person via engaging in social interactions (Staus et al., 2021). Therefore, informal learning environments are essential to students' university experiences. According to a study, students are more engaged when they use coffee shops as informal learning spaces as opposed to other formal settings (Painter et al., 2012). In a study by Moore & D'Souza (2013), pupils prefer to concentrate better in coffee shops. However, Steel Case Company has found that the demand for informal learning opportunities among current students has outpaced what cafés could provide.

1.2.2. Preference for choosing informal study space

The selection of a particular learning environment is influenced by the actual and perceived quality of a place's physical and social characteristics about other places (Marcouyeux, 2011). One of the concerns for higher education institutions in the future will be to completely match the physical and social characteristics of learning spaces with the activities that students choose to learn, while also taking into account the increasingly diverse student preferences regarding where and how they learn (Beckers et al., 2015). To resolve the duality between the physical and social characteristics of the environment, Van Sprang et al., (2013) coined the phrases physical dimension and social dimension. In the study “Why do they study there? Dairy research into students' learning space choices in higher education learning” pointed out that higher educational environments should facilitate interpersonal interactions from both a learning and social standpoint (Harrop

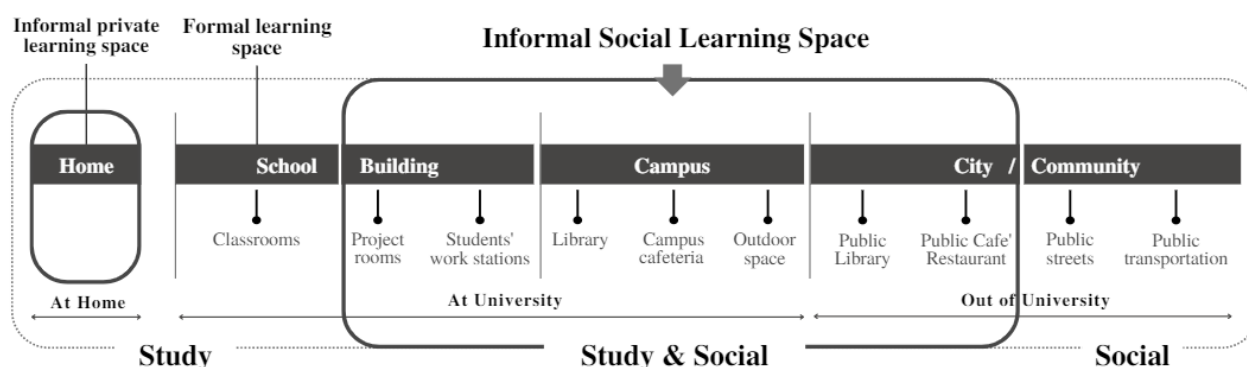
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& Turpin, 2013). Figure 2 illustrates the modification of higher education learning spaces and the influential characteristics affecting students' preferences in choosing informal learning spaces (Beckers et al., 2015).

Figure 2

Higher education learning space - Modification

+ **Influential characteristics affecting students' preference in choosing informal learning space**

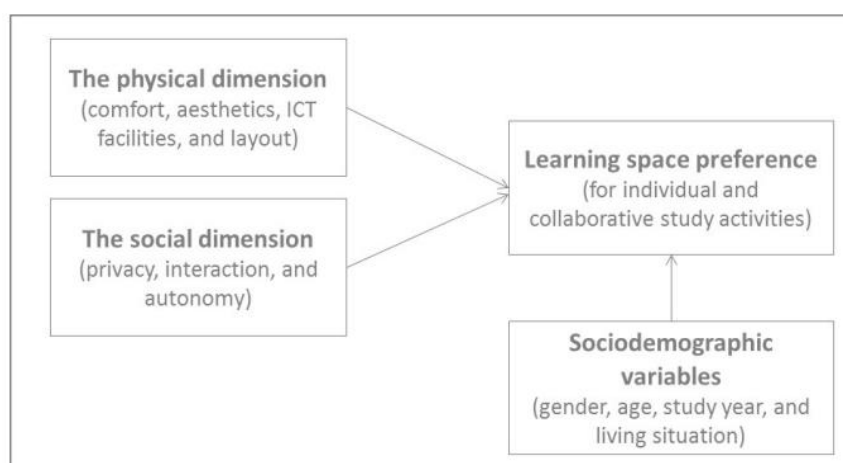


Source: Beckers et al., (2015)

Learning activities can take place anywhere without being limited to formal learning space systems such as traditional classrooms (Abeysekera & Dawson, 2015). Regarding learning space, two basic forms are of students' choice which are formal learning spaces such as traditional classrooms and informal learning spaces such as libraries, café shops, or co-studying spaces. Regarding the traditional learning space or formal learning space, one of the difficulties that every educational institution has to face is the adaptability of the space for multiple purposes (Montgomery, 2008). On the other hand, an informal learning space is more flexible in adapting students' requirements for further studying. Initially, informal learning requires learners to be self-responsible for "objectives, criteria, and determining the completion of learning (Yuan, 2019)." Therefore, informal learning spaces are found as a means to cope with informal learning behavior. These places are defined as locations "outside of the classroom, are available for use without booking, and are intended for individual or group study purposes (Scannell et al., 2016)." Moreover, according to Jamieson (2009), an informal learning space is a set of networks for social interaction and study process experience in the physical environment.

Figure 3

Beckers et al's Model framework (2016)



Beckers et al., (2016) developed a framework model about the characteristics affecting university students' preference of choosing informal spaces (figure 3). Two main overarching elements considered in this paper include physical characteristics (comfort, aesthetics, ICT facilities, interior design layout) and social characteristics (privacy, interaction, autonomy).

In Beckers et al., (2016), the finding showed that aesthetics was not a significant consideration among most students. A study by Adityawirawan & Kusuma (2021) on 419 Indonesian students indicated no correlation between aesthetics and students' preference for choosing informal learning spaces. In the research model, Beckers et al., (2016) only mentioned internal physical factors (comfort, aesthetics, ICT facilities, interior design layout), not external ones in the informal learning space. On the other hand, Barrett et al., (2015) concluded that naturalness is one of the factors considered by students when choosing an external learning space. Supporting this view, Adityawirawan & Kusuma (2021) also made a similar argument about the positive relationship between naturalness and the choice of informal learning space. Furthermore, owing to the development of 5G technology, an ideal physical factor in informal learning spaces is highly recommended for investment in information and communication technology (ICT) facilities (Beckers et al., 2016; Adityawirawan & Kusuma (2021). In the physical characteristics, the variables to be considered include amenity quality (comfort), naturalness, interior design layout, and ICT facilities.

