EXPER

Econ Conference

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เวลา 09:00 - 16:15 น.

ณ ห้องประชุมภัทรรวมใจ ธนาคารแห่งประเทศไทย

CBEE
Center for Behavioral and Experimental Economics
Chulalongkorn University

สสส
สำนักงานกองทุนสนับสนุนการสร้างเสริมสุขภาพ

PIER

กระแสสังคมกับการตัดสินใจส่วนบุคคล

(Effects of "the Wisdom of Crowds" on Individual Decision: An Experimental Evidence on Guesswork)

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Presentation Outline

- Introduction
- Objectives
- Experimental Design
- Preliminary Results
- Conclusive Remarks

Introduction (1)

- Aristotle is widely credited as the first person to write about the 'Wisdom of the crowd' in his work titled 'Politics'.
- The term “crowd” refers to any group of people, such as a corporation, a group of students, or simply the entire general public, which they may or may not know each other.
- Classic example of wisdom-of-the-crowds: At a 1906 country fair in Plymouth, eight hundred people participated in a contest to estimate the weight of a slaughtered and dressed ox. Statistician Francis Galton observed that the median guess, 1207 pounds, was accurate within 1% of the true weight of 1198 pounds. (Galton, 1907 in wikipedia)

Introduction (2)

- Vul and Pashler (2008): "What percentage of the world's airports are in the United States?“
  [Hourihan and Benjamin (2010) and Rauhut and Lorenz (2011)]
- Surowiecki (2004) observed “Who Wants to Be a Millionaire” game show and found that experts can correctly answered 65% but group of people 91% >> “Collectively Smart”
- However, weight of ox, proportion of airports or questions in game show are simple and clue in.
- What will happen if more complex question?
  - Individual knows that it’s difficult for crowd to guess correct value.

Objectives

1. To investigate effects of the wisdom of crowds in the case of more complex and without clue among familiar / unfamiliar issues.
2. To prioritize the aspects of the wisdom of crowds on individual decision.

