

## Introduction

With the limitations caused by the pandemic, there is an urgent need for online education. This sense of urgency emanates from the teacher's attitude and it brings challenges to the teachers to integrate technologies into traditional education system.

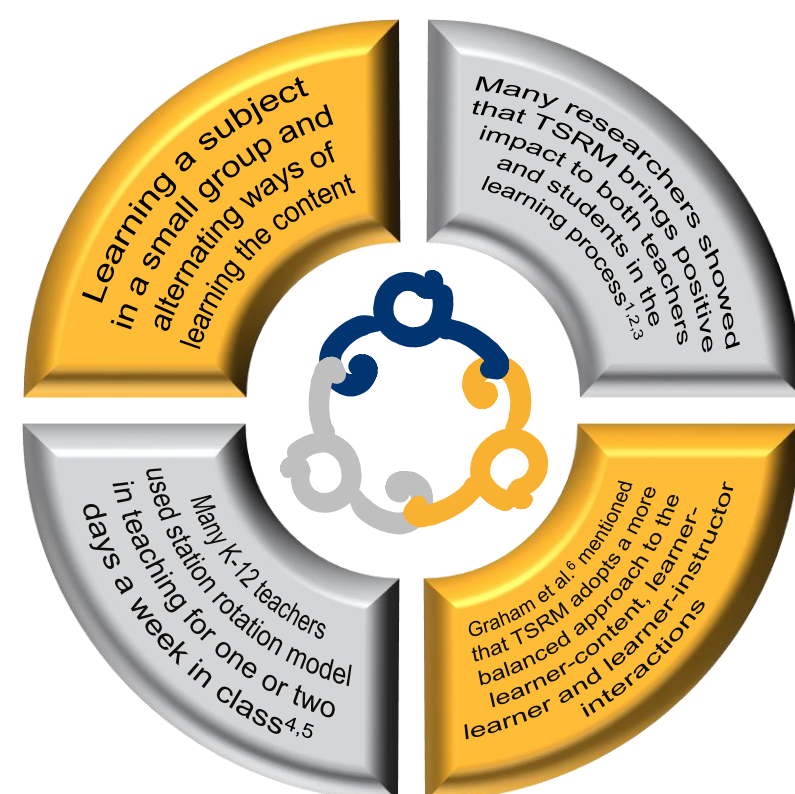


Figure 1: About Traditional Station Rotation Model (TSRM)