When considering factors related to social characteristics, Beckers et al., (2016) revealed that students did not regard privacy as an impacting factor in their preference of choosing a learning space. In contrast, a study by Harrop and Turpin (2013) showed that privacy and quiet study are the most preferred factors in the learning process. Advocated by a study by Cox (2018), the author discovered that students preferred to have little privacy within a public setting so they could be aware that others were working nearby without being too distracted or neglected. However, Cox (2018) pointed out that some learners are fond of background noise when carrying out their learning and the feeling of anonymity that comes from being in a place, especially when several individuals are working there. Adityawirawan & Kusuma (2021) re-examined the factors in the research model of Beckers et al., (2016), and the results showed that the privacy factor had no impact on the student's choice of informal learning space. Furthermore, previous studies (Beckers et al., 2016; Bueno et al., 2018; Adityawirawan & Kusuma 2021) extended the social interaction factor into two independent factors (customer presence and friend presence). The finding indicated that these two factors positively influence students' choice of study place.

The following studies based on the original research model of Beckers et al., (2016) have developed new factors. Based on previous research background (Oblinger & Lippincott 2006; Harrison & Hutton, 2013; Hurst et al., 2013), in the study of Wu et al., (2021), a sense of community (belonging) was added as a component of social characteristics positively impacts the tendency to choose a place to study. In higher education, the researchers concluded that feeling a part of a community in a learning environment may serve as a stress reliever for students and aid in their ability to participate more deeply in the learning process (Raymond & Sheppard, 2018). Murphy et al., (2020) had previously evaluated belongingness in connection to academic results. Furthermore, the building of learning communities (Strange & Banning, 2001), a sense of engagement (Owston et al., 2013), and the provision of an educational environment (Douglas et al., 2006) that supported student learning vital contributions to the student experience in regards to the learning environment. The factors to be taken into account for determining social characteristics include students' autonomy, customers' presence, friends' presence, and sense of belonging.

In summary, in this study, the researchers will base on the original model of Beckers et al., (2016) and the subsequent studies mentioned above, thereby improving several factors in both physical and social characteristics. Eight factors in the modification model framework include amenity quality (comfort), naturalness, interior design layout, ICT facilities, students' autonomy, customer presence, friend presence, and sense of belonging.

1.2.3. Physical characteristics affect the preference for choosing informal study space

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The physical dimension, also known as the physical learning environment, is “spaces which are planned and used as special places where teaching and studying occur” (Tani, 2013). Architecture is a term used frequently to refer to the tangible components of a physical place, including its construction, design, furniture, lighting, ventilation, and other resources and services (Harrop & Turpin, 2013; George et al., 2009; Yang et al., 2013). Yang et al. (2013) proved the architecture of classrooms, specifically air quality and temperature, has a large effect on students’ perception. However, in Harrop & Turpin’s (2013) study, students were less concerned about temperature but placed higher importance on lighting and natural light.

A background that is purposely designed for educational intentions will somehow have either a positive or negative influence on the perspective of students to view the place ideally for learning or not. Hunter & Cox (2014) had written in their research uncovered background atmosphere as the best and the worst reason for studying in informal learning spaces. When the surrounding environment is at ease and equipped with the appropriate music, it creates a suitable atmosphere for learning. However, if the environment is crowded, too bright, or plays inappropriate music, it affects students’ focus and poses stress to their learning.

In modern reality like today, technology is an indispensable aspect for every corporation to include in their system and service offers. In education as well, high-tech equipment will support and provide students with more capabilities, therefore, learners should have more powers on their hands to pursue their academic orientation. McDaniel & Strachota (2014) have listed some recommendations such as a variety of technological options, power outlets, and audiovisual tools that make it easier for students to get started on their assignments right away.

A study by McDaniel & Strachota (2014) mentioned another interesting factor that affects students’ perception, which is flexibility. As McDaniel & Strachota (2014) bring up in their work, flexibility is a key feature of places because it enables students to customize their physical surroundings to suit their preferences. According to Beckers et al., (2015), has a close relation to the interior design layout. The physical environment connects to how it makes it easier for students to move in and between study spaces and to work in space either alone or with others. To support the idea of Beckers and his fellows, Somerville & Collins (2008) pointed out that learners prefer free and unrestricted learning settings. Additionally, when individuals can alter the layout to suit their tastes, they tend to spend more time in these areas.

There is growing interest in the physical learning environment according to research on higher education (Fisher & Newton, 2014). The modern experience economy and rising student expectations of higher education university buildings and facilities, among other factors, make well-designed learning environments important (Beckers & Van der Voordt 2013; Pine & Gilmore 1998). Buildings that have good designs may assist draw students in (Price et al., 2003). Similar components of comfort and aesthetic qualities of informal learning spaces, in general, were merged with the amenity quality and interior design of a café (Adityawirawan & Kusuma, 2021). In terms of the environmental conditions necessary for physical comfort, the Naturalness principle is relevant (Barrett et al., 2015). Moreover, research by Wells & Evans (2003) along with White (2004) has shown that exposure to nature has tremendous advantages for youngsters due to their increased brain flexibility and susceptibility. Research by Benfield et al., (2015) also points out that natural views have an essential role in connecting students to their learning spaces. Moreover, the use of ICT in education offers advantages. Its usage not only modifies conventional teaching methods but also calls on teachers to be more inventive in modifying and personalizing their instructional tactics and resources (Reid, 2002).

1.2.3.1. Amenity quality

Students' preference for choosing informal learning involves amenity quality mentioned in previous studies, which is influenced by factors including furniture, artificial lighting, and artificial temperature. Kliever (2022) concluded that furniture needs to be designed to support the preferences and learning process. Artificial lighting plays a key role as part of the physical environment in influencing “individual’s perception” (Summers & Hebert, 2001). In addition, lighting can have a significant impact on customers’ behaviors. The lighting factor can attract buyers’ attention when they are aware of high-contrast lighting conditions in comparison to low-contrast lighting conditions. As a part of interior design, the combination of lighting factors

and others such as temperature, cleanliness, or smells has been indicated by the efficiency of customer services, “perceived time spent in place and processing time. Additionally, productivity is influenced by humidity and temperature level, as temperatures rise beyond or fall below optimal extent, the body must strive to adjust itself based on these conditions, which can seriously impact learning or working productivity (Sanders and McCormick, 1987). Besides, pupils who study in classrooms with lower humidity levels have higher rates of sickness and absence than pupils who study in suitable humidity levels. The old form of layout design, which has greater outside wall space for high temperatures that may readily be transmitted, is less preferred to multi-story, compact structures that effectively reduce heat transmission. Outside shading of educational institutions using trees also aids in the cooling of these buildings.

