

# High School Architecture in Times of Blended-Learning System

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## ABSTRACT

A blended learning system is a group of contemporary learning methods that began in the early 2000s. However, its existence turns out to be essential during the pandemics. When a conventional learning system offers only 1 learning method: conventional face-to-face meeting, a blended learning system gives 4 varied and technology-friendly methods: offline synchronous, offline asynchronous, online asynchronous, and offline asynchronous. The way we plan high school buildings indeed change to make place for the paradigm shift. This research discusses the differences among learning spaces both in conventional and blended learning methods through a participatory approach. The research methods are as follows; 1) The Architecture of Blended Learning System; 2) Security, Authority, Control, and Trust; 3) Interaction and Empathy; 4) The Future of High School Design. Conclusion and finding of this research are rooms in blended learning systems offer themselves flexible and versatile spaces and act as effective and efficient discussion places, especially for 11 to 18-year-old students.

**Keywords:** school, blended learning system, freedom to learn, classroom

## 1. INTRODUCTION

On December 11th, 2019, Indonesian Minister of Education, Nadiem Makarim, announced a game-changing plan on the national education approach: Learning Freedom (Merdeka Belajar, lit. Indonesian) Program. Makarim proposed that students, explicitly learning in secondary school and university, were bestowed the freedom to choose what they want to learn. Hence, this policy shaped a new way to assess how teachers would assess their ability. While the plan was still highlighting the news, Covid-19 struck. In less than 3 months, all schools were ordered to close, while offline and conventional learning methods shifted online. Having to adapt to the new technology was hard at first. Blended Learning System (BLS) that was once thought to be too sophisticated to be applied in common Indonesian high schools turned out to be a perfect (and the only) solution. BLS is a term of a technology-based system, popularized in the early 2000s, that comprises of 4 methods: online synchronous (real-time face-to-face/F2F learning through the internet), offline synchronous (conventional F2F meeting), offline asynchronous (learning offline without F2F meeting), and online asynchronous (internet-based learning without F2F meeting) [1] [2]. As time passes, most people have now been used to online remote learning. Classrooms have been facilitated by Course Management System (CMS), such as Moodle, WebCT, and Aimsis, and by Learning Management System (LMS), such as MSTeams and Google Classroom. Conventional teacher-

to-student knowledge transfer turns into flipped-class style and video-based learning, whose sources can come from the internet. And yes, Indonesian high school education is surfing towards a new paradigm like never before.

Sooner or later, the uncertainty of when school will open will make teachers and students fond of it. And when they have mastered the new technology, there must be a change in how we plan our high school buildings.

## 2. MATERIAL AND METHODS

### 2.1. Material

The material used in this paper was taken primarily from interviews with high school (both junior and senior) school students, parents, teachers, practitioners, and academicians, as well as observations on the spaces and methods they use in blended learning systems. This research was conducted when the Covid-19 pandemics was taking place, so to point out the space they take in the offline synchronous method, the interviewees were to recall based on what they remembered. These primary data are then compared to secondary data based on 3 main points: blended learning system, valuable learning space, and students' characteristics in high school.

## 2.2. Theoretical Review

Montessori & Claremont [3] described that it is only possible for children to receive the best education through learning in a prepared environment.

In such prepared environment, there must be:

1. Liberty to Move and Choose
2. Structure and Rules
3. Peers to learn together
4. Concrete Objects
5. Step by step presentation
6. Freedom to choose their interests
7. Support, not reward nor punishment

It applies to high school students who are in the age range of 12-18-year-old. According to Piaget [4] and Yusuf [5], students of that age span need a learning environment that supports a responsible environment. In this environment, students might train their sensory motoric, cognitive, sensuous, and social skills when they are in a classroom filled with supportive peers and facilities. However, these things are lacking in virtual spaces, which serve as representations of simplified classrooms.

