



# Let's FOCUS: Mitigating Mobile Phone Use in College Classrooms

Inyeop Kim, Gyuwon Jung, Hayoung Jung, Minsam Ko, Uichin Lee

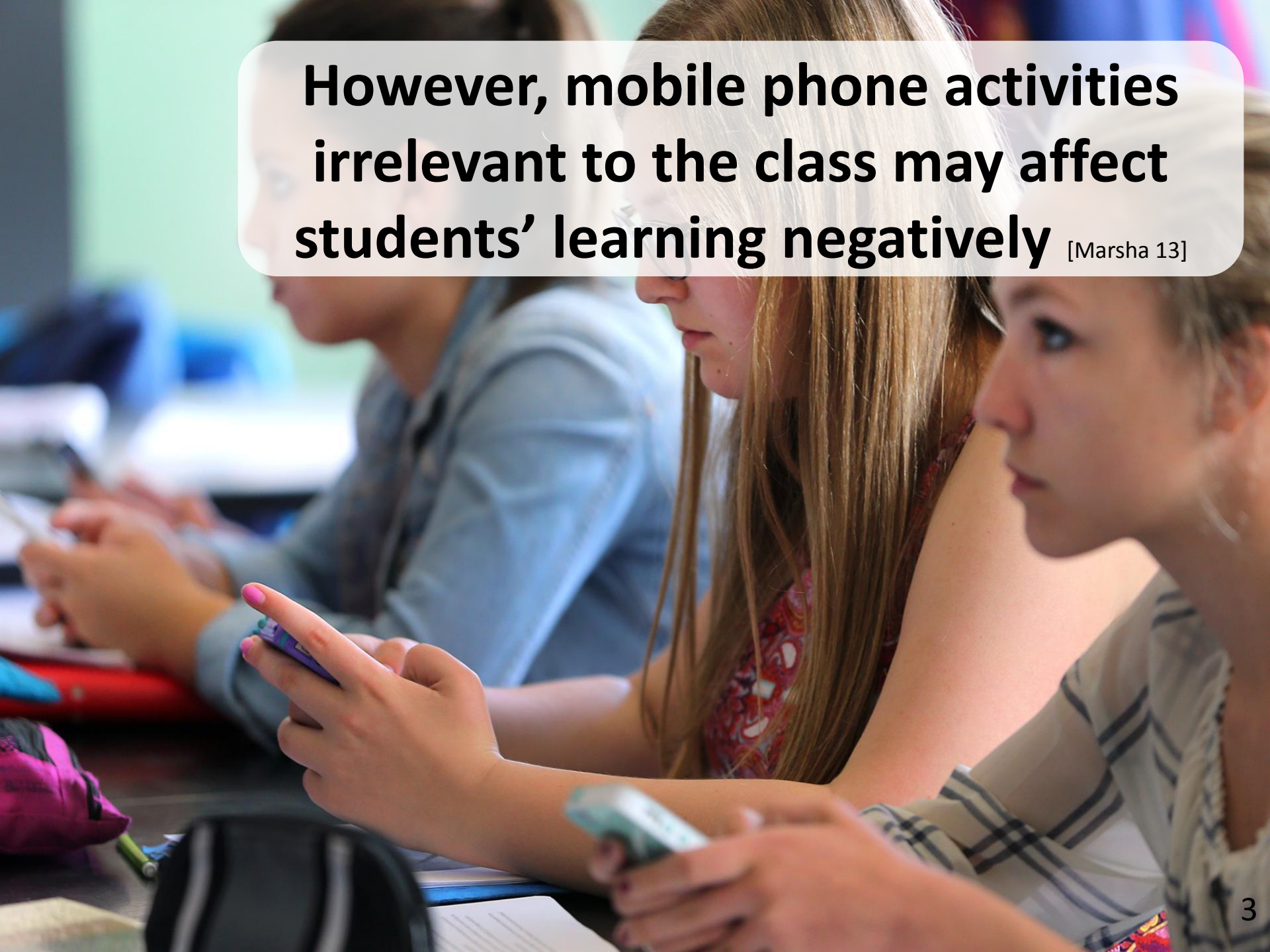


**Mobile phone is a useful learning tool in the class when it is properly used** [Q Chen 16]





**However, mobile phone activities irrelevant to the class may affect students' learning negatively** [Marsha 13]





A photograph of three female students sitting at desks in a classroom. They are all looking down at their mobile phones. The student in the foreground is wearing a grey and white striped shirt. The student in the middle has long blonde hair and is wearing a red patterned top. The student in the background is wearing a light blue shirt. A white rounded rectangular box is overlaid on the top half of the image, containing the text.

**Many students are using mobile phones during their classes**

# Studies on mobile phone use in classroom



## Understanding mobile phone use in classroom

- ✓ Habitual usage and media gratifications [Fang-Yi F 10].
- ✓ Contexts of beginning mobile phone use [Frederick T 11].