As Adityawirawan & Kusuma (2021) had defined in their recent research, amenity quality defines the café as a proper ILS through the availability of comfortable furniture, such as tables, and chairs, the size of the room, and also supported by appropriate music and lighting. Amenity quality holds an important point to make the culinary space into a new space suitable for learning in the form of furniture, the size of the study area, lighting conditions, musical atmosphere, and artificial ventilation conditions, and the results were found that amenity significantly affects the cognitive and affective response.

1.2.3.2. Interior design

According to Kisang, Ryu; Heesup, 2010, layout refers to the term of how arrangements of objects should be made in a specific space. This research has pointed out that the arrangements of furniture can directly affect customers' satisfaction and have an indirect impact on their need to return. This would enhance the “customers' service experience”. From this point of view, layouts have an influential impact on the customers' satisfaction and, hence, indirectly impact their preferences in choosing a café as a workplace.

While layout illustrates how things are organized on a general level, design styles refer to how decorations are done within the specific equipment used for furnishings. For example, the “color scheme, lines, floor covering, etc.” have an essential role in “delivering an image and in creating an overall aesthetic impression”. (Han and Ryu, 2009). Han and Ryu (2009) also stated in their findings that customers are highly aware of the comfort of the designs and decorations.

The study of Adityawirawan & Kusuma (2021) has indicated that the interior design shapes the café as a suitable ILS through the use of decorations and wall color. The same as their peers, Özgüner, (2017) thesis showed that interior design elements and design style are very influential atmospheric factors on customers' place attachment.

1.2.3.3. Naturalness

Scenery, temperature, natural lighting, wind level, and noise as contributing factors to naturalness that influence students' satisfaction. As stated in the following research, having open astonishing views can be a major factor in helping customers ease stress (Gifford, 2002). In addition, because of that reason, the seating area beside windows is usually filled up quickly compared to the other seating areas (Waxman, 2004). Outdoors factor is defined as the tendency to concentrate on the customers' “basic physiological needs, e.g. the feeling of comfort affected by temperature, humidity, and airflow” (Vít & Kopp, 2019). Outdoor aspects are highly advised to improve with the concept of natural nuances. On the other hand, natural lighting is also brought into consideration within this research paper. As stated in the following research paper, this factor has been well recognized that it should be “the natural light coming in the window sometimes results in glares” which happens “during the day” (Waxman, 2004). Additionally, wind level can be observed as a factor that could have a noticeable impact on students' behavior during their time studying. Thus, it is assuredly defined as the gatekeeper of remaining “better circulation” within the space of the café shop (Pangestu & Halim, 2022). Besides, many previous types of research indicated that noise can either positively or negatively affect the creative process. Background noise can have an impact on the creative phase: A moderate degree of noise causes abstract cognition and increases creativity, but a large amount of noise reduces the extent of information analysis, which hinders the creative process. Loud noise can be annoying when irritation is

increased as the duration of the noise break decreases. Workers tend to prefer shorter quiet time which happens more often to longer quiet time that occurs once in a while. In the research of Adityawirawan & Kusuma (2021), naturalness is defined as how an informal learning space as a café' reacts to its surroundings, by giving the students access to view or feel the natural aspects outside the café, be it in the form of visual (scenery) or audial (noise). The result of the study showed that students' cognitive responses were mainly positive based on amenity quality, along with its naturalness.

1.2.3.4. ICT facilities

Internet café are now worldwide acknowledged as chances of learning and working together with friends and colleagues meanwhile being connected to the net. Moreover, the demand for connecting to the internet has been increasing. At almost all food and beverage services or public places, customers naturally want to have Wi-Fi access to their devices.

Of all four variables, ICT facilities seem to be the most prominent characteristics in making the café into an ILS. This concludes that students consider the availability of space required to use a laptop or fast Wi-Fi connection the most during the learning process (Adityawirawan & Kusuma, 2021). Also, the study of Beckers et al., (2016) said that "Modern ICT facilities support new ways of learning and allow students to study anytime, anyhow, and anywhere". The idea of a physical learning environment also refers to the furnishings and materials used in the informal learning space. Students' evaluation of an academic-purpose area is heavily influenced by resources like ICT facilities, such as PCs, printers, huge displays, internet connectivity, and software, provided by Harrop and Turpin (2013).

1.2.4. Social characteristics affect the preference for choosing informal study space

Judging a place based solely on its physical surroundings is not so wise, since apart from the existing gadgets in sight, the social interaction or the social identity is an undeniably important dimension to be under consideration. Wisniewski and Page (2022) cited the theory of Altman (1975) as follows: privacy is "an interpersonal boundary process by which a person or group regulates interaction with others," by altering the degree of openness of the self to others. Another element, According to the research of (Johnson & Seaton 2011; IGCB(N), 2010; Murphy et al., 2020; Goines & Hagler, 2007), is exposure to different levels and sources of noise pollution in the learning environment hurts cognitive performance, which can result in subpar academic performance and future incompetence.

Moreover, the Peesker (2019) article found that learners in open-concept spaces feel more productive when being exposed to positive rhythm sounds before a task can heighten performance, or a quiet hum of white noise – dulling the sound of voices. In addition, considering privacy preferences by Harrop and Turbin (2013), the researchers suggested that self-learning environments should encourage and support student engagement from both social and educational viewpoints. Assertively pointed out by Bingham and Sidorkin (2004) there is no education without relationships lately stated in the report of Frania and Correia (2022), interpersonal competencies for relationship building are also crucial for an effective education process. In short, preference for privacy, communication, and interaction intertwines with one another relying on the level of interaction and nature of learning.

On the other hand, according to Appel-Meulenbroek et al., (2011), personal control is considered as another build-up element of the social dimension, which when placed in the learning context, personal control is also understood as self-directed learning, learning to learn, and learner autonomy (Meyer et al., 2024; Mynard & Stevenson, 2017; Hounsell, 1979; Smith, 2008). In the usage of learning spaces in higher education research, one of the key advantages of studying at home is that one may adjust the ambient noise, temperature, or music (Beckers et al., 2015). However, Cox (2018) found that some students experienced studying at home as a source of undue interference driving to delay doing work and one of the reasons is from lack of motivation created by social dimension.

Additionally, a significant level of autonomy is one of the factors that influence students' preferences for learning spaces (Beckers et al., 2016). On the other hand, Harrop & Turpin (2013) also indicated that some

students prefer a more lively setting. Mayer (2005) points out that social engagement is favorably correlated with academic success. Another research by Bueno et al., (2018) indicates that coworking space and social interactions have beneficial effects on productivity. Picciano (2002) discovered a significant connection between students' success on written tasks and their social presence. Social interaction can be divided into two categories: the presence of friends and the presence of customers (Adityawirawan & Kusuma, 2021).