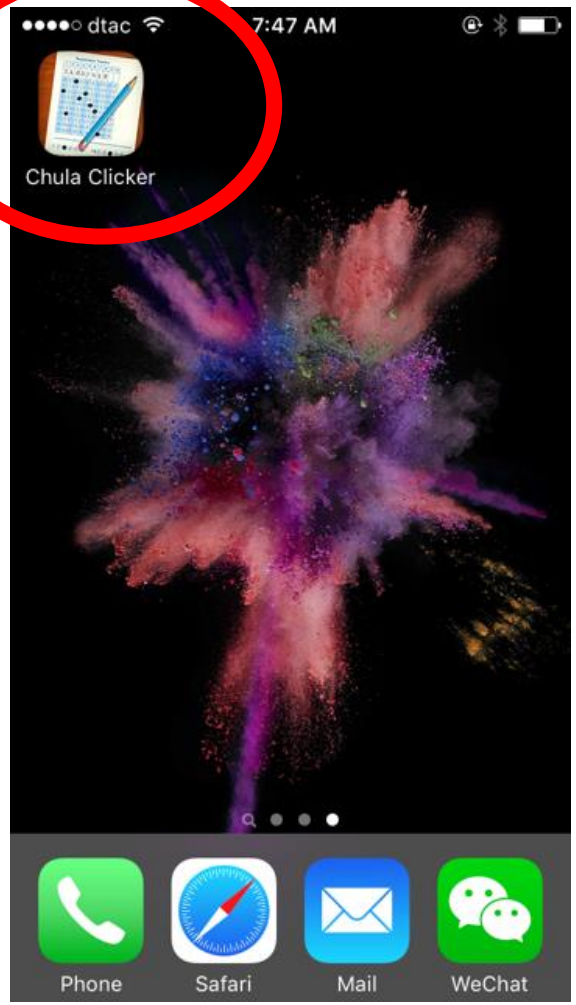
Experimental Design

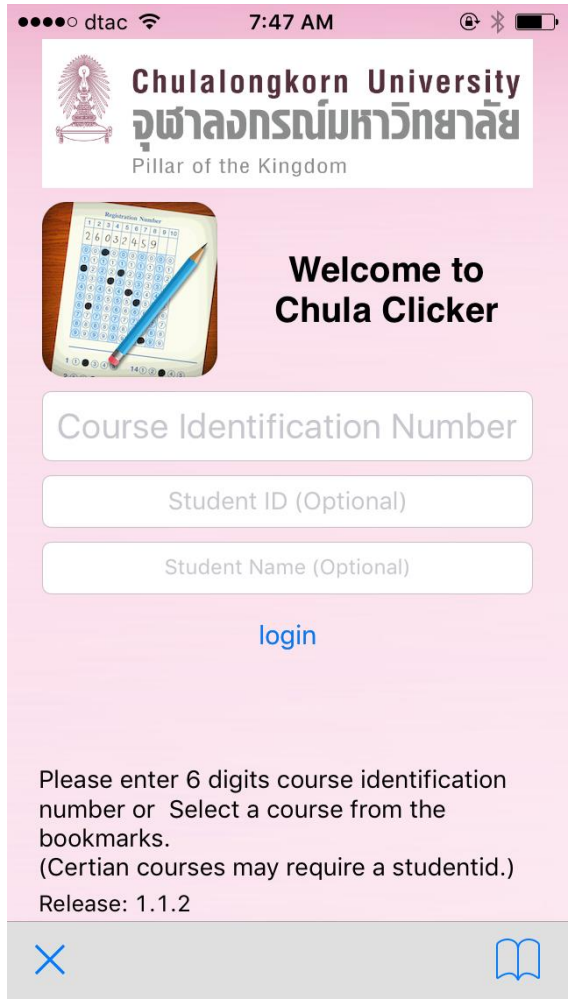
Device / Setting / Subject / Payment

Device

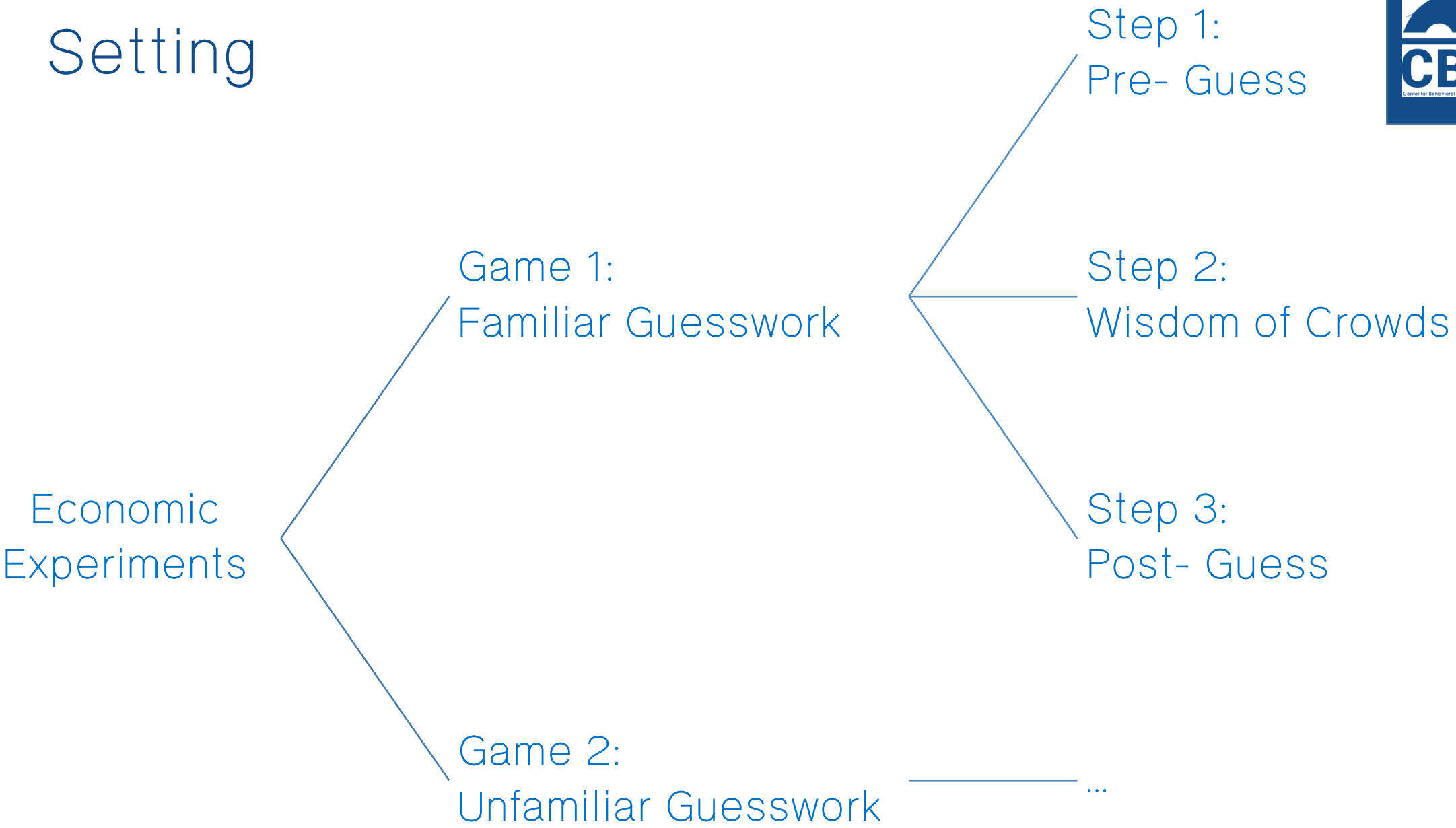
Now, "Chula Clicker" App on Smartphone

- The experiment requires
  - Anonymous
  - Collect data and process result real-time
- Use real clicker by Turning Technology™