## Analyzing negative effects of mobile phone use

- ✓ Negative influence on task performance such as reading [Laura L 10], note taking, and recalling [Jeffrey H 13].
- ✓ Lowered academic performance such as quiz score [Amanda C 14], and GPA [Reynol J 12]



## Exploring Instructors' intervention policies

- ✓ Employment of permissive rules [Kehbuma L 14]
- ✓ Difficulties in policy enforcement [Hopke K 09]

Many software-based interventions have been widely used to mitigate mobile phone use in various situations



**Parental mediation** [M. Ko 15]



**Group activity** [M. Ko 16]



**Work productivity** [J Kim 17]

There is an opportunity to apply software-based intervention in the context of college classes!

Many mobile-based intervention have been suggested to mitigate mobile phone use in various situations

So, we set our research goal as **designing software-based intervention to mitigate mobile phone use in college classrooms**

There is an good opportunity to apply mobile-based intervention to the context of the class!

Many mobile-based intervention have been suggested to mitigate mobile phone use in various situations

For this, we should better understand

- ✓ students' mobile phone use behaviors in the class
- ✓ their perception of the adoption of software-based intervention

**There is an good opportunity to apply mobile-based intervention to the context of the class!**

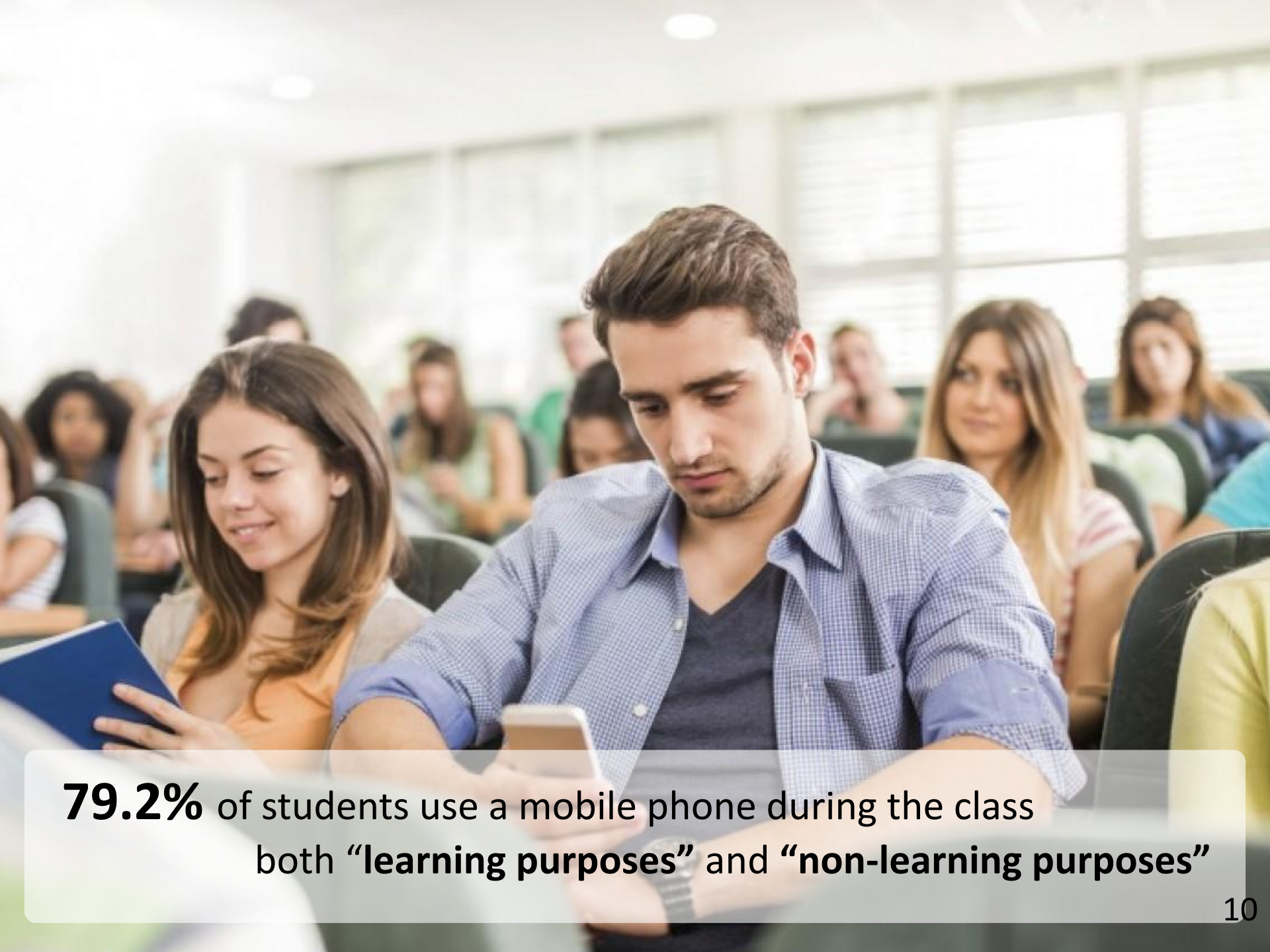


# Preliminary study

## Online survey

- Participants
  - 283 students (101 females; mean ages: 23.5)
  - 56 professors (6 females; mean ages: 42.7)
- Likert scale questions + Open-ended questions
- We asked
  - Perception of mobile phone usage in the classroom
  - Perception of the adoption of software-based intervention to regulate students' mobile phone use
  - Experience of mobile phone usage in the classroom (*only for students*)





**79.2%** of students use a mobile phone during the class both “learning purposes” and “non-learning purposes”

# Understanding mobile phone usage in classrooms

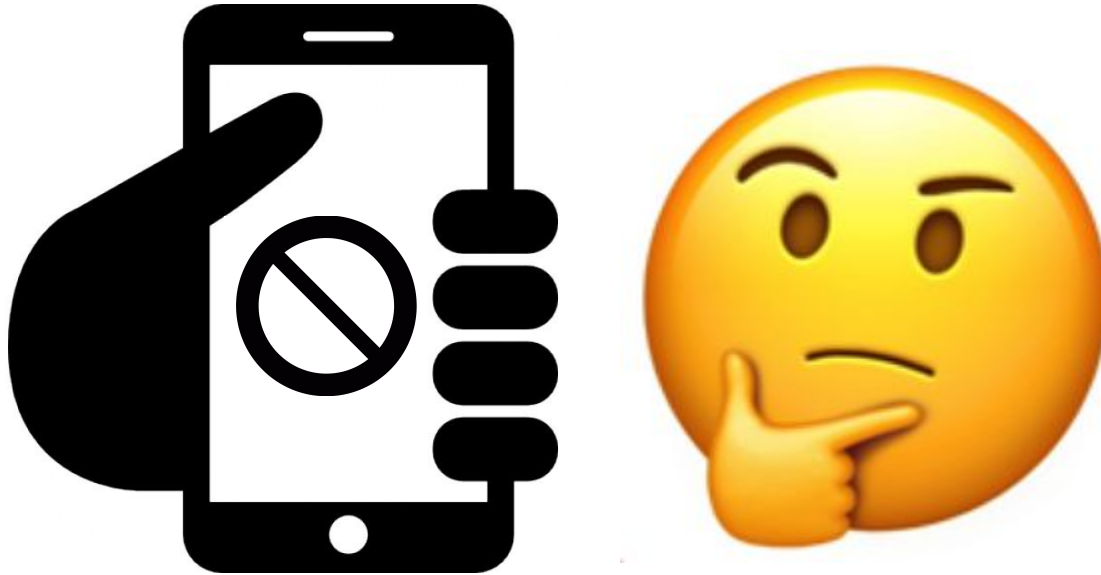


**69.4%** of students and **83.0%** of professors **agreed**  
“students should abstain from mobile phone use in the class”

**74.8%** of students and **89.4%** of professors **agreed**  
“mobile phones disrupt the flow of the class”



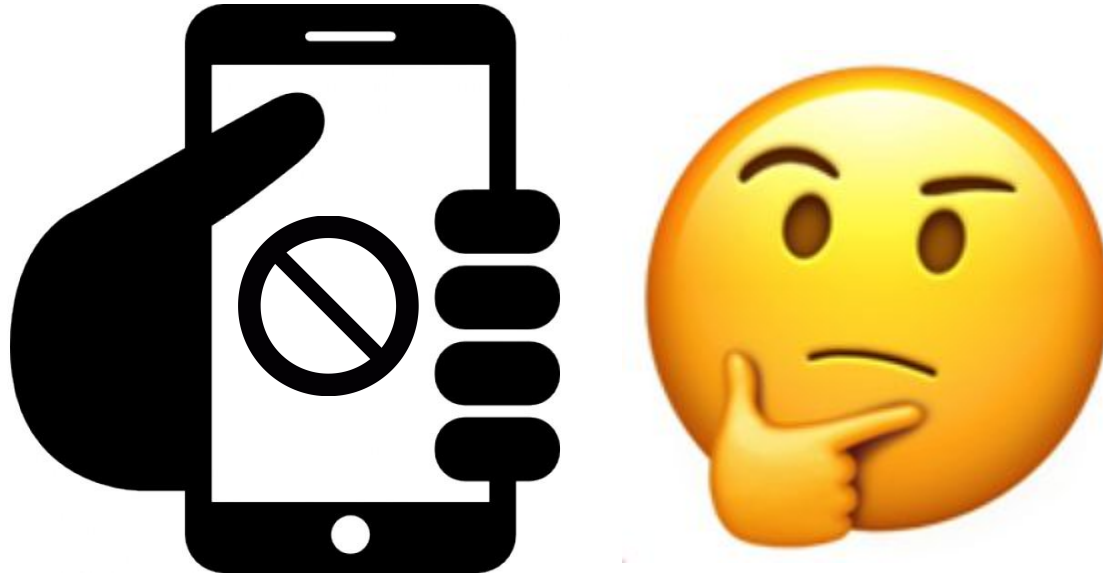
# Perception of technological intervention