1.2.5. Student's autonomy affects preference of choosing informal study space

In the literature, learner autonomy is usually used interchangeably with personal control, self-directed learning, and learning-to-learn (Hounsell, 1979; Appel-Meulenbroek et al., 2011; Mynard & Stevenson, 2017; Smith, 2008). Learner autonomy has been defined by Dam (1995) as follows "the readiness to take charge of one's learning in the service of one's needs and purposes, which entails a capacity and willingness to act independently and in cooperation with others, as a socially responsible person". 20 years later, Beckers et al., (2015) explained more comprehensively that personal control refers to the degree or level of freedom and discretion in deciding what to do, where, and when. In the study of Adityawirawan & Kusuma (2021), the result found that student autonomy holds the most notable aspect among the three (student autonomy, customer's presence, and friend's presence), with its highest rate. Student's flexibility in picking a table or seat in a café or how the location gives more privacy from other customers was important to be considered when using a café as an ILS.

1.2.6. Customer's present affect preference of choosing informal study space

In such places as informal learning spaces (student cafeterias, cafes, and other socially oriented spaces and social hubs,...), the main customers are potential students or peers (O'Neill, 2013). And the appearance of a customer's presence is seen as a part relating to social interaction. The considered social interaction above does not necessarily refer to physical interaction or verbal communication (Turkle, 2012). Students utilize the Internet to expand their social networks, making them more accessible at all times (Van Tuan, 2021). A previous study demonstrated the above situation when an individual sat next to others but rarely talked or engaged with them. They merely take pleasure in participating in the studying community there (Crook & Mitchell, 2012). According to Cox (2018), when individuals work at a place, they especially like the sense of anonymity that it brings them. To support the idea, previous studies report students appearing to be motivated to study and do academic work by merely being among others with the same intent (Cox, 2018; Neurohr & Bailey, 2017). Head and Eisenberg (2011) reported that students valued the library – one of many forms of informal learning spaces as a place where "they could witness other students engaged in 'hard work,' and this often was contagious for them". According to a study of student preferences toward informal space on campus in 2018, the results show that although the informal learning space on a particular campus is located within a busy atmosphere, the students didn't feel disturbed by the crowds occurring and the majority of respondents supposed that the bustling atmosphere was still tolerable crowds (Anggiani & Heryanto, 2018).

1.2.7. Friend's presence affects the preference of choosing an informal study space

Besides learning by oneself or self-directed learning, students may also have to learn with friends in school projects or just simply have someone they are acquainted with to pursue studying-related actions near them. This leads to the term "collaborative learning". The study by Vo (2015) raised that collaborative learning is commonly used to describe a group of students working together to understand a concept, develop an artifact, or find a solution. Collaborative learning as a pedagogy involves the grouping of students to work together in or out of class (Panitz & Panitz, 2018). As Harrop and Tubin (2013) stated in their early research and further cited by Cox (2018) students regularly worked alongside each other and this makes certain spaces more preferred compared to others. This created a 'domesticated' atmosphere for study as the space also enhances social interaction among friends such as creating a sense of community, relaxation, and co – support. Furthermore, seeing others working helped discipline oneself to work. Working alongside others one knew was also important for companionship rather than working directly on the same task (Cox, 2018).

1.2.8. Sense of belonging affects preference of choosing informal study space

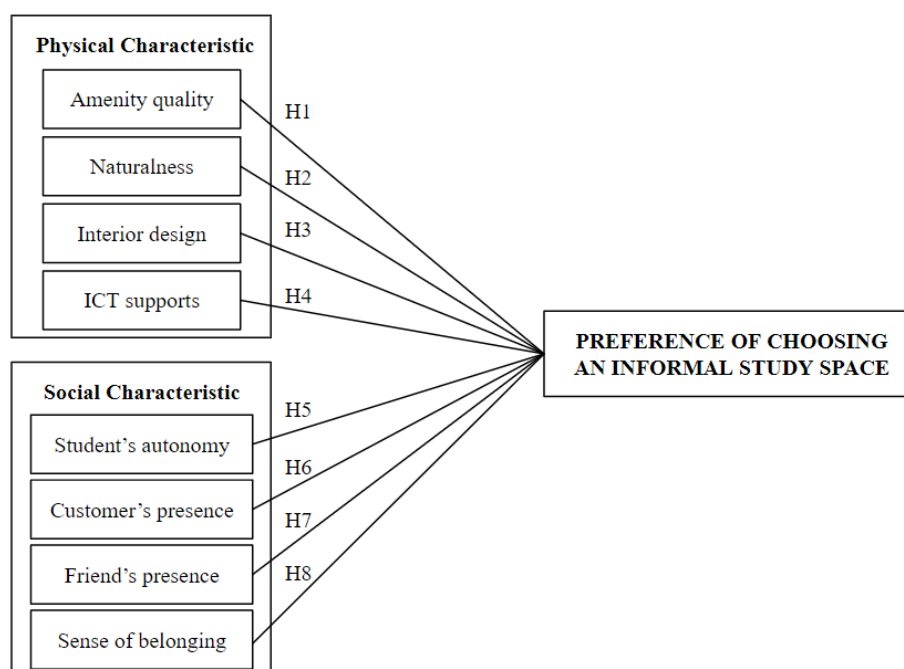
“Whether, when, and why a student feels like he/she/they fit in, belong, and can be their comfortable, true self in a place or space” is a statement provided by Broughton (2019) to understandably define what is sense of belonging is. Previous research by Harrop and Turpin (2013) also supported the fact that it should be a space where students can fulfill the desire for “community” and “conversations”. Considering aspects of the fundamental demands of a human being, Strayhorn (2018) suggests students’ sense of belonging includes at least six core elements. First of all, a sense of belonging is a universal, basic human need. It is also a motive sufficient to drive students’ behaviors. It takes on a heightened importance in certain contexts, at certain times, and among certain populations. It is related to matter and it is influenced by one’s identities. When a student feels a sense of belonging, it can lead to positive outcomes and success. Finally, it must be satisfied as conditions change. When all of those factors are satisfyingly supplied can ideally lead to a positive sense of belonging, which has been shown to relate to academic persistence, success, and motivation (Freeman et al., 2007; Hausmann et al., 2009; Hoffman et al., 2002). Additionally, another factor to be considered is a sense of community, when students have the feeling of common purpose from others in a learning space. (Harrop and Turpin, 2013)

1.2.6. Proposed research model

With the above theoretical basis, the research team proposed a research model for this study. This model will be suitable for the scope and research objects proposed.

