

The background of the slide is a blurred photograph of a classroom. In the foreground, a blue toy car with orange wheels is on a colorful rug. In the background, several children are visible, some looking towards the camera. A semi-transparent red banner covers the middle of the slide, containing the title and author information. A yellow square is on the left side of the red banner.

# Current issues in Mathematics Education

## THE FUTURE OF MATHEMATICS TEACHING AND LEARNING

Dr. Farida Nurhasanah

# Introduction

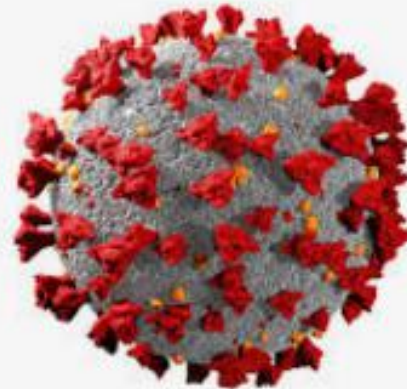
Since the pandemic covid-19 hit the world, all educators have to leave face-to-face learning mode into distance teaching mode. This situation lead to the use ICT for teaching mathematics in almost all levels. Most of mathematics teachers were not well prepared for teaching math using ICT for remote teaching, otherwise most of them have knowledge and skills to use ICT in their classroom integrated with face-to-face learning mode.

As the vaccination programs runs by the the government, many educators are starting to think how the mathematics instructions will look likes in the future?

Covid-19 Pandemic has been forced the use of ICT in education for remote teaching



Most of Math Teachers conducted remote teaching without any preparation



# Issues in online math teaching



## Type-1

Giving clear explanation of procedures followed by practice and correction

(Kirschner et al. 2006; Przychodzin et al. 2004)



Which one easier to be adopted in online/remote learning for teaching math?

## Type-2

Giving problems to be solved and opportunities for explaining and justifying students' reasoning

(Kapur 2014; Schwartz and Martin 2004; Sullivan et al. 2020)



Please go to: [Please write on the chat box](#)



## Type-1

1. This approach is relatively easy to adapt to online environments in that there are many short videos that offer demonstrations and explanations and practice exercises or games that can be easily sourced online or created by teachers.
2. Learning this way may be less interesting to students working by themselves. It is hard for the teacher to provide explanations and targeted practice that meets students' needs. But most of all, students are not thinking about mathematics, they are not doing mathematics, when working online, and they are likely to form the impression that mathematics is something that is done to them rather than knowledge and connections that they create

## Type-2

**This approach is more difficult to  
arrange in remote and online  
environments**



## Aims of the Course



**1**

Identifying the role of ICT in  
existing situation



**2**

Formulating the use of ICT for  
upcoming situation in post  
pandemic covid-19



**3**

Sharing ideas in the use of ICT  
before and after pandemic covid-19 for  
teaching math in secondary level

# Fact: The use of digital technology in mathematics classroom

---

*“Digital technology use in mathematics classrooms was reported to be inconsistent in quality, quantity, and effectiveness” (OECD, 2016)*





## Digital teaching tools:

- Video Conference (Zoom, Google meet, Webex, Bluejeans, etc).
- Digital whiteboard
- Screen recorder
- Voice recorder
- Video recorder
- Camtasia
- Padlet
- learningapps.co
- etc

## LMS

- Google Classroom
- Edmodo
- Schoology
- Spada
- Ingenio
- Edumu
- Teams
- etc

## Social Media:

- Facebook
- Instagram
- Whatsapp
- Telegram
- You tube
  - Line
- TikTok
- Kaizalai
  - itch
  - etc



## Virtual Manipulatives:

- Geogebra
- Desmos
- Maple
- Mathematica
- Matlab
- <https://www.mathplayground.com/>
- [https://www.ct4me.net/math\\_manipulatives.htm](https://www.ct4me.net/math_manipulatives.htm)
- <https://toytheater.com/geoboard/code.org>



## Learning Website:

- Portal Rumah Belajar
  - Ruang Guru
  - Zenius
- Rumah Belajar
- Khan Academy
  - Udemy
  - etc


# Listening to teacher's voice

---

**How confident are you as math teacher teaching mathematics remotely to secondary students during pandemic covid-19?**

Please raise your hand or write on chat box





Uses of digital technologies in mathematics can be ineffective, distracting, or even dangerous when not integrated into the learning process in **meaningful ways**

(Attard 2015; Freeman et al. 2017)



