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# Active Learning Classroom Design in Sagittarius-kan: Concept, Process and Challenges

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This report outlines the background and process behind the creation of the active learning classroom design utilized in a total of twelve classrooms on the second and fifth floors of the building, "Sagittarius-kan." The report describes how the concept was created, the process and challenges in making it a reality, and ongoing concerns about aspects of the design. It also gives a rough outline of how the overall concept is grounded in theory and practice primarily in Europe and North America and how it was adapted to the design constraints of the building.

KEYWORDS：Classroom Design, Educational Spaces, Active Learning

Sagittarius-kan was opened April, 2016 for the Faculty of Foreign Studies and for the Faculty of Sociology, which began teaching in 2017. The building consists of a range of classrooms, a Global Commons, computer class rooms, audio and video studios, faculty offices, meeting rooms, a teachers' room and toilets, including a powder room. The classroom sizes go from large lecture course orientated rooms with fixed seating to small seminar rooms. The author was on both the committee responsible for the Global Commons as well as the committee from the Faculty of Foreign Studies which worked with the architects on classrooms, the teachers' room, and other aspects of the building design.

This report seeks to outline the background and reasoning behind the unusual design which was originally proposed by this author for the middle sized rooms, for classes of up to between 36 and 48 students, in particular those on the 2nd and 5th floors, a design which also became the model for the Open Classroom in the Global Commons. The proposal was made at a time when emphasis on encouraging active learning was growing and Foreign Studies Faculty goals involved the CEFR descriptors, encouraging development of student ability in all four skills. Graphics used in this article are those

downloaded at the time, while background information is often from more recent literature as, while designs like this have become much more common in recent years, it was not as well recognized as a design concept at the time of proposal.

## 1. Concept and path to design

As Rands and Gansemer-Topf (2017) state in the introduction to their article "The Room Itself Is Active: How Classroom Design Impacts Student Engagement" in the Journal of Learning Spaces;

Changes in student expectations and attitudes, as well as research demonstrating the relationship between active engagement and student learning (Prince, 2004), have challenged institutions to reconsider their design of classroom spaces (Oblinger, 2006). The "traditional" college classroom, with a fixed, lecture-style configuration, does not match what we know about how students learn nor how students expect to learn (Oblinger). As a result, many colleges and universities around the country are committing resources to redesign classroom spaces to

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promote *active, participatory, experiential learning* (Harvey & Kenyon, 2013). (p.26, *italics added by this author*)

Knowing the importance of promotion of "active, participatory, experiential learning" outlined above, the author spent considerable time researching possible methods of classroom design that would be effective.

One of the most influential approaches to considering the problem was the Future Classroom Lab, (opened in 2012 by European Schoolnet and, at the time, supported by 30 Ministries of Education) and its concept of six learning zones, each with two sub areas: "develop (plan and examine), exchange (support and encourage), create (imagine and explore), investigate (research and discover), present (listen and share) and interact (question and discuss)." (n.d.) An *"active, participatory, experiential learning"* classroom design would need to be adaptable to a range of layouts to provide opportunities for as many of the activities outlined above in the six zones as possible. As Michael Horn is quoted by Glatter, Deruy and Wong (2016):

It will be critical to rearrange the physical space and furniture to align with the principles of student agency, flexibility, and choice that are the core of new learning models. Because these models will leverage multiple modes of learning, they will need spaces built for different activities, which can occur individually through digital media or in small interactive groups.

This would require a flexibility to create spaces such as illustrated in image 1 downloaded at the time from school.uchida.co.jp.

However, the author felt that, while a classroom of flexible design such as the one in image 1 is powerful, it does not tackle the issue of technology in the classroom. The author felt, in addition to the individual use of digital media that Michael Horn suggests above, group use of media and the need to cater to the potential future shift to BYOD by the university would need to be catered for. However, as Randi Weingarten (president of the American Federation of Teachers) is quoted as pointing out in Glatter, Deruy and Wong (2016),
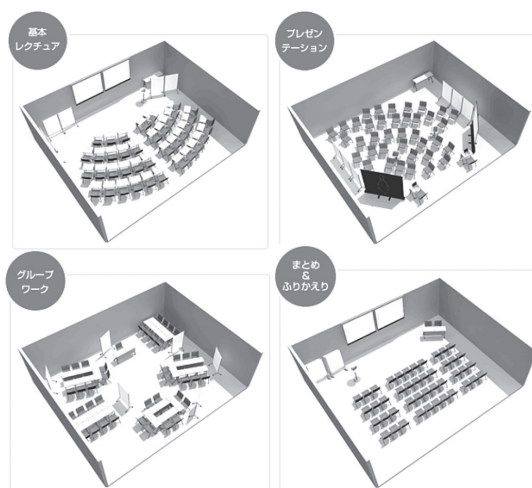


Image 1: school.uchida.co.jp

"Technology can be a powerful tool, but it must be implemented with the intention of enhancing educator-facilitated learning, not replacing it."