Figure 3

Research model developed from Beckers et al’s framework (2016)



Hypothesis:

- H1: Amenity Quality has an impact on the Preference of Choosing An Informal Study Space among college students
- H2: Naturalness has an impact on the Preference of Choosing An Informal Study Space among college students
- H3: Interior Design has an impact on the Preference of Choosing An Informal Study Space among college students

- H4: ICT Support has an impact on the Preference of Choosing An Informal Study Space among college students
- H5: Student's Autonomy has an impact on the Preference of Choosing An Informal Study Space among college students
- H6: Customer Presence has an impact on the Preference of Choosing An Informal Study Space among college students
- H7: Friend's Presence has an impact on the Preference of Choosing An Informal Study Space among college students
- H8: Sense of Belonging has an impact on the Preference of Choosing An Informal Study Space among college students
- H9: There is no difference between the factors affecting the Preference of Choosing An Informal Study Space among college students in terms of Gender, Study Year, and Living Situation.

2. METHOD AND MATERIALS

2.1. Research design

Quantitative research is the systematic and empirical analysis of observed phenomena in the natural world. Social sciences also use statistical, mathematical, quantitative, and computational methods. The purpose of a quantitative approach is to create and apply a mathematical model, theory, or hypothesis about an event. Measurement techniques are very important to quantitative studies because they combine experimental observation with the derivation of numerical representations. Metric quantification includes all quantitative data, numeric system statistics, proportional percentages, and more. (Given, 2008)

Researchers have chosen quantitative methods because of the advantages of quantitative studies that use statistical data as a means of saving time and resources, also the aim and purpose of the studies. Data can be calculated and processed by computer researchers using the Statistical Package for the Social Sciences (SPSS) (Gorard, 2010; Connolly, 2007), which significantly saves energy and resources. This method also helps the team test hypotheses on a large sample.

2.2. Data collection instrument

To ensure the validity of the questionnaire, it was developed on the basis of previous research. The questionnaire consists of three parts: general information on the respondents, questions on the dependent factors and questions on the independent variables. A Likert scale (1-5) is a measure or instrument used in surveys to determine the attitudes, behaviors and perceptions of individuals or consumers.

The survey form would be created using Google Forms and sent to students via seeding the link in university groups and QR code would be printed and delivered to students at these universities. The students then would be directly requested to scan and complete the form.

2.3. Participant

Students from seven universities participated in this study. Before starting the main part of the survey, we did a pilot test to determine the set of questions that will segment the main target audience. According to Yamane (1967), a sample size based on the desired precision with a 95% confidence level requires a minimum of 397 respondents for a population of 20,000 or more. Besides, according to the 10:1 ratio of Hair et al. (2014), with a total of 30 questions, the standard sample should be about 300 (30 x 10).

Based on this, the research team collected 790 forms. After screening and data cleaning, 772 true respondents remained. Even for a specific case, the number of respondents was sufficient to allow the research team to analyze the data.

3. RESULTS

The research team approached the interviewees at Thu Duc University Village, Thu Duc City, Vietnam, a location where numerous national universities are situated. The team collected responses from over 700 participants across 7 universities, as listed in Table 1. The number of students from the participating universities was fairly balanced, ranging from 97 students from the University of Social Sciences and Humanities to the largest group of 136 students from the University of Science and Technology.

3.1. Frequencies

Table 1

Frequency

		University			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ĐH Bách Khoa	136	17.6	17.6	17.6
	ĐH Kinh Tế Luật	119	15.4	15.4	33.0
	ĐH KHTN	121	15.7	15.7	48.7
	ĐH Quốc Tế	101	13.1	13.1	61.8
	ĐH KHXH&NV	97	12.6	12.6	74.4
	ĐH CNTT	99	12.8	12.8	87.2
	ĐH Quốc Gia Khoa Y	99	12.8	12.8	100.0
	Total	772	100.0	100.0	

3.2. Cronbach Alpha and EFA

The reliability of the question group, which consists of seven independent variables and one dependent variable, is assessed using the Cronbach's Alpha index in Table 2. The Cronbach's Alpha coefficient's acceptable range is between 0.6 and 1, with values closer to 1 indicating higher questionnaire reliability. Since Cronbach's Alpha testing only omits questions that are not reliable enough to represent a group of questions or variables, it cannot be utilized to convey the idea of groups of research variables.

Table 2

Cronbach's Alpha

Variable	Code	Questionnaire	Corrected Item - Total Correlation	Cronbach's Alpha
Amenity Quality (AM)	AM1	The tables and chairs in the learning space need to be comfortable for me to study for a long time.	0.776	0.912
	AM2	The space is spacious which helps me feel more comfortable learning.	0.798	
	AM3	The artificial lights in the space help me to increase concentration while learning.	0.804	

Naturalness (NT)	AM4	The temperature of the air conditioner in the space is suitable for the learning process.	0.821	0.757
	NT1	I can see the natural scenery from inside the learning space.	0.494	
	NT2	Natural lighting (sunlight) in the learning space is suitable for my learning process.	0.539	
	NT3	The learning space's windows create ventilation.	0.611	
Interior Design (DS)	NT4	I'm seldom bothered by the noise in the space while learning.	0.622	0.784
	DS1	The concept of the decorations encourages me to spend more time learning in the space.	0.609	
	DS2	Bright color on furniture, walls, ... in the space helps to produce an optimal level of stimulation on my moods and energy levels while learning	0.582	
	DS3	Visual variety in the space's layout (pictures) creates interest for me in my learning process.	0.580	
ICT Support (IT)	DS4	Furniture in the learning space provides appropriate visual diversity and helps enhance my productivity.	0.591	0.880
	IT1	I always bring a laptop to the learning space to support my learning process.	0.722	
	IT2	Internet access is a necessity for me during my learning process.	0.814	
	IT3	The learning space is fully equipped with electrical outlets to charge devices (laptops, smartphones, etc.) is what I am interested in.	0.711	
Autonomy (AU)	IT4	The availability of printing facilities in the learning space supports my learning process.	0.716	0.849
	AU1	I would prefer a space where there are no disturbances from others	0.724	
	AU2	It's essential for me to make my own decisions when I choose to learn in space.	0.699	
Customers' Presence (CP)	AU3	It's essential for me to make my own decisions on where I choose to learn in the space	0.730	0.886
	CP1	It would be more comfortable if other customers cannot see what I do in my space.	0.758	
	CP2	It would be more comfortable if other customers cannot hear what I say in my space.	0.799	
Friends' Presence (FP)	CP3	Conversations with customers in the space help me feel at ease when learning.	0.796	0.847
	FP1	I like collaborating with my friends in the learning space	0.844	
	FP2	I would prefer learning spaces where my friends enjoy going to	0.500	

Sense of Belonging (SB)	FP3	Conversations with friends in the space help me feel at ease when learning	0.834	
	SB1	I experience a sense of belonging in this informal learning space.	0.916	0.914
	SB2	The feeling of having a sense of community in space is a motivation for my learning.	0.813	
	SB3	My team values my role more in the informal learning space.	0.759	
Preference of Choosing ILS (PR)	PR3	I find it easy to concentrate while studying in informal learning spaces.	0.622	0.826
	PR2	I feel like the subjects are easier to understand when studying in an informal learning space.	0.650	
	PR3	I feel like I can finish my studies faster when studying in an informal learning space.	0.588	
	PR4	I feel comfortable studying in the informal learning space.	0.617	
	PR5	I feel happy while studying in the informal learning space.	0.633	

As can be seen from Table 2, a set of independent and dependent variables' Cronbach's Alpha indexes is more than 0.6, which means all of the questions are considered sufficiently reliable to move on to the next accumulation.