**So, what next?**

# The Vision of On-Line learning in Math:

---



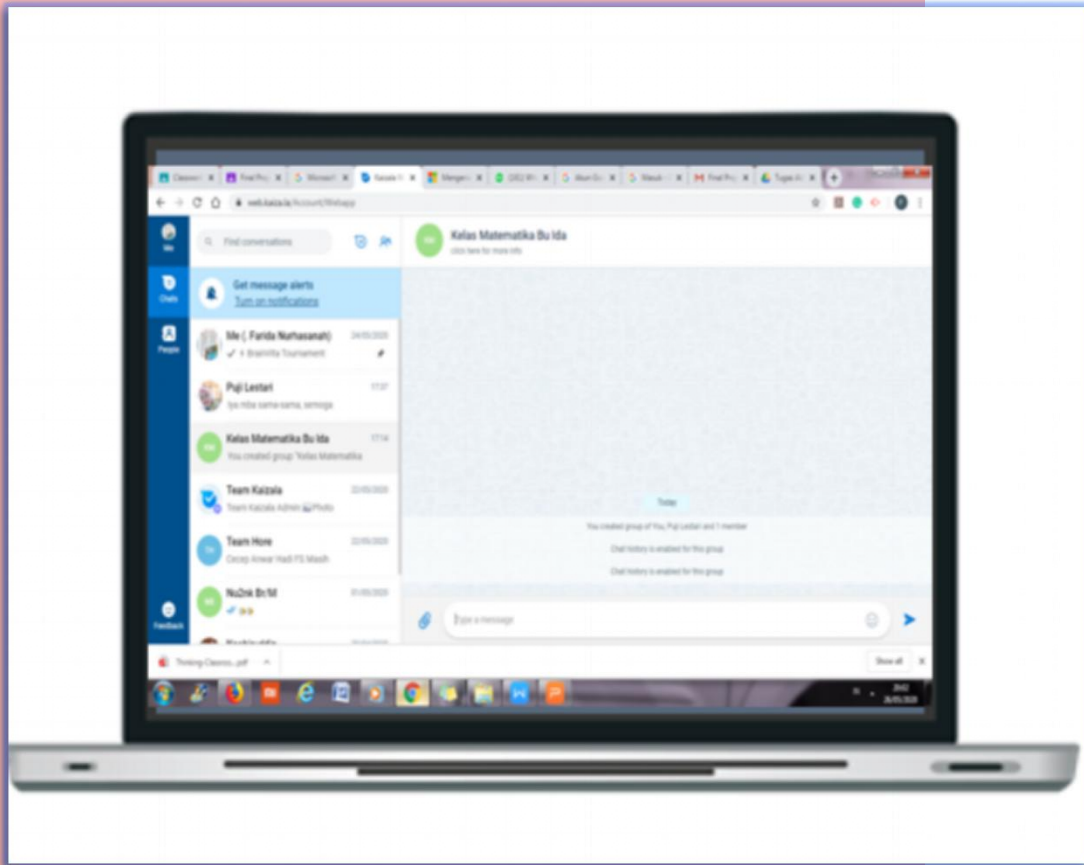
Students need to be Immersed in mathematics culture that give them opportunities to:

1. learn, use and refine inquiry, investigation, experimentation, and problem solving process;
2. develop the tools/skills/habits of a life-long learner, learn significant concepts and procedures (with understanding) that they can then use in an integrated authentic fashion to conduct inquiry, experimentation, investigation and problems.

source: The field institute for research in mathematics science



# What should be the focus of on-line learning?



- The focus should be on mathematical problem solving and mathematical relationships.
- Learning should be situated in activity that is authentic for the discipline of mathematics
- on-line activities should allow for exploration of concepts and relationships.
- **Warning!:** If this cannot be satisfactorily constructed in on-line program, it might be better not to offer an online program at all.

# How would the teacher role of the teacher change in online mathematics learning?



- The teacher is a key role in creating an online culture that values and encourage students' sense making and construction of mathematical knowledge.
- The teacher need to have to have knowledge and comfort level with the technology as well as expert in the field of teaching mathematics.
- The teachers need to work in a group to investigate mathematical concepts and prolematics situastions.
- The teacher have to create feeling of community and facilitate collaborative learning.
- **Acombination of face-to-face interaction and online learning would be an effective option rather than solely online.**

# Essential Notes for Teachers

1. Students need opportunities to experiences thinking and attitude associated with mathematical activities. Some of this will be possible through appropriate interactive multimedia experiences
2. The on-line human interaction -between teacher and students, and among students- will play a key role in mathematics thinking and attitudes that are modeled and encouraged.
3. Students need opportunities to problem solve and express their math thinking and ideas. on-line design need to take into account.
4. students need opportunities to check their understanding. Feedback and assesment should be built into online actities.