Some students and professors are **concerned** about the adoption of software-based intervention to regulate students' phone use

- Infringement of autonomy and freedom
- Usage demands in certain situation

# Perception of technological intervention



Students were negative about **being forced** to adopt software-based intervention **by professors**

# Objectives of software-based intervention



*Encouraging voluntary participation*



*Framing intervention software as an assistive tool for learning*



*Increasing awareness regarding appropriate phone use*



# Let's FOCUS design



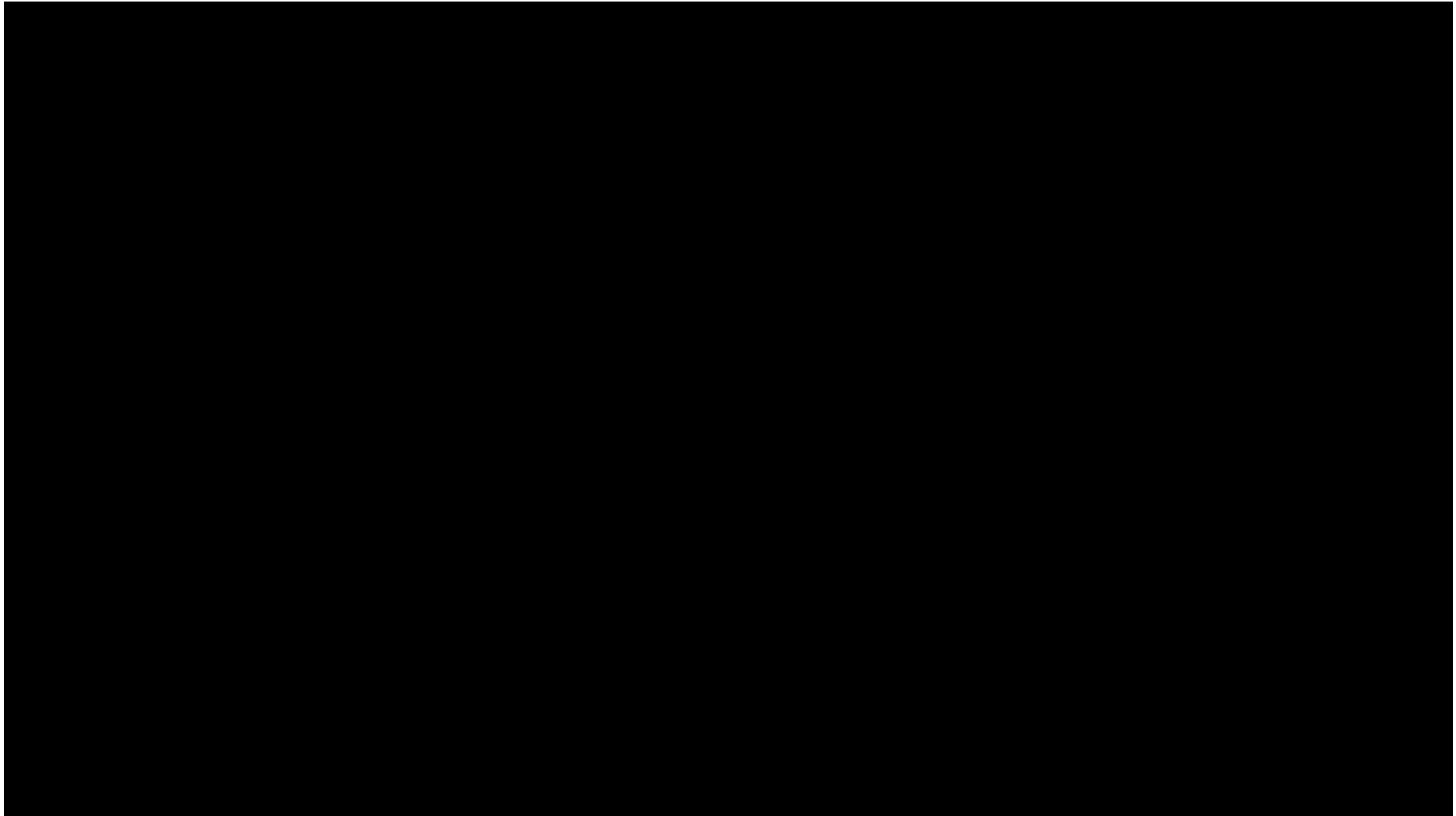
- ✓ Assisting tool for learning
- ✓ Support students' autonomy
- ✓ Motive student to limit mobile phone use