With this in mind, the author looked to see how well-known universities were handling this challenge and found the TEAL (Technology Enabled Active Learning) classroom model at MIT, a classroom design that came from the iCampus research collaboration between Microsoft Research and MIT that "merges lectures, simulations, and hands-on desktop experiments to create a rich collaborative learning experience." (MIT iCampus, n.d.)

The original idea was developed for larger lecture courses in the sciences where the lecturer does not lecture but challenges the students to solve problems in groups. It had since also been used for smaller class sizes, such as the NEI Collaborative Classrooms at Nanyang Technological University, Singapore. Support for this design concept was growing at the time (other names for similar designs included REAL, SCALE-UP), and image 2 for a TEAL classroom at Yale university provides a simple visual description of the layout.

The key here is the organization of desks into groups and the provision of each group with a monitor on a nearby wall and with white boards around the room. The round desks, which provide a significant work space, include power points and methods (such as HDMI outlets) to connect devices to the group's monitor.

While the TEAL concept of organization into groups with access to a group monitor with the
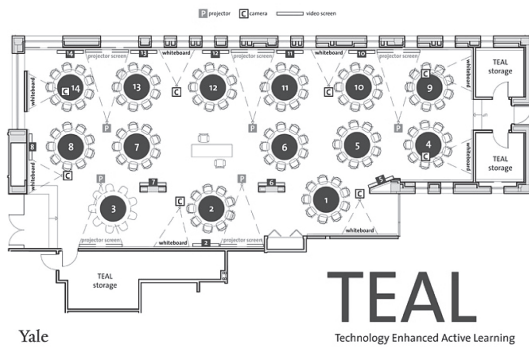
Image 2: "The Room"

support of white boards and large tables for laptops and equipment around the room was seen as powerful and promising, the author was concerned about the cost of implementing the concept and the challenges in gaining faculty and administration for it. However, what was of even greater concern was that it would prevent the classroom from being used in a more traditional sense, thus limiting the types of classes that could be put there, and that, by having power outlets and connections to the group monitors on the round desks, desks were set and thus not flexible.

McGill university's TLS (Teaching and Learning Services) article "Principles and Standards for Designing Teaching and Learning Spaces" at the time stated design should, "in the classroom… encourage active and collaborative learning" through a list that included "flexible furniture" to promote collaboration, "work surfaces" that are "adequate for laptops and papers," opportunities for "information sharing," "collaborative areas" in the form of "writable walls" and "collaborative technologies" that include "screen sharing to encourage student-driven learning." (n.d.) The author felt that this concept of furniture that provided flexibility, having work surfaces that were "adequate for laptops and papers", and the "writable walls" with shared screens provided the best solution for the challenges in the design of these classrooms.

For the above reasons, the initial concept that was taken to the architects was one of a classroom with movable individual desks and chairs so a varying range of sizes of work space could be created for both individual and group work, monitors around the walls for student use, spaced so as to facilitate division of the class into groups of up to around 6 or 8 sets of tables and chairs (or just chairs), with remaining wall space to be covered with white boards, thus providing McGill's "writable walls." At the same time, the room would require the more traditional teacher's white board and desk with work space, computer, the standard range of outlets (such as HDMI and VGA) and screen. It was also seen as necessary that there be power outlets for students to be able to charge the devices they were using in group work or on the monitors. For reasons of cost, it was decided that the student monitors would be stand alone (not connected to each other or under the teachers' control) and that, if possible, furniture would be colorful to make the room more attractive.

## 2. Challenges during the design stage

Once the concept was approved and work began with the architects, challenges during the design stage were two-fold.

First, in working with the architect for the building overall there was concern about classroom size, in particular width, as the overall design of the building made the width pre-decided and the new classrooms were to be longer and narrower than similar sized classrooms in existing buildings such as building 12. The smaller width meant concern about how easy it would be to move around the classrooms once with the furniture was in and also how to design for the teachers' desk, overhead screen and whiteboard when each room was required to have two doors by regulation.

Extensive experimentation in current classrooms and simulations led to solutions that, while not perfect, were seen to be workable in the classroom environment and allowed for flexible creation of working spaces from the individual to a range of sizes of group. Naturally, later furniture choice was heavily influenced by this concern, with the final choice being tables and chairs that enabled simple and efficient stacking in a small space to pack away

unneeded classroom furniture to enable maximum use of space.