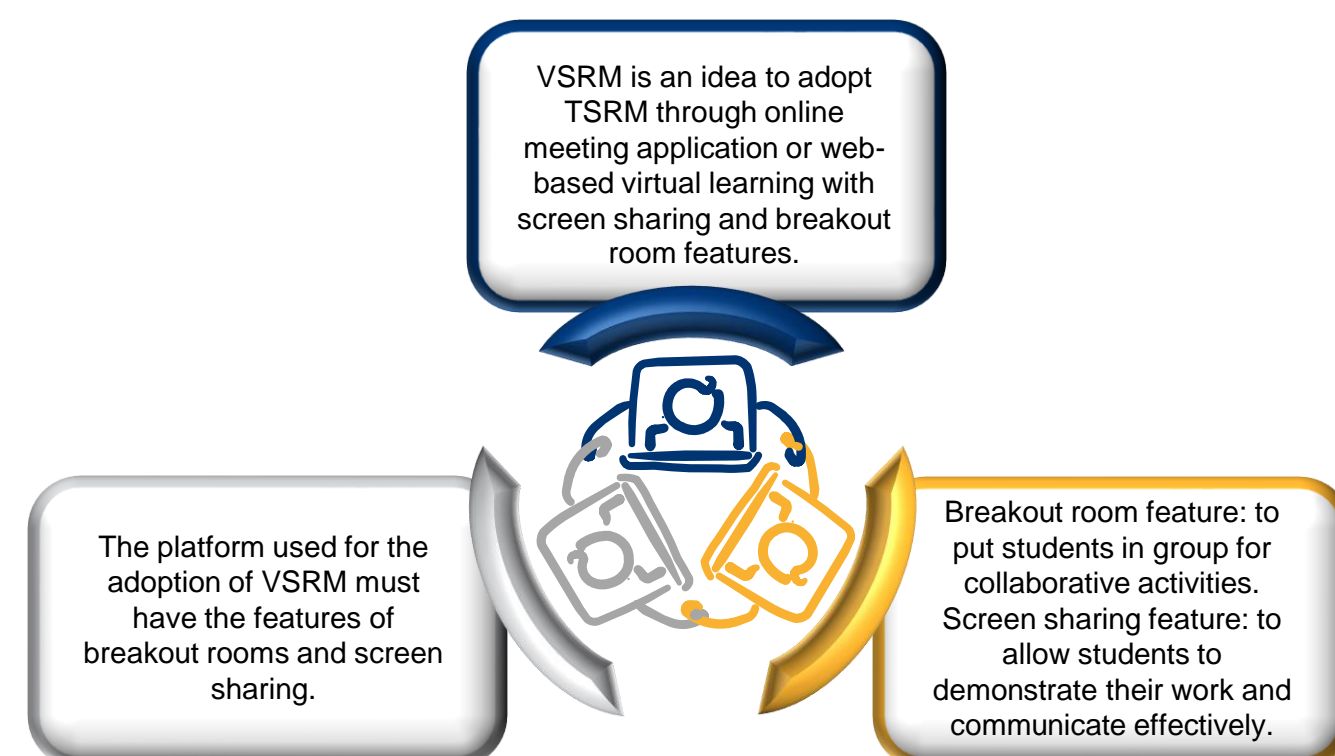
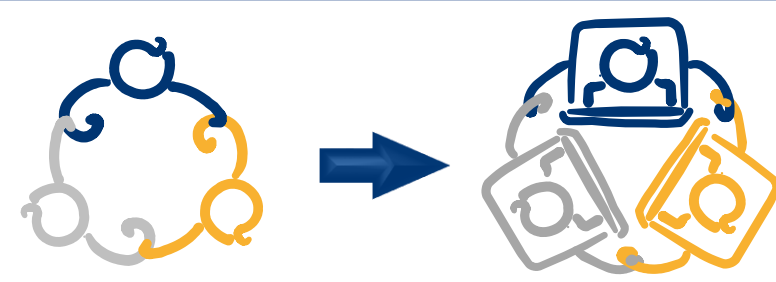


Figure 2: About Virtual Station Rotation Model (VSRM)

Does it have the same impact on the learning process with the implementation of VSRM?

- <sup>1</sup> Ayob et al. (2020)
- <sup>2</sup> Mahalli et al. (2019)
- <sup>3</sup> Nisa & Mubarak (2018)
- <sup>4</sup> Maxwell & White (2017)
- <sup>5</sup> Soselisa & Bachri (2019)
- <sup>6</sup> Graham et al. (2019)

## Objective



This study aims to examine the effectiveness of VSRM deployed in Blackboard to learn double integral.