Foucault [6] stated that teachers own the power to give grades (as rewards and punishments) to their students instead of their good behaviours. However, the way teachers assess scores have changed from calling out traditional subjects memorizing (banking-model) to a more rational comprehension case study explorations (problem solving-model) since school institutions do not possess full control of what students do during school hours due to limited visual and audibility. Merriam [7] studied that high school student's decision to stay in a classroom is mainly voluntary, and by understanding this, rewards and punishments will no longer affect the application of power and authority towards them. Teachers only spend enormous energy disciplining them. This character is shown in Kitzmiller's model of abdicated power [8], in which teachers lack authority over their students and thus do not get decent respect from them. However, in our situation, the character is not shown in a cynical position but rather serves as a product of both teachers and students' failure to adapt quickly in the newly applied learning environment.

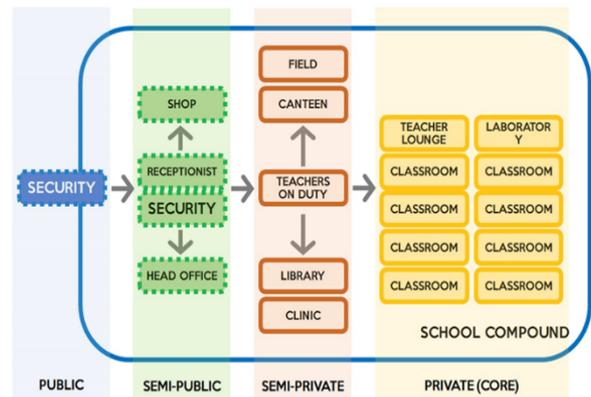
## 2.3. Method

Since students and practitioners most likely experience the learning paradigm, we choose the participatory approach as the research methodology. The primary and secondary data are then used to conclude how high school architecture changes in times of blended learning systems. The research methods are as follows; 1) The Architecture of Blended Learning System; 2) Security, Authority, Control, and Trust; 3) Interaction and Empathy; 4) The Future of High School Design

## 3. RESULT AND DISCUSSION

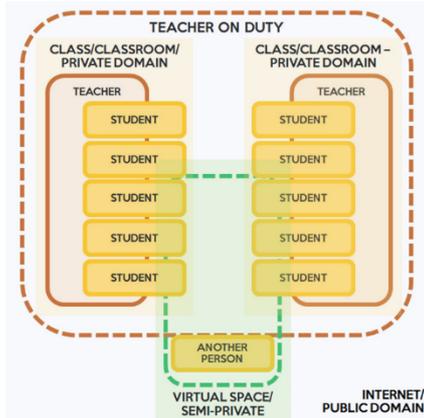
### 3.1. The Architecture of Blended Learning System

As mentioned before, BLS provides education with more methods rather than focuses only on an offline F2F method. These varied methods revolutionize how space and time work in learning spaces.



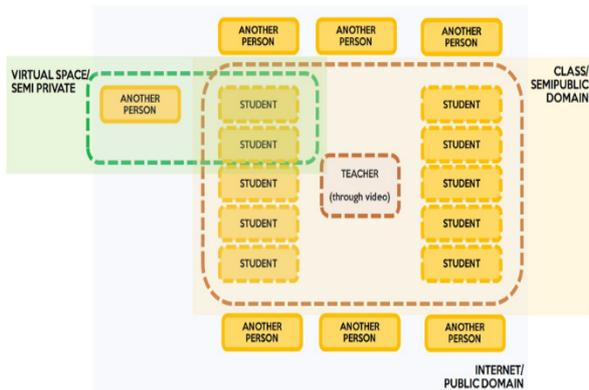
**Figure 1** Spatial Organization of a School Building using Offline Synchronous Method (Source: Author, 2021)

**Offline Synchronous Method**, or the conventional ones, is currently forbidden during the pandemic in Indonesia. The method is related closely to the archetypal notion of high school designs. Conventional school takes its root from classroom units with clear spatial hierarchy and organizations, commonly in the form of branching linear flow. Each layer of this zone may not be intruded by people with no interest. Allowed visitors move from public zone towards a strictly guided private core zone which are classrooms. The pattern is similar to teaching and learning system in classes. Teachers and students need to be in the exact same place and time. This condition ensures students to focus themselves on what the teachers need to pass down. Each classroom serves as an entity, which cannot and may not be interfered by other entities (other classrooms and other rooms existing in the same school compound) up until that class hour ends. Class, which refers to the bond between students and corresponding teacher, is now synonymous with the classrooms.