The second stage of concern was in working with the interior architect. The primary challenge was the design of the wall box that would house the student wall monitors. It had to be slim enough so as not to encroach on the width of the room, robust enough to last years of rough use and, while the primary student work space would be the desks, the wall box needed something like a shelf to hold student devices while in use to provide, when required, what McGill TLS termed a "work surface… adequate for laptops and papers," (n.d.) while students were doing presentations or leading a group in work using the screen. In addition, in a further challenge that included the company providing the electronics, the system needed a simple, cost-effective way to connect student devices to the screens.

Design of the wall box itself took considerable time and involved the creation of multiple mock-ups, but the final result was a simple black box with inset monitor that was designed to help improve the sound environment in the classroom. A shelf deep enough to support a tablet or small to regular size laptop computer to be folded up when not in use, with a small lip to try to prevent devices slipping off, was eventually decided upon.

How to connect student devices to the monitors became the principal challenge. Cordless methods such as using Bluetooth-like devices were found to be expensive but also difficult to use as students would need to do things like download an app and register and connect to each monitor each time. If students did not disconnect from previous monitors, it was feared that one students' work would be projected onto multiple monitors, including those that had been used in previous classes, and perhaps even in different classrooms.

At this time, it was found the majority of students had iPhones and that, while expensive, iPhone adapters were available that would enable students to connect their iPhones or iPads to the monitors. Android smart phones presented another challenge due to the great variety, but it was found that, if two types of adapter were bought, around 80% of the types would be covered, so it was decided to provide each student-use monitor with a VGA cable, HDMI cable and power cable with a length that enabled work at desks in a group nearby, to be coiled up and put inside the monitor wall box shelf when not in use.


Images 3a and b: The classroom and monitor box

## 3. Challenges now the classrooms are in use

The classrooms are now in use and have proved popular with teachers who practice active learning and with students as the design is novel and they can use their smart phones. Visitors to the university are impressed and photos of the classrooms are now in use on university advertising such as webpages and in brochures. However, several concerns remain.

The first and foremost is the continued viability of the method of connection of student devices to the monitors. The initial idea was for each student to purchase their own adapter, but that was found to be impractical to ask at this stage, and so sets of Apple adapters and several Android adapters (of one of the two types mentioned above) were purchased and stored in the office for the Faculty of Foreign Studies on the first floor of the building. Teachers come and borrow the sets for class use, and return them afterwards. Careful management of this is necessary due to the high costs of each adapter, in particular the Apple adapters. Students whose Android phones were unable to connect often bring their own tablets, usually iPads, or share their work such as PowerPoint files with students who have iPhones and use those iPhones to show their work.

However, there is concern whether this model

will continue to work in the long term. While the popularity of iPhones continues with students, newer models of Android devices, in particular some Galaxy models, only permit a wireless connection to the phone. If Apple ever takes a similar approach, the method of connection with the monitors will need to be rethought, although if the university does choose to go BYOD and the majority of students begin to bring their own computers, this may significantly reduce the impact of any change by Apple in its iPhones.

Other challenges are ones that were imagined but felt unavoidable in the design stage. The teacher's desk was made movable to try to reduce the impact on door use and increase flexibility, but when the wires connecting the desk to the equipment are exposed, it creates a trip hazard. Similarly, the teacher's screen was slightly offset so it did not cover the entire white board, but that meant that the screen, when lowered, also slightly intruded into door access space. Teachers and students have adapted and, with the width of classrooms being pre-determined by overall building design, perhaps it could not be helped. However, the design did not create an ideal space for teacher use.

In conclusion, the design for the classrooms in Sagittarius-kan was a concept based on a growing awareness internationally of the need for change in the education environment to help facilitate a more "active, participatory, experiential learning" (Rands and Gansemer-Topf, 2017, p.26) environment. While no design is ever perfect and there are certainly continuing concerns about aspects of this one, the combination of being able to provide a more traditional classroom (with teacher's white board and desk with computer and screen, and desks ordered in rows facing the front) while also providing the flexibility to create student-centered classroom layouts (with furniture that enables quick and easy movement into a range of layouts supported by group monitors on the walls with white boards in between) has provided a powerful tool for educators at this university to meet the needs and demands of current shifts in pedagogical approach.

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## サギタリウス館におけるアクティブ・ラーニング教室のデザイン：コンセプト、プロセス、そして課題

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クラフリン・マシュー[1]

　本稿は、サギタリウス館の2階と5階にある合計12教室で採用されているアクティブ・ラーニング教室のデザイン、その背景、そして完成までのプロセスについての報告である。まず、教室のコンセプトがどのように生まれ、どのようなプロセスを経て実現したのかを説明する。そして、その過程で直面した問題点や、現在解決するべきデザイン上の課題について考察する。また、全体のコンセプトが、主に欧米での実践例や理論をどのように取り入れ、建物のデザイン上の制約にどのように適応させているかを検討する。

**キーワード**：教室デザイン、教育スペース、アク
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