- ✓ *Virtual limiting room*
- ✓ *Context-aware reminders*
- ✓ *Timeline of limiting behaviors*

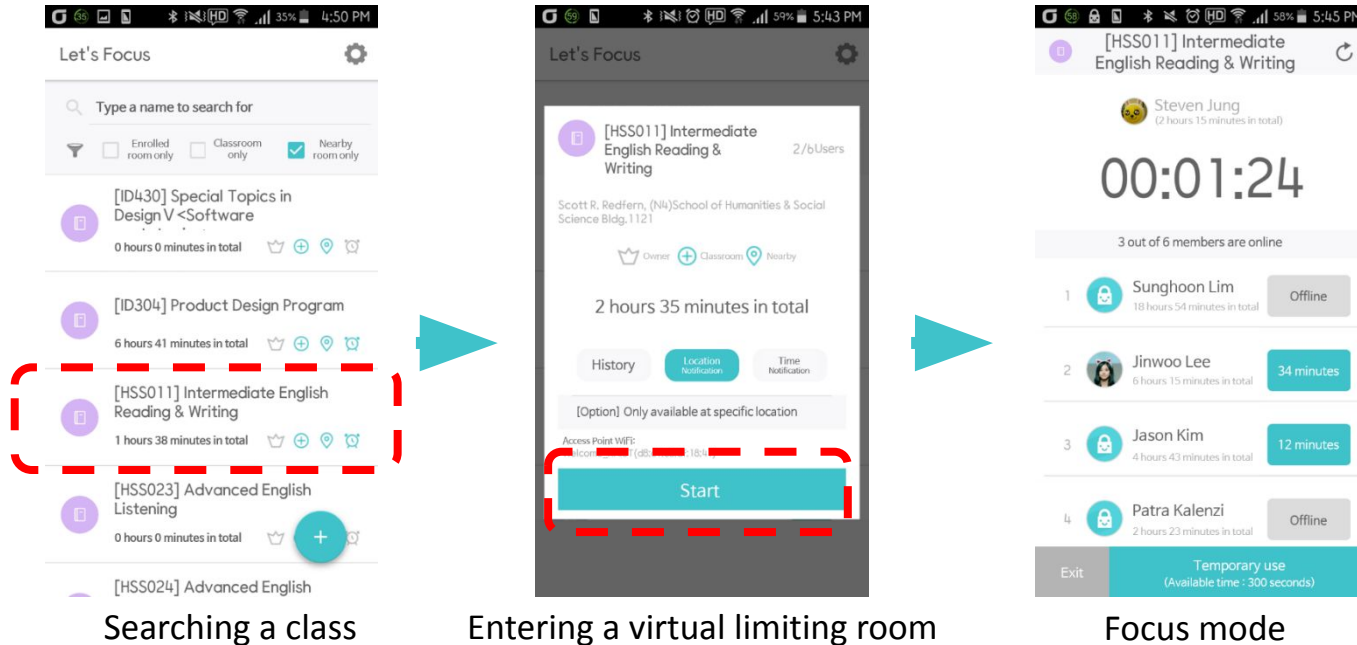
**Based on the design objectives, we proposed Let's FOCUS to mitigate mobile phone use in classroom!**

# Let's FOCUS design (Virtual limiting room)



Virtual limiting room is most important feature of Let's FOCUS!

# Virtual limiting room (Focus Mode)



If students enter a virtual limiting room, ***“Focus Mode”*** begins

- ✓ Locking screen and muting all notifications
- ✓ Displaying the student’s own limiting records and the limiting behaviors of other students’ in the room



# Virtual limiting room (Temporary Use)

The screenshot shows a Zoom meeting interface for a room titled "[HSS011] Intermediate English Reading & Writing". The host is Steven Jung, with a total time of 2 hours 15 minutes. The current time is 00:01:24. There are 3 out of 6 members online. The participant list includes:

Participant	Status	Time in Meeting
1. Sunghoon Lim	Offline	18 hours 54 minutes in total
2. Jinwoo Lee	Online	34 minutes
3. Jason Kim	Online	12 minutes
4. Patra Kalenzi	Offline	2 hours 23 minutes in total

At the bottom, there is an "Exit" button and a "Temporary use (Available time : 300 seconds)" button. A red dashed box highlights the "Temporary use" button, with a red arrow pointing to the right towards the text "Begins Temporary use mode". Below the dashed box, the text "Focus mode" is written.