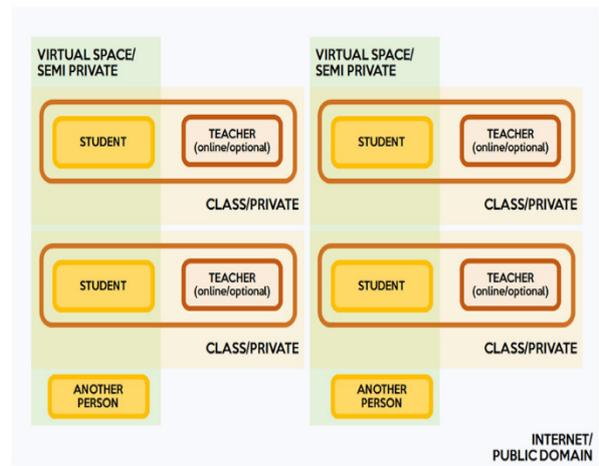
**Figure 2** Spatial Organization of a Class using Online Synchronous Method (Source: Author, 2021)

**Online Synchronous Method.** Different patterns pop out in BLS, which are applied during a pandemic. The application of technology creates a spatial disruption. Classrooms become invalid since learning activities can take place whenever and wherever according to the chosen method. The notion of a classroom in which students and teachers gather in the same place and time can no longer be found in BLS. A meeting in this virtual space represents a particular classroom. The virtual class/classroom is still considered private. Teachers hold full authority and control over the security system of the meeting. However, the learning activities in this method differs from the conventional one by giving a chance for each person to be in another semi-private virtual space simultaneously, something that was hindered in the conventional method. Every person is not guaranteed to focus on the class subjects while not at the same time doing something in another 'place' both online and offline. Teachers on duty who used to serve as a layer in school buildings now acts as an overseer helping teachers in recording students' presence and securing the virtual meeting spaces.



**Figure 3** Spatial Organization of a Class using Offline Synchronous Method (Source: Author, 2021)

**Online Asynchronous Method.** In this method, the spatial pattern turns more complicated since the teacher may be different from the students. Students must watch a given video at a specific time, but teachers are not to be there for them simultaneously. Teachers' videos become a representation of their presence towards the students. Each person watching the video and then working on the given assignments are considered being in a class. This class no longer requires each student to be in neither a virtual nor physical room, although they are required to watch the video simultaneously. We can no longer call this class a classroom. The class is now in the public domain: the video uploading platform, such as YouTube, and can be accessed by everyone.



**Figure 4** Spatial Organization of a Class using Offline Asynchronous Method (Source: Author, 2021)

**Offline Asynchronous Method** occurs in the form of collaborative class to class projects and life skill practice. The application of these methods differs according to the schools' policy. In this offline asynchronous method, classes are no longer bound to the notion of time and space. Assignments relate to both teachers and students. The only state in which they both are simultaneously, and the place is when they have to turn in their projects through online spaces such as emails or LMS. Classes are no longer held with a lot of students be in the same time and space. Classes are when students learn by practically doing their assignments and uploading their papers/videos for their teachers.

**3.2. Security, Authority, Control, and Trust**

Security in a school is required to regulate unwanted disturbances from interfering learning process. In school planning, spatial organization and hierarchy are essential. Ching [9] explains that spatial patterns are organized to encourage coherency and flow in a building. Suptandar [10] stated that for educational buildings, a combination of

clustering and linear spatial organization is important to ensure the learning process to go well.

In BLS, this linear spatial organization can no longer be found. Since the F2F meeting occurs virtually, all persons in possession of the invitation link might enter. The only defence shielding these virtual rooms from unwanted visitors is its application security system. One application, Zoom, features a 'waiting room' in which everyone trying to enter the rooms will be put on hold by the host (in this case: teachers) and may enter when given permission. Teachers now turn into the sole holder of authority connecting educational institutions and students. During their teaching hours, a teacher is genuinely the only authority that can force school laws upon students because of the reductions of security layers. Classrooms which were once the core of school buildings, now shift into stranded and tiny bubbles, virtually exposed to other parts of the world.