## Teaching Strategies

### Procedure:

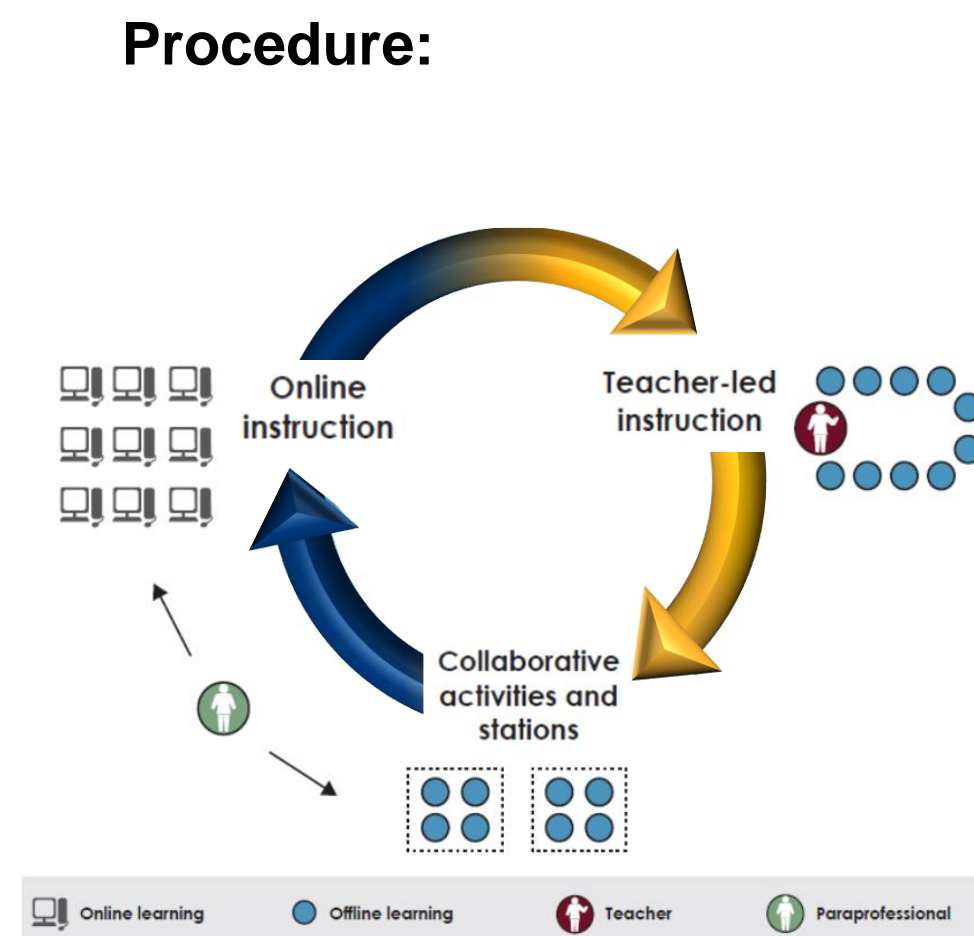


Figure 3: Station Rotation Blended Learning Model (as cited in Staker & Horn<sup>7</sup> (2012))