Let's FOCUS provides **“Temporary Use”**

- ✓ For necessary use (e.g., information search, urgent contacts)
- ✓ Five minutes per hour

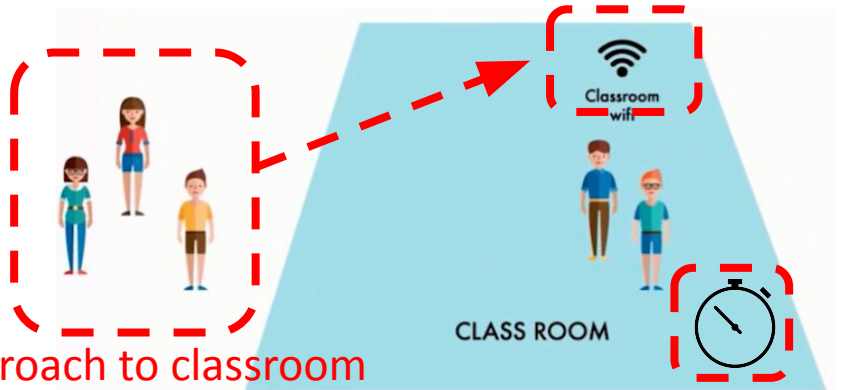
**Begins Temporary use mode**

# Context-aware reminders

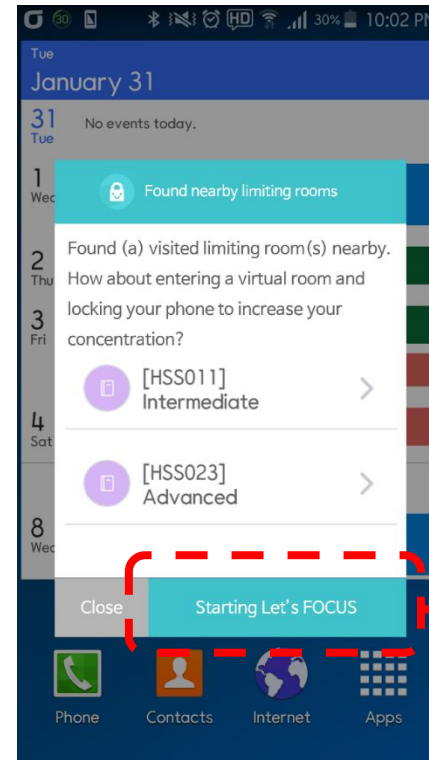
(Location-based)

Scans Wi-Fi fingerprint!

Approach to classroom



Time to limit!  
(Time-based)



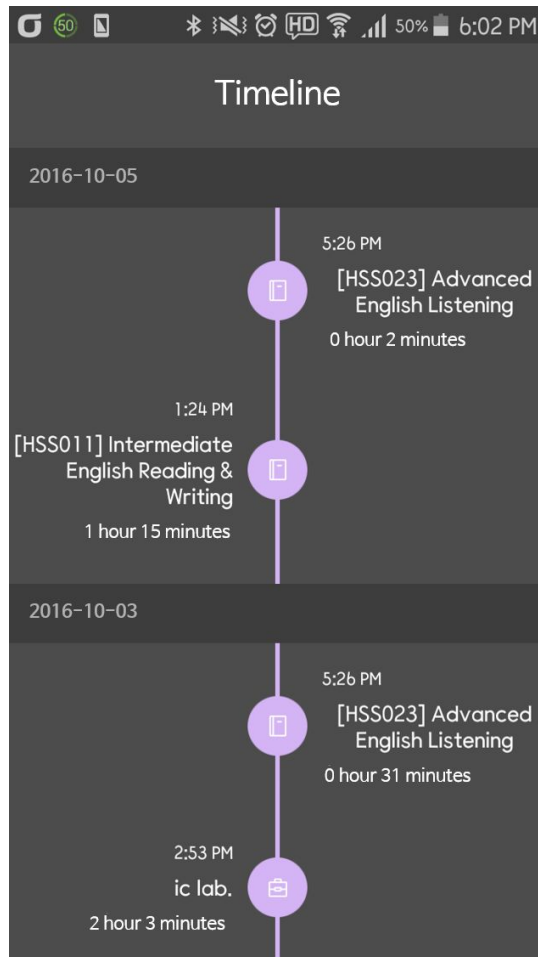
Begins  
focus mode

Location-based reminder

Let's FOCUS sends **“Context-based Reminders”**

- ✓ Suggests the limiting behavior

# Timeline of limiting behaviors



**Timeline**

Let's FOCUS provide **“Timeline”** to enable students to reflect their limiting behaviors



We designed a **“real-world campaign”**

at a large technical university in Korea!



# Campaign procedure

## Technical environment setup

- We collected information of all lectures of the semester (2016 Fall)
  - The Wi-Fi fingerprints of APs near the classroom
  - Lecture title, instructor name, schedule, location, etc.
- For each lecture, we generated corresponding virtual limiting rooms (n=1,003)





**LET'S FOCUS 와 함께하는 강의실 속 집중포드 캠페인**





여러분의 강의실에서 LET'S FOCUS와 함께 집중해 보세요!