# Something need to be noticed!



Number

- a = 12
- b = 7
- c = 9
- d = 0
- e = 0.66
- f = 0.53

Point

- A = (9, 0)
- B = (2, 2)
- C = (2, -3)
- D = (14, -3)

Can you make a triangle with the 3 known side lengths?

Move the colored points above to adjust the side lengths.

Move the yellow points to move the two free sides to try and form a triangle.

## Something need to be noticed!

Many students associate computer with GAMES and IMMEDIATE feedback and GRATIFICATION. This will not be the case with open-ended on-line exploration where there is not a game to be won and there is not immediate feedback of correct or incorrect answers. This is a re-training issue for students that our envision to be explicitly addressed in on-line learning.

**Solution:** Give students appropriate introductory activities that accustom students to think mathematically online

# Introductory Analysis



**Sparking  
Curiosity**



**Sense  
Making**



**Clear  
Feedback**



**Mathematical  
Discourse/  
Interaction**



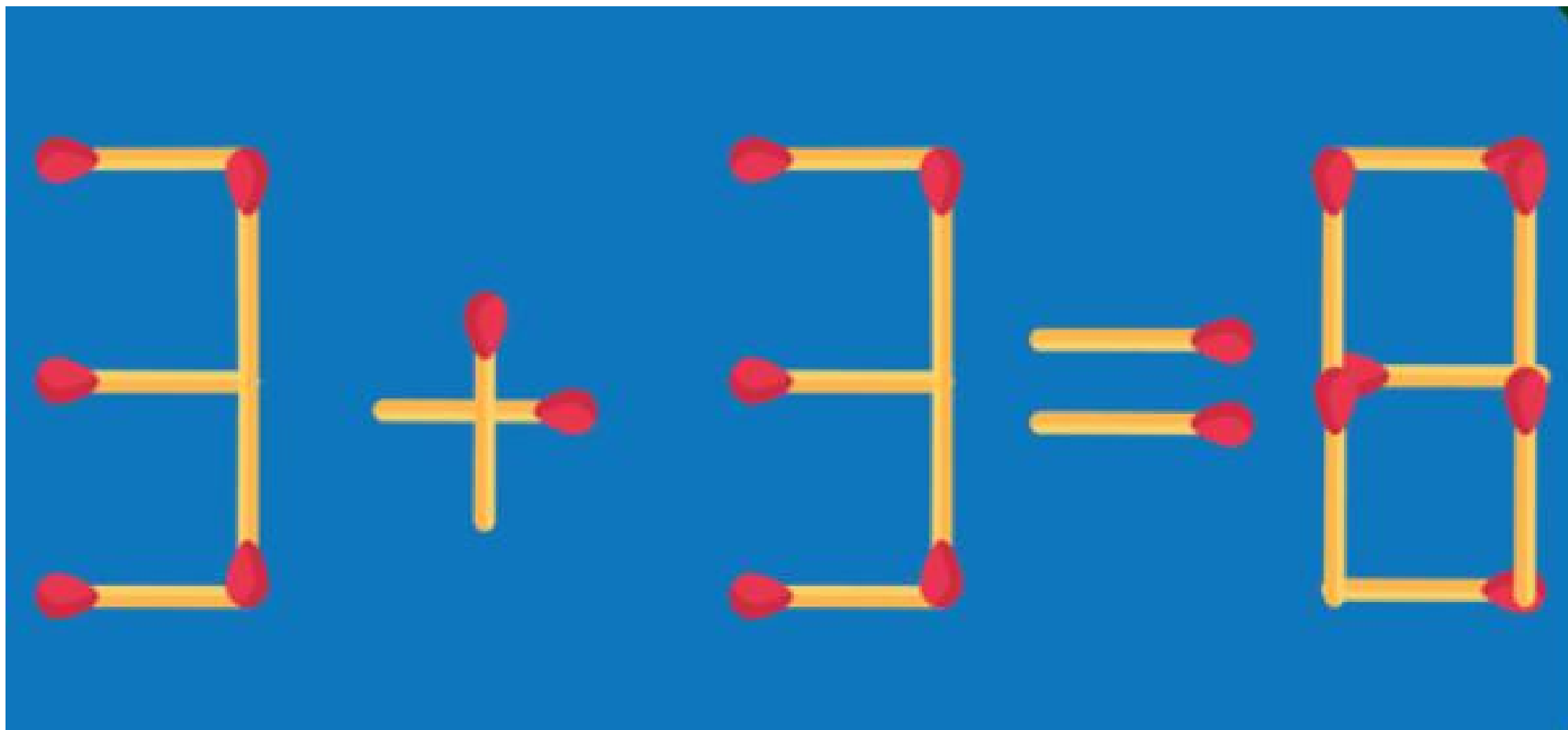


# Q and A Session

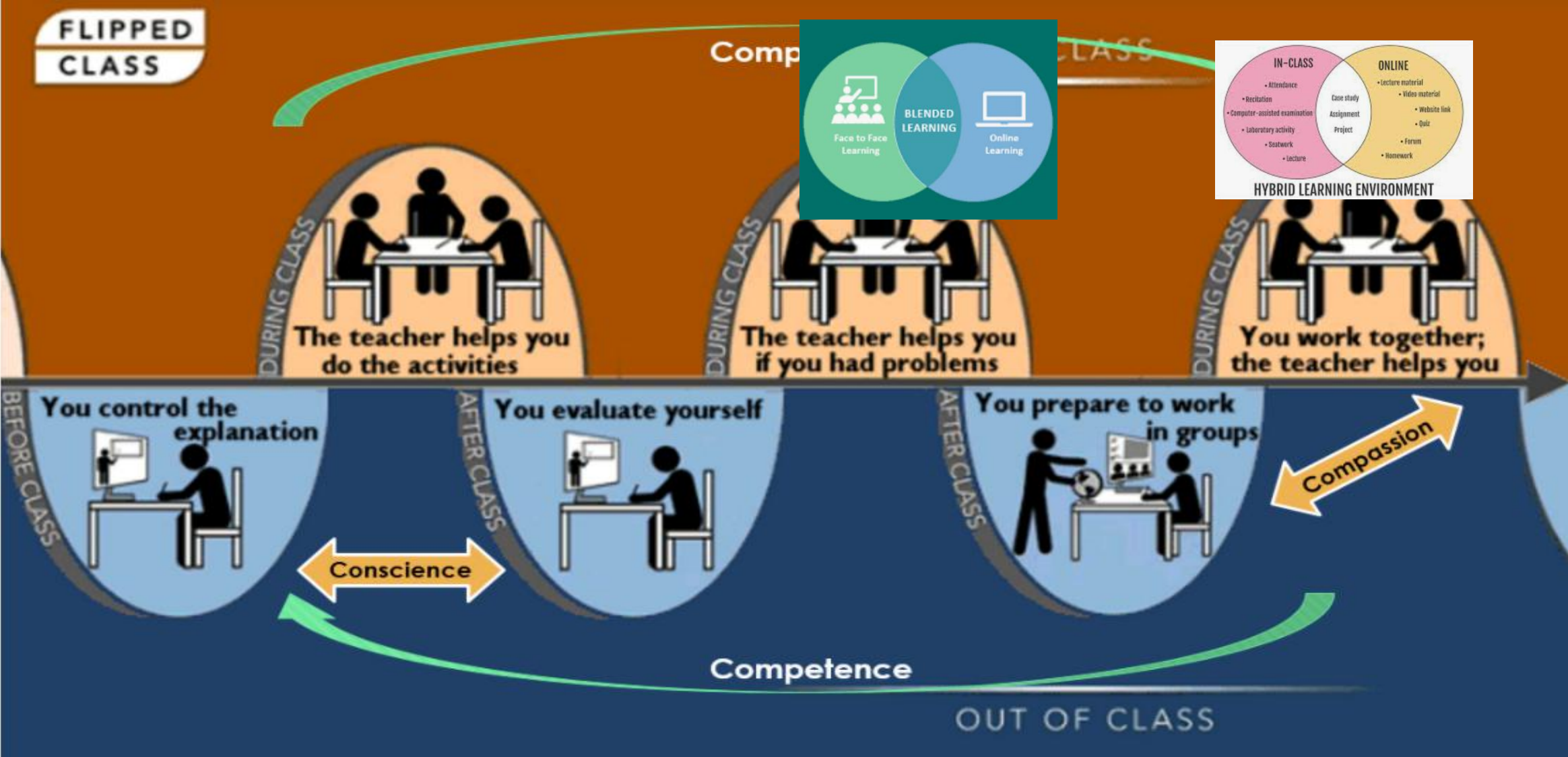


Please raise your hand or write  
on the chat box