3.3. Exploratory Factor Analysis (EFA)

EFA is a technique for condensing a set of k observations to a more suitable set of F factors ($F < k$). EFA evaluates the correlations between variables across all groups (factors) to identify observations that depend on several factors or are initially handled differently. When conducting EFA research, KMO coefficients and Bartlett's tests should also be taken into account ($0.5 \leq KMO \leq 1$) as a sufficient requirement for the suitability of factor analysis for the coefficients used for applicability evaluation. An observed variable within a factor is determined to be correlated if Bartlett's test of Sphericity indicates that it is (Bartlett's test < 0.05).

Table 3

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.			.753
Bartlett's Test of Sphericity	Approx. Chi-Square		16702.653
	df		378
	Sig.		.000

Table 3 indicates that $KMO = 0.753 > 0.5$ and Bartlett's sig test = $0.000 < 0.05$ support the appropriateness of exploratory factor analysis (EFA). Moreover, Table 5's rotation matrix analysis findings revealed that 29 observed variables were grouped into 8 factors, and that all of the observed variables had strong factor loading coefficients of 0.5 and above. The observed variables are not excluded and are all meaningful or indicative of a collection of variables or factors. Table 4 displays the rotated component matrix.

Table 4

Rotated component matrix

Rotated Component Matrix^a

Nguyen, A., Nguyen, B., Le, H. & Pham, K. (2025). Physical and social factors influencing university students' preferences for informal learning spaces. *Global Journal of Guidance and Counseling in Schools: Current Perspectives*, 15(1), 12-42. <https://doi.org/10.18844/gjgc.v15i1.9644>

	Component							
	1	2	3	4	5	6	7	8
AM1	.848							
AM3	.827							
AM2	.809							
AM4	.793							
IT2		.868						
IT1		.828						
IT4		.781						
IT3		.777						
SB1			.898					
SB2			.856					
SB3			.830					
CP2				.895				
CP1				.883				
CP3				.880				
DS3					.776			
DS1					.759			
DS2					.734			
DS4					.705			
NT4						.854		
NT3						.839		
NT2						.619		
NT1						.571		
FP1							.936	
FP3							.926	
FP2							.716	
AU1								.791
AU2								.762
AU3								.757

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

3.4. Multiple linear regression analysis

If there are two or more independent variables, a multilinear regression model is used to analyze the relationship between independent and dependent variables. The findings of the multilinear regression show the relative contributions of each variable to the change in the dependent variable. The beta value is a measure of how steeply the regression line slopes (Anderson et al., 2013).

Table 5

Model Summary

Model Summary^b						
Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate	Durbin-Watson
1	.900 ^a	.809	.807		.25920	1.945

a. Predictors: (Constant), SB, DS, FP, CP, IT, NT, AU, AM

b. Dependent Variable: PR

The results for the adjusted R-squared (R-squared) and R2 (R-squared) measure the influence of the independent variable on the dependent variable. Table 5 illustrates that the dependent variable (PA, NA, IT, TC, CO, IR, GR) accounted for 80,07% of the independent variables, and the adjusted R square was 0.807 which is larger than 0.5 and smaller than 1, which is an appropriate number for a good research model. The series can be checked for first-order autocorrelation using Durbin-Watson metrics. Durbin-Watson(d) = 1.945 (0 < d < 3) exhibits no autocorrelation.

Table 6

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	217.686	8	27.211	405.028	.000 ^b
	Residual	51.260	763	.067		
	Total	268.946	771			

a. Dependent Variable: PR

b. Predictors: (Constant), SB, DS, FP, CP, IT, NT, AU, AM

Testing the fit of the regression model is a result of the value of Sig. F test. The multiple linear regression model and the data set are appropriate, as shown in the ANOVA (Table 6) with Sig. < 0.05.

Table 7

Coefficients

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.	Collinearity Statistics
-------	-----------------------------	---------------------------	---	------	-------------------------

		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.031	.077		.411	.681		
	AM	.104	.012	.188	9.017	.000	.573	1.745
	NT	.115	.018	.116	6.315	.000	.737	1.357
	DS	.133	.012	.195	10.654	.000	.746	1.340
	IT	.173	.010	.326	17.422	.000	.713	1.402
	AU	.097	.011	.182	8.942	.000	.600	1.667
	CP	.108	.014	.128	7.592	.000	.884	1.132
	FP	.118	.013	.149	9.026	.000	.914	1.094
	SB	.127	.012	.207	10.742	.000	.674	1.483

a. Dependent Variable: PR

As can be seen from table 7, the independent variables all influence the dependent variable, shown by the $\text{sig} < 0.05$. Collinearity is not likely to happen because all of the independent variables' variance exaggeration factor (VIF) < 2 (1,094 to 1.745). Upon the fulfillment of the prerequisites, it is helpful to assess the amount of each factor affecting the dependent variable relative to other factors using Standardized Coefficients Beta and build regression equations. The ICT facilities factor (IT) had the highest beta value of 0.326 when the beta value was taken into account. It demonstrates that "ICT facilities" (IT) has the greatest influence on the university students' preferences of choosing informal learning spaces in Ho Chi Minh City.

$$\text{PR} = 0.326 \cdot \text{IT} + 0.207 \cdot \text{SB} + 0.195 \cdot \text{DS} + 0.188 \cdot \text{AM} + 0.182 \cdot \text{AU} + 0.149 \cdot \text{FP} + 0.128 \cdot \text{CP} + 0.116 \cdot \text{NT} + \epsilon$$

3.5. T-test

Relationship between gender and students' preference of choosing informal learning space

Table 8

T-test (Gender)

		Independent Samples Test				
		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
PR	Equal variances assumed	2.153	.143	1.023	770	.306
	Equal variances not assumed			1.026	769.995	.305

Sig. Levene > 0.05 (0.143) indicated the variance between the two sexes (male and female) is not different. Next, researchers checked Equal variances assumed - Sig T-Test ≥ 0.05 (0.306) means there was no statistically significant difference in the preference of choosing informal learning space level of respondents of different genders (table 8).