**LET'S FOCUS**는 집중이 필요한 활동 (강의실, 도서관, 조모임 등)을 지원하는 위치 기반 앱입니다.



**"렛츠포커스"를 검색해보세요!**

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**캠페인 일정**    캠페인 진행 기간 ▶ 2016. 09. 19 ~ 2016. 10. 28  
 앱 사용 효과 공모 이벤트 마감 ▶ ~2016. 10. 31  
 이벤트 경품 발표 ▶ 2016. 11. 04

**Event #1 내가 바꾼 집중성**    **Event #2 몰입하는 우리 수업**    **Event #3 새롭습니다 더지 있습니다**  
 신청 후 20시간 사용 달성 시 선착순으로 5,000원 상당의 기프트카드를 드립니다.  
 신청이 사용하신 분들의 집중률\*으로 신청하여 다양한 신청사유(이벤트, 그리고 학생의 학습 목표 등)를 첨부하여 신청합니다.  
 블루투스 스피커, 키보드, USB 등을 드립니다.  
 친구들과 함께 수업 등에서 함께 참여해보십시오.  
 방과 후 수업 시간에 좋은 수업을 수강하여 문제상황을 지금에 대비합니다(이벤트 신청에 참여해야 합니다).  
 재미있고 유용적인 후기를 보내주시면 특별한 다양한 상품(사이드보드, 고급 무선 마우스, 기프트 카드, 블루투스 스피커, 키보드, USB 등)을 드립니다.

참여 방법, 경품 등 자세한 정보는 LET'S FOCUS 홈페이지(letsfocus.kaist.ac.kr)에서 확인하세요!  
 letsfocus@gmail.com  
 KAIST Interactive Computing 연구실

웹툰 보고서 ㅋㅋㅋ  
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 내겐 큰 혼동



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밀어서  
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## Let's FOCUS campaign (2016.09.19 ~ 10.28, six weeks)

- ✓ Let's FOCUS app is downloadable via Google Play and Apple store
- ✓ On/Offline campaign advertisements
- ✓ Promotional events to improve bootstrapping (about \$5)

# Campaign procedure (Data collection)

## During the campaign

- App usage data (n=379)
  - Usage data with timestamps



## After the campaign

- Exit survey (n=177; females=65)
  - General experiences of Let's FOCUS
  - Attitude change toward in-class mobile phone use
  - Likert scale questions + Open-ended questions
- Semi-structured interview (n=19)
  - How students used the Let's FOCUS
  - What features were effective to focus on the lecture
  - Took one hour and provided additional reward (20\$)



# Research questions

## **RQ1. Distraction management benefits**

- ✓ How did Let's FOCUS help students minimize mobile phone distraction?

## **RQ2. Social comparison and limiting behaviors**

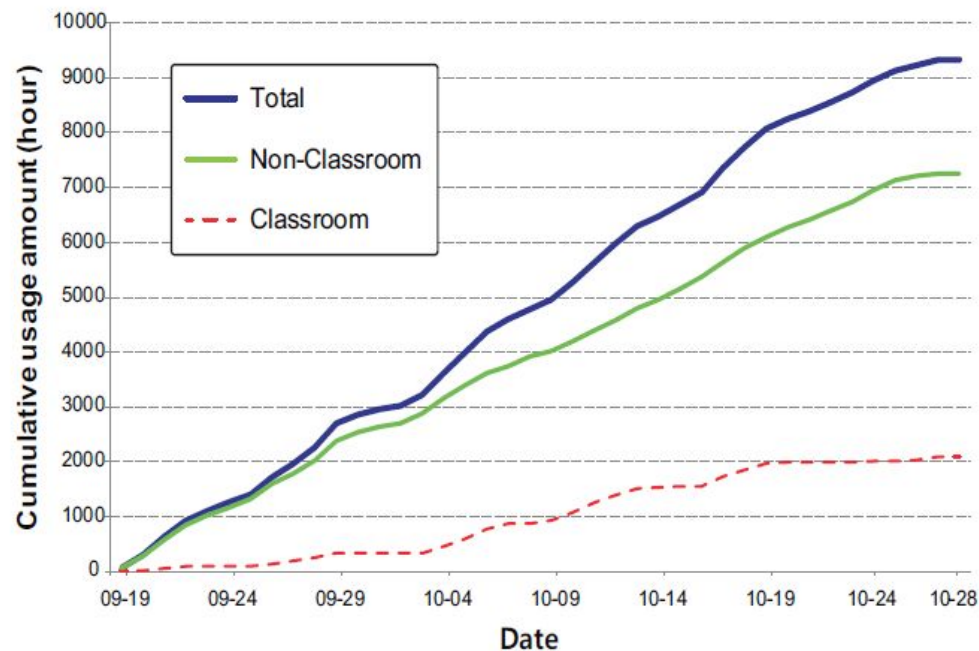
- ✓ How did social sharing in Let's FOCUS help maintain limiting behaviors?

