

Hong Kong Student Science Project Competition 2023

Template of Extended Abstract (Investigation Design Proposal)

(Word Limit: 1,600 words, Pages: 3 pages only)

Team Number: JDBC137

Project Title: Seating arrangement that can enhance the teaching and learning effectiveness in Hong Kong secondary schools

Project Type: Investigation Design Proposal

To our best knowledge, there are / are no * similar works in the field; (if there are,) related research links are as below:

<https://files.eric.ed.gov/fulltext/EJ1194750.pdf>

<https://myjms.mohe.gov.my/index.php/myse/article/view/8684/3864>

The enhancement our project proposed / the difference with related research are:

The aim of the research is to study whether seating arrangement can enhance both teaching and learning effectiveness during lesson time, while the related research are to enhance students' concentration during lesson time.

**Please delete if not applicable. The competition values the originality of works. Students must do enough literature research to ensure that their works are unique and list relevant reference materials before starting research or invention.*

I. Background

- Provide background information of project and/or state the problem to tackle
- Provide highlights of the **literature review** with the support of pertinent and reliable references
- Provide an overview of work and mention the **research gap that the project is trying to fill**

Many teachers complain about the low learning efficiency and poor concentration of students during lesson time. Simultaneously, it is difficult for students to understand what they have learned in the course of class. Gifford (2002) stated that open learning environments, classroom comfort and flexibility of appliance arrangements can have positive functions on learning outcomes. Van den Berg and Segers (2012) found that bringing students closer together reduces peer-reported behaviour during the class.

Therefore, research would be conducted to investigate whether seating arrangements could improve the teaching and learning effectiveness of students.

II. Objective(s)

- State the **aim(s)** of project

The aim of the project is to study whether seating arrangement inside a classroom can enhance the teaching and learning effectiveness in Hong Kong secondary schools.

III. Hypothesis

- Propose an explanation for a phenomenon and stating how the **hypothesis** can be **tested** by experiments

Group seating arrangement has been widely used by schools in the world. This type of classroom seating arrangement is amazing for group work and cooperative learning. By purposefully planning groups, teachers can build upon student strengths and use the format as a part of students' behaviour management plan. This cluster arrangement can be especially advantageous when students will work in groups with their classmates for a large portion of class time. More generally, this arrangement communicates a learning community where students are expected to work with one another.

Therefore, an assumption is made, that students seated in groups will have a better understanding of knowledge and have a higher improvement rate.

IV. Methodology

- List out the materials to be used
- Describe the **experimental protocol** including the set-up of **control experiment** (if any), **repeated experiment** (if any), and its scientific theory
- Indicate with the support of reasons, the **analysis** to be used in the investigation

The experiment will last for one year, from the start of the academic year (September) to the end of the first term (February). Five secondary schools in Hong Kong with a total of 150 students which do not offer English literature, physics and economics education in the form 1 and 2 curriculum will be participating in this experiment. Students from each school will be divided into five groups and each group will use one of the seating arrangements. English Literature, Chinese, Physics, Economics and Mathematics will be the subjects students study under specific seating arrangements.

V. Expected Results and Impact of research

- Describe the **expected results** with the selected approach
- Discuss **limitation** and compare with existing related works (if any)
- Discuss the importance or impact of the research and how it is applicable to real problems

It is expected that students who sit according to the newly assigned seating arrangement can strengthen their knowledge absorption during lesson time. Students will also pay more attention in class. In terms of seating arrangements, the students who sat in the Cluster seating arrangement improved the most. It is desirable to observe that students can discuss with other groupmates and therefore gain a better understanding of the topic. Teachers will know which seating arrangement is right for them and can use it in the classroom according to their teaching style and in-class activities.

Since it is assumed that the only factor that affects the result is the seating arrangement, the table below shows other factors that may affect the effectiveness. Modifications are suggested to be done to minimise the effect of each factor.

1. Individual students' behaviours and abilities
2. Teaching quality and style of teachers
3. Students' pre-knowledge about the teaching
4. Duration and time of each lesson
5. Resources provided to students

The seating plans, such as the cluster seating arrangement can be easily applied to school classrooms as it nicely fits in classrooms seen in Hong Kong. The other seating arrangements, such as the runway seating arrangements, although is also effective for enhancement in knowledge absorption, it takes up a lot of space of the classroom and makes the classroom have little space to place other items, such as lockers.

The experiment is to find out a new way in the future to fix the problem and hence allow the seating arrangement to be used in Hong Kong school classrooms. It is also expected that students may feel inconvenience by moving around the classroom due to the new seating arrangements.

VI. If your team will compete the Sustainable Development Award, please indicate the specific sustainable development goal the project is related to, and provide justification for competing for this award. (Word limit: 300 words)

The related sustainable development goal is '4. Quality Education'. Since quite a lot of students that have a relatively wealthy family can support them to go to tutorial centres or receive private tutorials, they may have a relatively better academic result and motivation due to the additional resources they received. As secondary school education is compulsory in Hong Kong, it is believed that all students can receive quality and equitable education by enhancing the teaching and learning effectiveness during their lesson time through suitable seating arrangement.

VII. If your team will compete the Social Innovation Award, please list the target group or social issue the project focuses on, and provide justification for competing for this award. (Word limit: 300 words)

The related target group is secondary school students. Since quite a lot of students that have a relatively wealthy family can support them to go to tutorial centres or receive private tutorials, they may have a relatively better academic result and motivation due to the additional resources they received. If the teaching and learning effectiveness within the classroom can be enhanced by choosing a suitable seating arrangement, it is believed that all students can be benefit from this research. Moreover, if the research is successful, it is possible to extend this research to schools with different bandings, different forms of students and even primary schools.

VIII. Conclusion

➤ Make a conclusion of the design project and the way forward of the research

Our proposed experiment can be used for improving the speed of absorption of knowledge of the students in the secondary school in Hong Kong. After conducting the experiment, the result will show which of the seating arrangements can be used during each lesson for the students to have a better understanding of the knowledge taught by the teachers. As a result, the proposed experiment is worth conducting.