Teachers can only see what students want to present. Teachers can only hear when students turn their mics on. Learning conventionally in school buildings give teachers authority and control over students, thus ensuring a more focused condition. Through the asynchronous method, teachers can no longer validate students' work from academic frauds. Students tend to be undisturbed by outside situations. Alsobaie [11] finds this phenomenon to be a students' tendency toward self-directed learning. Hence, the learning method can't rely on teachers' authority and control but trust. Teachers and students are now intensely bridged by the thin thread of trust that they have their rights and duties (to teach and learn) and have self-authority and self-control of the learning process they will go through - class materials.

### **3.3. Interaction and Empathy**

Another dissimilarity lies in how individuals in the online remote system interact. Extreme reduction of spatial sensing ability is visible in this new method. Online synchronous meetings allow only restricted and controlled visual and audible senses to be in use. Each interviewee admits that they have lost an effective and efficient discussion process, leading to a fuzzy learning process. Teachers confess that visual constraint toward what the students are doing ends their inability to understand the class materials. Moreover, students tend to be unsuccessful in maintaining focus due to prolonged computer exposure and seating time.

Through asynchronous methods, students find it hard to start a direct dialogue with teachers. In video-based learnings, students tend to be quickly disinterested and unfocused because they are forced to watch their teachers' lectures without having any chance to interact. Hinkel [12] stated that we had lost human interactions that promote incidental interactions and idea-sharing, or in short, the small informal meetings. Yes, teachers, students, and parents now can reach out to one another not only formally during in-class hours as in the conventional method but

through social media and other means of telecommunication. In BLS, they can interact whenever they feel like to, even up until midnight (if both parties give consent), in order to achieve the best learning result. However, it would add extra effort that means less chance of meeting more people outside of our inner circle.

In BLS, each person can exist in multiple spaces at one time. Even in video-based learning, they can be in the same place but at different times. Formal education institutions, which happened in one place and one time simultaneously, now shift, resulting in vanishing empathy among teachers, students, and parents, even though school buildings are places not only for learning but also socializing.

### **3.4. The Future of High School Design**

For teachers, the ideal learning process takes place in the offline F2F meetings in classrooms. The weakness in applying the BLS in K12 education is the importance of restructuring the class and changing the paradigm of the educators (Donaldson & Conrad [13]). Another difficulty can be found in the elementary level, that according to Montessori & Claremont [3], students learn by getting to know the space where they are (prepared environment). Realspace helps their development to understand the concrete things around them.

These items lack in the BLS. However, in the context of the new normal, we must still apply the online learning process. Hence, educators and pupils are fuzz in what means to use to achieve desirable results. If an on-site theory-based F2F meeting previously occurs 80% of overall school hours, the number should be less in the case of screen-based meetings. However, that was the initial thought in the early remote learning process. In some cases, some teachers just hand out presentation documents or give homework with too little explanation in one semester.

Based on learning spaces comparison in Table 1, we find that some keywords will be the essential criteria of the future high school design, which are:

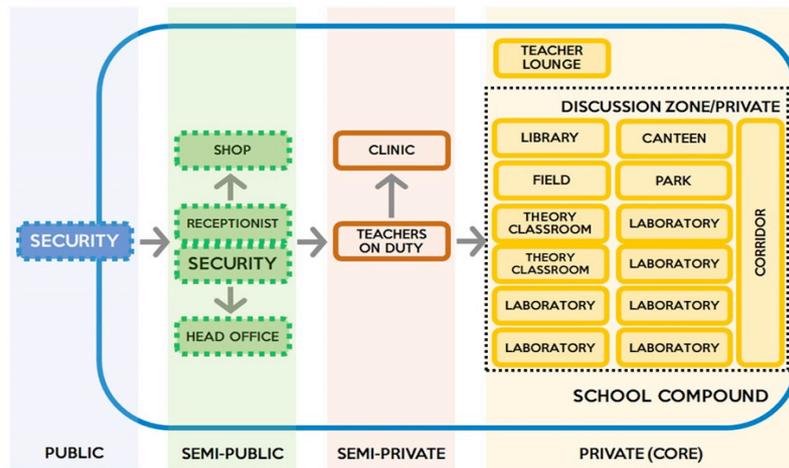
1. Flexibility. That learning can be done anywhere without being bound by a rigid space. It eases the students and teachers, as long as there is an internet connection in that place.
2. Spatial Arrangement. Unlike the conventional paradigm, through the virtual room, students and teachers can arrange their digital space in such a way and can be used for many chances, not only for the learning process, but also for other things such as online chitchats friends, or any other meetings.
3. Connectivity and Flow between Spaces. The virtual room might be split into several rooms inside a big room, like a private room to gather as a group.