## **RQ3. Attitude changes and after the campaign**

- ✓ How did campaign participation influence attitudes towards in-class mobile phone use after the campaign?
- ✓ How did participants use the app after the campaign?

# Campaign statistics

- ✓ **379 users** entered **233 virtual classroom**, and created **375 new virtual rooms**
- ✓ **9,335 hours** were limited during the class (2,082 hours) and individual study (7,253 hours)
- ✓ Undergraduate (77.4%), graduate (21.5%), and two staff members



Accumulated limiting hours

# RQ1. Distraction management benefits

## Focus mode

- Students could better focus on the class (71.9%)
- Focus mode prevented students from being interrupted (e.g., habitual usage, external distraction)



*“When I turned on the phone screen as usual during the class, the screen indicated that it was in the lock mode... I became aware of how frequently I check the phone” (P6)*

*“While using Let’s FOCUS in class..., I felt isolated from the outside world with its distraction...” (P4)*



# RQ1. Distraction management benefits

## Temporary use mode

- Most students utilized the temporary use mode (five-minute allowance) during the focus mode (96.3%)
- Main purpose: contact (54.3%), information search (37.0%), SNS and game were only 7.4% and 1.9%

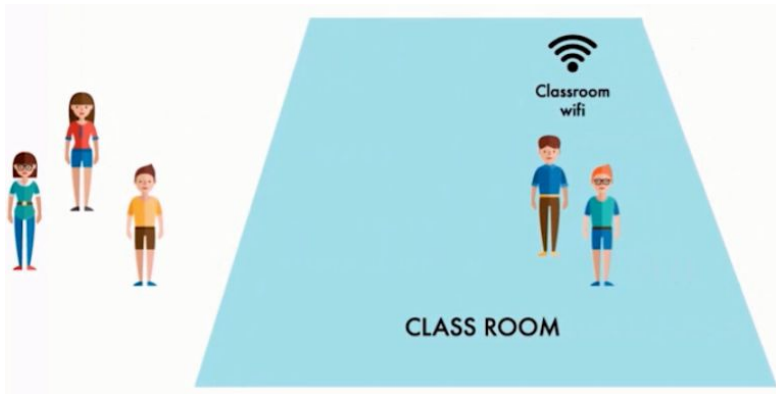


*“Temporary use mode was good because I could focus again after dealing with a phone task within five minutes.” (P17)*

# RQ1. Distraction management benefits

## Context-based reminders

- Students preferred location-based reminder to time-based reminder
- It reminds students that they should limit mobile phone use when they arrive at their classrooms



*“When I received the notification near a classroom, I recognized that the class would begin soon and that I should focus on the lecture” (P07)*

# RQ1. Distraction management benefits

## Diverse usage contexts other than classes

- Students focus on activities (e.g., individual study, work, conversation) by creating their own virtual limiting rooms.
- Some students used the application before sleep



*“When I met friends at a café, I created a room...” (P8)*

*“When I stayed up late in the bed contents such as comics..., it was difficult to quit. So, I locked my smartphone..., I could fall asleep after using the five-minute allowance” (P5)*

# RQ2. Social comparison and limiting behaviors

## Factors that facilitate social comparison

- Intimacy level with members
  - Students is more motivated to limit when they use the app with close users
- Existence of active users
  - The number of users limiting concurrently is related facilitating social comparison
- Limiting record differences
  - Students felt motivated by comparing limiting records with others, but less motivated when record difference is large
- Engagement of collocated activities
  - More effective when members in a virtual room are co-located and engage in the same activities

# RQ3. Attitude changes and after campaign usage

- **31.7% of students changed attitude after the campaign**
  - Attitude changed negatively (84.2%)
    - *“Urgent matters did not occur frequently during the class”*
    - *“Off-task usage in the class negatively influenced concentration”*
  - Attitude changed positively (15.8%)
    - *“Mobile phone was not a distraction source when it is properly used”*
- **Let’s FOCUS use after campaign (no further reward)**
  - 117 students continued to use the Let’s FOCUS and limited 1,224 hours till the end of the semester



# Summary & Discussion



## Designing software based intervention

- Support autonomy of students
  - Frame functions of software
  - Motivate users to participate
- ➔
- “Suggesting” limiting behaviors
  - Focus mode / temporary use mode
  - Social comparison / conducting

# Summary & Discussion



## **Towards smarter classrooms**

- **Fully equipped with various interactive smart devices**
- **More frequently intact with technology**
- **Multiple devices management should be considered**



# Thank you!

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