modified to

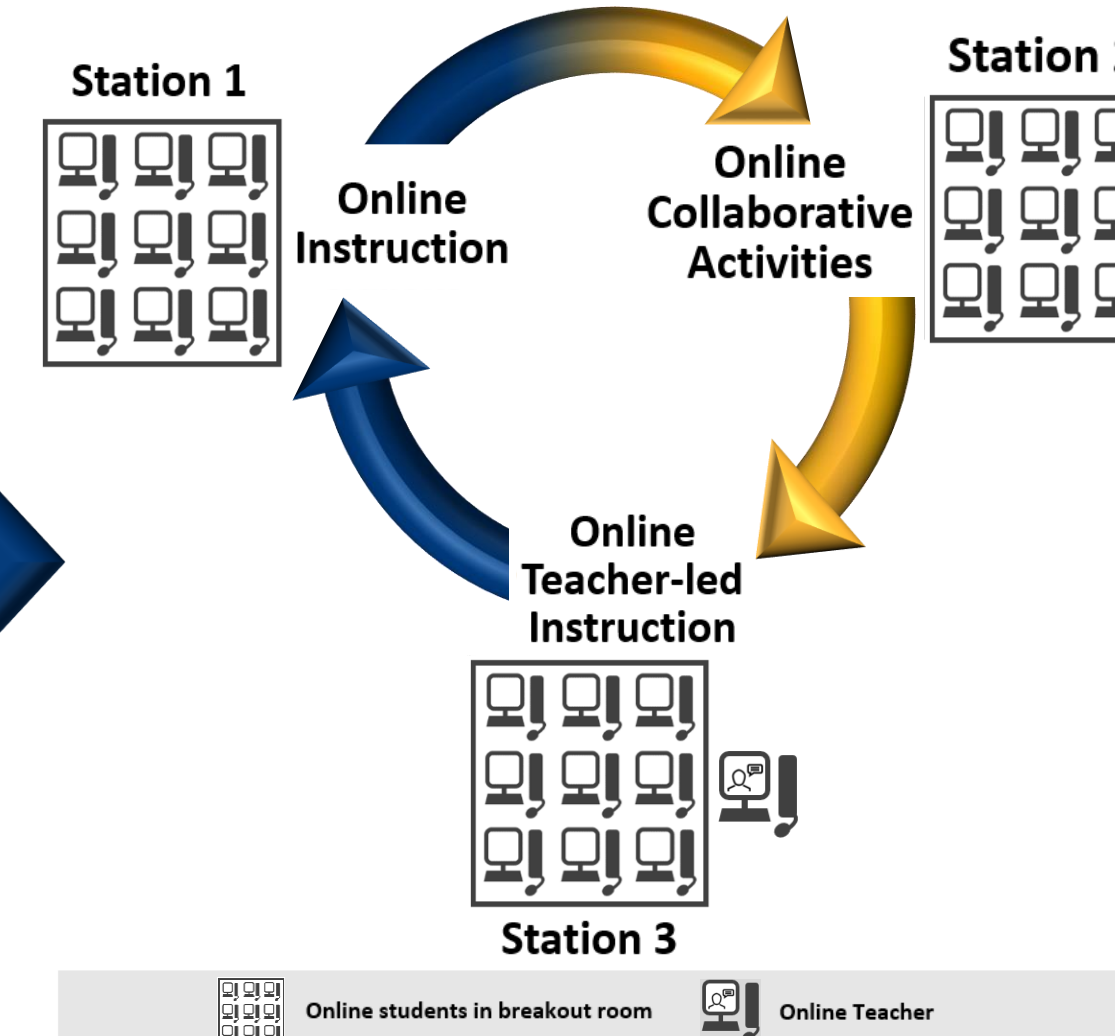


Figure 4: Virtual Station Rotation Model

To make online learning more effective, the TSRM (Figure 3) is transformed to VSRM (Figure 4). In the first rotation, students were divided into three groups. Each group was having different tasks in different breakout rooms called virtual stations 1, 2 and 3 respectively.

- VS 1: Peer discussion and learning through guided material in pdf form.
- VS 2: Online collaborative learning with peer discussion through watching Edpuzzle interactive video.
- VS 3: Live online teaching led by teacher.

Students rotated from one virtual station to another for two rounds, given the next task by the teacher in the same breakout room, to complete all the tasks related to double integral in three different virtual stations.

## Findings

In previous two semesters, double integral was taught in asynchronous mode with posted recording of lectures. To study the impact of VSRM compared to asynchronous delivery, the mean results of all the assessment questions on double integral for this student cohort and students from the previous two semesters, are compared (see Table 1).

Table 1: Mean Results of August 2020, January 2021 and August 2021

Month	Mean Score
August 2021	76.4
January 2021	78.6
August 2020	76.5

## Discussion

The result shows that students are able to learn the same context and achieve equally well results through VSRM deployed using breakout groups feature in Blackboard.

Based on the teacher's observation, students are having remarkable experiences with different interventions incorporated for effective learning and boosting students' engagement and connecting students to a sense of community. With different activities offered in each station, it enhances the students' learning experience and improves student performance<sup>1,8</sup>.

"I really enjoyed the collaborative work today since I don't know many of my peers in the class. I hope you have more class work for us like this in the future so that we can participate in class actively."

"I like the breakout rooms that Ms. Janice conducted frequently for us to work as a group and it makes online learning less bored."

"Ms. Janice attempted to incorporate new activities to make the class more interesting."

Figure 5: A Quote Bank about VSRM from Students

Figure 5 shows the quotes from few students that had a fun time and they learned better with VSRM. This is in line with the opinion of Christina et al.<sup>9</sup> and Zacharis<sup>10</sup> in their researches.

- <sup>8</sup> Susanti & Suwu (2016)
- <sup>9</sup> Christina et al. (2019)
- <sup>10</sup> Zacharis (2009)

## Conclusion & Recommendation

This study reported the good prospect of implementing VSRM, offering educators a new pedagogy centers on students' needs. It is good to explore how other online platform can be used to integrate VSRM in teaching and learning context to benefit both teacher and students' learning process.