**Table 1** Comparison of School Learning Characters

Characters	Application of Only Offline Synchronous Method	BLS without Offline Synchronous Method	Future Design (BLS-based School)
Learning Characters	70% theory : 30% real-life practice	50% theory : 50% real-life practice	30% theory : 70% real-life practice (Freire, 1970) (Freedom Learning Program)
Classroom Authority	Teachers and Faculties	Teachers (limited, based on trust)	Teachers and Faculties (based on trust)
Classroom Control	Teachers	Each person (based on trust)	Each person (based on trust)
Classroom Characters	1 designated place and 1 designated timeslot for each subject	Various places of each one's liking, various (physical and virtual) spaces, variously designated timeslots	Various places and (both physical and virtual) spaces, but 1 designated timeslot for each subject
Flexibility	1 room with many uses, limited versatility, enhances focus	Unlimited, but tends to be ambiguous	Versatile, a collaboration between real-life practice and theory

Future high school buildings can serve as a learning space for practices that can hardly be done in other places (see Figure 6). Currently, approximately 80% of the rooms in a school are occupied as formal classrooms, and the rest is divided among supporting facilities such as administration, laboratories, and services. This enormous area can be utilized more as laboratories for students to hone their skills, for example; rooms with mirror enclosures as dancing studios; cooking practice; musical chambers with good

acoustic; and other rooms that correspond well with trending students' interests and talents. High school institutions, through their buildings, must emphasize life skills learning, which is important for the future of their students. Theory-based materials can be transmitted online, but practice-based learning, which is a prioritized curriculum, soon must occur in school compounds so that teachers can ensure its quality.



**Figure 5** Spatial Organization of a Class in times of Blended Learning System (Source: Author, 2021)

**4. CONCLUSION**

Although conventional classrooms provide furniture-moving chances, it resembles banking-model learning that Freire [14] extremely did not suggest. Future high school architecture needs to prioritize discussion spaces. Perhaps outdoor or open-space discussion spaces become essential

since they will trigger problem-solving discussion. Students are conditioned to face each other so that discussions turn exciting and on point. Even these discussion spaces can come in the shape of informal facilities like canteen, library, parks, and even corridors provided that students are proven to be able to behave themselves. Therefore, teachers must be able to control their students without exerting too much obvious authority.

BLS has truly become a new normal for the high school architecture we are used to knowing. Our needs of high school architecture will adapt according to changing events in the near future. The way students learn and teachers teach in high schools surely will change. Pandemic proves that BLS can aid learning process soon learning freedom context. The pedagogy and learning process will shift towards liberation and big data integration. However, our need for sensuous classrooms can never be changed. This research proves the defects in BLS that are not fully applied (happens without offline synchronous method) that we face in this pandemic. Senses need to be continuously honed (Montessori & Claremont [3]) while facing the digital era. We find that high school students display extraordinary critical thinking. They can collaborate with teachers, developing a new creative and independent learning method. Future high school design ought to facilitate this flexibility and versatility. Conventional school spatial organization should be applied to provide security for classrooms that are located at its core. Control and authority, which were forced in conventional classrooms, has transformed into responsible freedom in learning in the form of guided group discussion spaces spread among school compounds. Real-life practise becomes a new priority of school space use.

This research is an initial integration stage of 2 fields: pedagogy and architecture. Yes, we surely won't know how the future will unravel, but we know that men will always find a way to adapt their way of life and design their built environment. We choose high school students because, according to Piaget [4], they are in a solid cognitive phase. This research then can be continued to a similar one by taking samples from children of the preoperational stage (kindergarten and 1st-3rd grade primary students) and concrete operational stage (4th-6th grade primary students). Hence, the research will unravel how an architect should plan a complete Indonesian K-12 school compound in general.

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