# Let's Take a Break

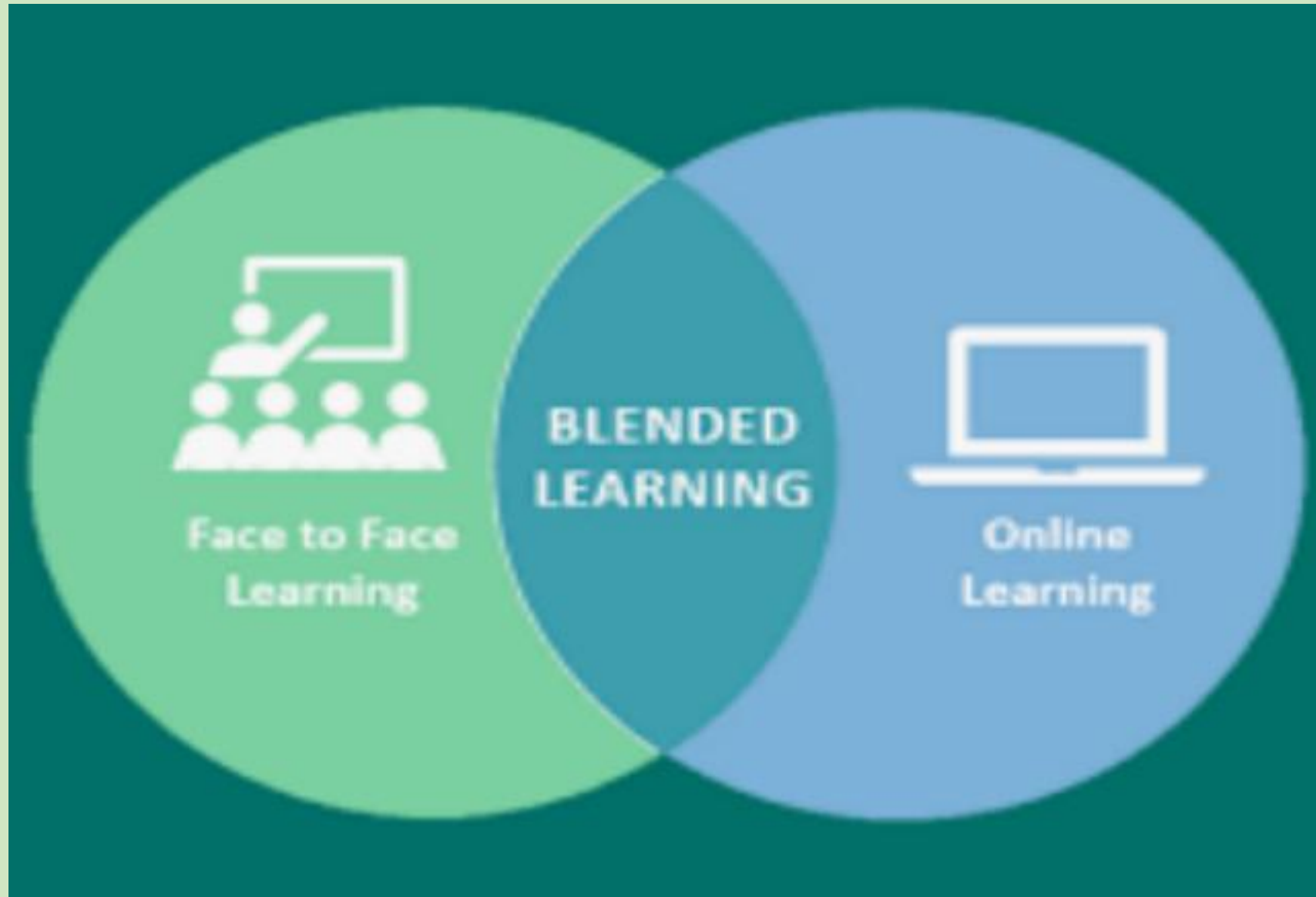


# What probably happen in the future?

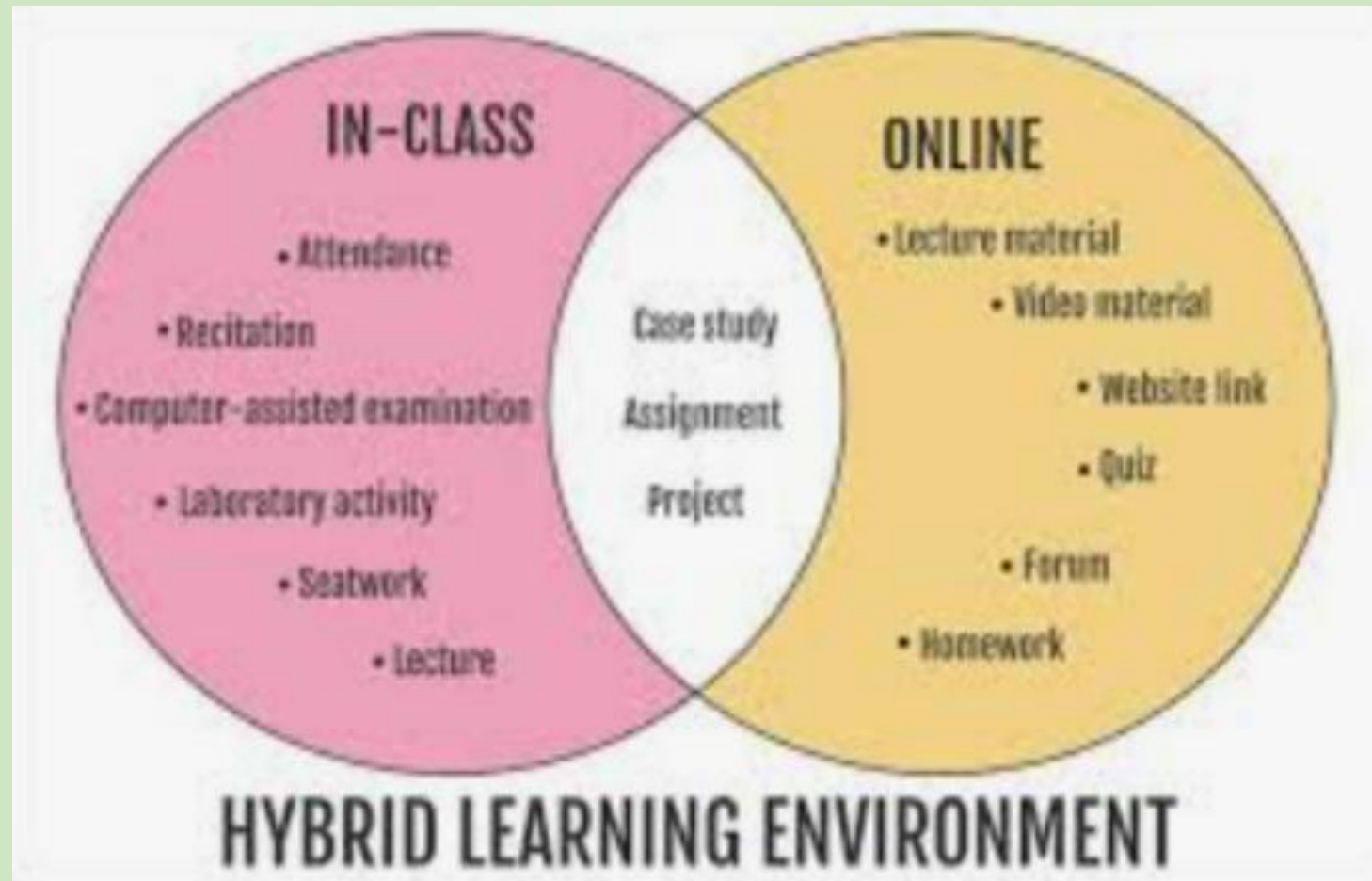




# What probably happen in the future?



# What probably happen in the future?



A close-up photograph of a computer keyboard. The central focus is a light blue key with the words "Thank you" printed on it in a dark blue, serif font. The key is slightly raised and has a soft glow. Surrounding it are other keys in various colors: white, grey, and pink. Some of the visible keys include the asterisk/underscore key, the hash key, the tilde key, and the Shift key. The background is softly blurred, emphasizing the "Thank you" key.

**Thank you**



## Contact and Social Media

---



farida.nurhasanah@staff.uns.ac.

farida.nurhasanah@fkip.uns.ac.id

nurhasanahfarida@gmail.com

[www.hasanahworld.wordpress.com](http://www.hasanahworld.wordpress.com)

[www.kidscientistcorner.com](http://www.kidscientistcorner.com)

---

### INSTAGRAM

# Instagram

Farida Nurhasanah

<https://www.instagram.com/nurhasanahfarida/>

### FACEBOOK



Farida Nurhasanah

[www.hasanahworld.wordpress.com](http://www.hasanahworld.wordpress.com)