Relationship between living situation and students' preference of choosing informal learning space

Table 9

T-test (Living Situations)

		Independent Samples Test				
		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
PR	Equal variances assumed	.215	.643	.803	770	.422
	Equal variances not assumed			.803	763.833	.422

Sig. Levene > 0.05 (0.643) indicated the variance between the two living situations (at home and rental) is not different (table 9). Next, researchers checked Equal variances assumed - Sig T-Test ≥ 0.05 (0.422) means there was no statistically significant difference in the preference of choosing informal learning space level of respondents of different living situations.

3.6. One-way ANOVA Test

Relationship between study year and students' preference of choosing informal learning space

Table 10

Test of homogeneity of variance

Test of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
PR	Based on Mean	.280	3	768	.840
	Based on Median	.175	3	768	.913
	Based on Median and with adjusted df	.175	3	756.918	.913
	Based on trimmed mean	.215	3	768	.886

Table 11

ANOVA

PR					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	19.404	3	6.468	19.907	.000
Within Groups	249.541	768	.325		
Total	268.946	771			

Table 12

Descriptives

PR								
	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean			
					Lower Bound	Upper Bound	Minimum	Maximum
Year 1	149	3.2926	.57681	.04725	3.1992	3.3860	1.80	4.80
Year 2	228	3.3404	.56999	.03775	3.2660	3.4147	1.80	5.00
Year 3	229	3.6734	.53659	.03546	3.6035	3.7432	1.80	5.00
Year 4	166	3.5639	.60754	.04715	3.4708	3.6570	1.20	5.00
Total	772	3.4780	.59062	.02126	3.4363	3.5197	1.20	5.00

"Table 10", the value of Sig. Levene (0.840) is greater than 0.05, showing that the variance between the choices of the qualitative variable "Study year: Year 1 - 2 - 3 - 4" above is not different, then considering the results in the ANOVA table (Table 11) obtains the value of Sig. F greater than 0.05 (0.05). In conclusion, there is a statistically significant difference in the preference level of respondents from different "Study Year" groups. Table 12 shows that the study year has a positive relationship with the dependent variable Preference (PR). This means, the longer a student has a year of enrollment, the higher the level of interest in choosing informal learning space - the Mean value respectively is Y3 (3,6734) > Y4 (3,5634) > Y2 (3.3404) > Y1 (3.2926).

4. DISCUSSION

After performing data analysis on the physical and social characteristics affecting university students' preferences for choosing informal learning spaces in Ho Chi Minh City, the researchers obtained several findings in comparison to the initial goal. The first finding revealed that factors such as Amenity Quality, Naturalness, Interior Design, ICT Facilities, Autonomy, Customers' Presence, Friends' Presence, and Sense of Belonging impact the physical and social characteristics influencing students' preferences for informal learning spaces. These factors were found to have a positive relationship with the dependent variable, with significance values greater than 0.05 and standardized coefficients Beta greater than 0. The second finding indicated that ICT Facilities (IT) had the greatest influence on students' preferences, followed by Sense of Belonging, Interior Design, Amenity Quality, Autonomy, Friends' Presence, Customers' Presence, and Naturalness, respectively. The third finding highlighted a difference between study year and students' preferences for choosing informal learning spaces, while gender and living situations had no impact on students' preferences.

Descriptive statistics was used to organize and present the collected data, helping to identify any potential errors in the research. Table 11 shows a valid sample size of 772, with a range of each variable ranked from 1 to 5, confirming the absence of errors in the survey data. The mean of Amenity Quality was notably high (3.6703), indicating that students prefer comfortable furniture in informal learning spaces. The highest mean was for AM1, followed by AM3, AM2, and AM4, supporting the conclusion by Adityawirawan and Kusuma (2021) that Amenity Quality is a key factor in choosing informal learning spaces.

Regarding Naturalness, the study found a lower mean (3.2503), contrary to Barrett et al.'s (2015) findings that naturalness significantly impacts learning. The mean for NT3 was 3.18, which was not significant enough to suggest that students prefer spaces with windows for ventilation. However, Waxman (2004) noted that seating areas near windows are often preferred by workers, a finding that contrasts with the results of the current study, where noise disturbances (NT4) were less significant for students ($m = 3.19$).

In terms of Interior Design, the study found the second-lowest mean (3.3591), indicating that the design of informal learning spaces does not strongly influence students' preferences. This aligns with Han and Ryu (2009), who noted that students value comfort in designs and decorations. However, the concept of

decorations encouraging students to spend more time learning was partly supported, with DS1 receiving the highest mean. Both the current study and Adityawirawan and Kusuma (2021) found that ICT Facilities are essential for students, with IT1 and IT2 receiving the highest means, indicating that students require laptops and internet access during the learning process.

Autonomy was identified as the most important factor affecting students' preferences, with the highest mean. This is consistent with Beckers (2015), who concluded that students prefer learning spaces where they can make their own decisions. AU1 received the highest mean, indicating that students prefer spaces free from disturbances. This relates to Harrop and Turpin's (2013) description of privacy, where students emphasized the importance of personal workspaces free from distractions.

The study also found that students preferred autonomy over customers' presence, with the mean for Customers' Presence being one of the lowest. Previous research by Crook and Mitchell (2012) described situations where individuals sit near others without interacting, enjoying the sense of being part of a community. However, the current study found that students preferred having conversations with others in the learning space, which helped them feel more at ease when studying.

Regarding Friends' Presence, students preferred having friends around in informal learning spaces, as suggested by Adityawirawan and Kusuma (2021). The means for the three questions (FP1, FP2, FP3) were around 3.51, indicating that students value collaboration and conversation with friends, as well as choosing spaces where their friends also enjoy studying. This aligns with previous research by Beckers et al. (2016), Harrop and Turpin (2013), and Adityawirawan and Kusuma (2021).

Finally, Sense of Belonging had the highest mean (3.6775), suggesting that students value being included in informal learning spaces that support their learning process. This finding aligns with studies by Freeman et al. (2007), Hausmann et al. (2009), and Hoffman et al. (2002), which concluded that a strong sense of belonging is associated with academic persistence, success, and motivation. The sense of community (SB2: $m = 3.70$) was identified as the most crucial factor for students' preferences, supporting the findings of Harrop and Turpin (2013), who emphasized the importance of working alongside others.

5. CONCLUSION

The aim of this study is to recognize the components that make up a dimension directly affecting university students' preference of choosing an informal learning space. Conducting the quantitative methodology, the research collected students' opinion on their perceived factors that motivated them to decide on an informal learning space. The outcomes pointed out a desirable correlation among eight variables, which are amenity quality, naturalness, interior design, ICT support, autonomy, customer's presence, friend's presence and sense of belonging when considering a place for their self-taught activities. This paperwork's findings, ICT Facilities (IT) and Sense of Belonging have the greatest impact on the physical and social characteristics affecting the university students' preferences of choosing informal learning spaces in Ho Chi Minh City, followed by Interior Design, Amenity Quality, Autonomy, Friends' presence, Customers' Presence, Naturalness, respectively. Planning to build up a place where modern technologies will be applied for self-learning purposes can respond to the basic needs of customers about power source, internet connection, check-in or booking system and other services. If a spot has a high level of satisfying the previously mentioned factor, students may come to visit and from that, the other advantages of the place will be experienced. In addition, a great deal of students said that they are also in love with a space that offers them a high sense of belonging, for them to feel like they are a part of the place, and that they can contribute to the community. Students often feel disattached because of the workload, the atmosphere or even the overwhelming presence in such a large society at school, this creates a blur veil of prevention in their cognition.

This research is dedicated to figure out the requirements from university students to give better suggestions for planners, owners of such venues, to place more emphasis on students' perspective in education, and to customize more unique approaches for the sake of both owners and customers. It also contributes to expanding and validating existing research on the cognition of students nowadays. Unavoidable

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limitations, such as not disclosing all elements, or increasing the sample size to enhance accuracy and reliability, are present while carefully considering subjects.

Conflict of Interest: The authors declare no conflict of interest.

Ethical Approval: The study adheres to the ethical guidelines for conducting research.

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APPENDICES

APPENDIX A

Questionnaire

Dimensions	Code	Measurement Items	Reference
Independent variable			
Amenity Quality	AM1	The tables and chairs in the learning space need to be comfortable for me to study for a long time.	Goddard (2008)
	AM2	The space is spacious which helps me feel more comfortable learning.	AbuThahir & Krishnapillai (2018)
	AM3	The artificial lights in the space have a moderate level of light that helps me increase concentration while learning.	Aimilios & Chryso (2017)
	AM4	The temperature of the air conditioner in the space is suitable for the learning process.	Banbury & Berry (2010)
Naturalness	NT1	I can see the natural scenery from inside the learning space.	Adityawirawan & Kusuma (2021)
	NT3	Natural lighting (sunlight) in space is suitable for my learning process..	
	NT3	The space's windows create ventilation.	Nesreen (2019)
	NT4	I'm seldom bothered by the noise in the space while learning.	Adityawirawan & Kusuma (2021)
Interior Design	DS1	The concept of the decorations encourages me to spend more time learning in the space.	AbuThahir & Krishnapillai (2018)
	DS2	Bright color on furniture, walls, ... in the space helps to produce an optimal level of stimulation on my moods and energy levels while learning	Peter et al. (2019)
	DS3	Visual variety in the space's layout (pictures) creates interest for me in my learning process.	
	DS4	Furniture in the learning space provides appropriate visual diversity and helps enhance my productivity.	Fisher et al. (2014)
ICT Support	IT1	I always bring a laptop to space to support my learning process..	Adityawirawan & Kusuma (2021)
	IT2	Internet access is a necessity for me during my learning process.	
	IT3	The learning space is fully equipped with electrical outlets to charge devices (laptops, smartphones, etc.) is what I am interested in.	Janice et al. (2010)
	IT4	The availability of printing facilities in the learning space supports my learning process.	(Lau et al., 2019)

Autonomy	AU1	I would prefer a space where there are no disturbances from others.	Adityawirawan & Kusuma (2021)
	AU2	It's essential for me to make my own decisions on the time I choose to learn in space.	Beckers & Dewulf (2016)
	AU3	It's essential for me to make my own decisions on where I choose to learn in the space	
Customers' presence	CP1	It would be more comfortable if other customers cannot see what I do in my space.	Adityawirawan & Kusuma (2021)
	CP2	It would be more comfortable if other customers cannot hear what I said in my space.	
	CP3	Conversations with customers in the space help me feel at ease when learning.	Beckers & Dewulf (2016)
Friends' presence	FP1	I like collaborating with my friends in the learning space.	Beckers & Dewulf (2016)
	FP2	I would prefer learning spaces that my friends enjoy going to.	Harrop & Turpin (2013)
	FP3	Conversations with friends in the space help me feel at ease when learning	Adityawirawan & Kusuma (2021)
Sense of belonging	SB1	I experience a sense of belonging in this informal learning space.	Broughton (2019)
	SB2	The feeling of having a sense of community in the space is a motivation for my learning.	Harrop & Turpin (2013)
	SB3	My team values my role more in the informal learning space.	Paul (2004)
Dependent variable			
Preferences	PR1	I find it easy to concentrate while studying in informal learning spaces.	Adityawirawan & Kusuma (2021)
	PR2	I feel like the subjects are easier to understand when studying in an informal learning space.	
	PR3	I feel like I can finish my studies faster when studying in an informal learning space.	
	PR4	I feel comfortable studying in the informal learning space.	
	PR5	I feel happy while studying in the informal learning space.	

APPENDIX B
Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
AM1	772	1	5	3.74	1.155
AM2	772	1	5	3.65	1.201
AM3	772	1	5	3.70	1.195
AM4	772	1	5	3.60	1.240
NT1	772	1	5	3.27	.852
NT2	772	1	5	3.36	.919
NT3	772	1	5	3.18	.662
NT4	772	1	5	3.19	.686
DS1	772	1	5	3.62	1.134
DS2	772	1	5	3.41	1.141
DS3	772	1	5	3.14	1.060
DS4	772	1	5	3.27	1.106
IT1	772	1	5	3.79	1.246
IT2	772	1	5	3.74	1.321

IT3	772	1	5	3.46	1.324
IT4	772	1	5	3.69	1.289
AU1	772	1	5	3.79	1.237
AU2	772	1	5	3.53	1.296
AU3	772	1	5	3.71	1.266
CP1	772	1	5	3.26	.711
CP2	772	1	5	3.38	.862
CP3	772	1	5	3.58	.744
FP1	772	1	5	3.54	.854
FP2	772	1	5	3.51	.858
FP3	772	1	5	3.52	.850
SB1	772	1	5	3.64	1.073
SB2	772	1	5	3.70	.986
SB3	772	1	5	3.69	1.057
PR1	772	2	5	3.67	.707
PR2	772	1	5	3.34	.754
PR3	772	1	5	3.36	.752
PR4	772	1	5	3.24	.788

PR5	772	1	5	3.78	.840
Valid N (listwise)	772				

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
AM	772	1.00	5.00	3.6703	1.06537
NT	772	1.00	5.00	3.2503	.59865
DS	772	1.00	5.00	3.3591	.86546
IT	772	1.00	5.00	3.6710	1.11079
AU	772	1.00	5.00	3.6757	1.10967
CP	772	1.00	5.00	3.4054	.69925
FP	772	1.00	5.00	3.5220	.74677
SB	772	1.00	5.00	3.6775	.95979
PR	772	1.20	5.00	3.4780	.59062
Valid N (listwise)	772				