Setting


Economic Experiments
Game 1: Familiar Guesswork
Game 2: Unfamiliar Guesswork
Step 1: Pre- Guess
Step 2: Wisdom of Crowds
Step 3: Post- Guess
…

Subject

- College Students / Major in Economics / Higher than 3rd year
- Trained how to use Chula Clicker App
- Run Experiments in Chulalongkorn University
  - Total 70 students
  - Skip Walailuk University in this presentation

#1 Objective

To investigate effects of the wisdom of crowds familiar / unfamiliar issues

Game 1: Familiar Guesswork

"How many students are there in Chulalongkorn University?"

(A.Y.2015)

Step 1: Pre- Guess

- Each student was assigned to answer individually.
- They cannot talk to each other.
- The answer was limited at 5 digits.
- 30 seconds was provided.
- Then the individual answers were collected and not provided.

Period 2: the Wisdom of Crowds

- The answer was still limited at 5 digits.
- Each student was assigned to answer digit by digit starting from the ten thousand digit.

__ __ __ __ __

- "Mode" of number in each digit was chosen as a wisdom of crowd.
- The biggest number is 99,999 students.
- All subjects always know this number.

Period 2: the Wisdom of Crowds

- For example of the first digit, 60% - 0, 30% - 1, 5% - 2, 2% - 3, …
- Put
  _0_ __ __ __ __

The biggest number changes to 09,999 students.

- The second digit, 20% - 0, 50% - 1, 20% - 2, 5% - 3, …
- Put
  _0_ _1_ __ __ __

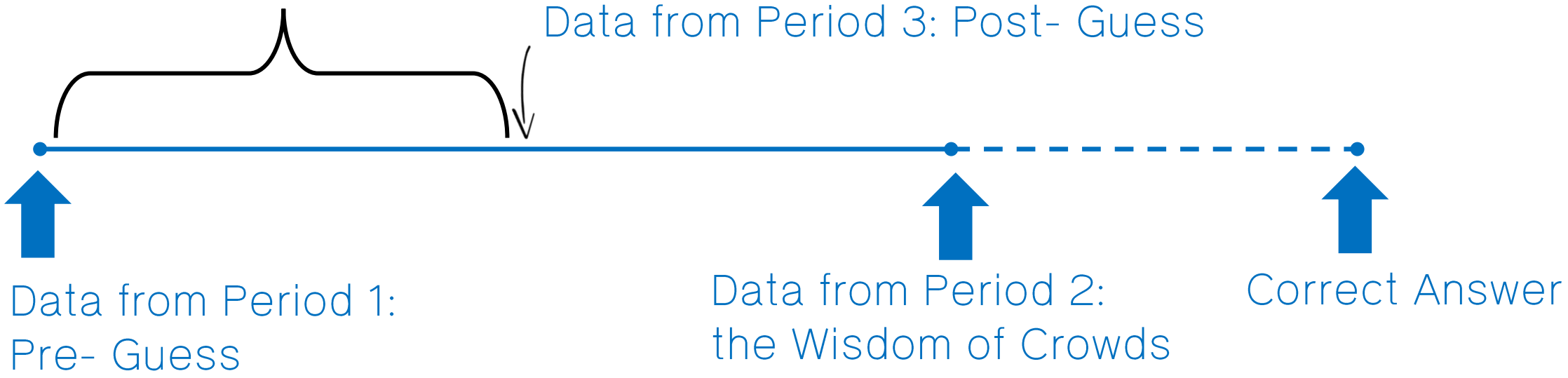
The biggest number changes to 01,999 students.

Period 3: Post- Guess

- Each student was assigned to answer individually (again).
- They cannot talk to each other.
- The answer was still limited at 5 digits.
- 30 seconds was provided.
- Then the individual answers were collected again.

Observe

How much individuals adjust their guess



Game 2: Unfamiliar Guesswork

"How far is it from Chulalongkorn University to Colosseum (in km)?"

(Everyone knows Colosseum.)

Step 1: Pre- Guess

Step 2: the Wisdom of Crowds

Step 3: Post- Guess

Payment

- The payment is important to guarantee rationality and effort of students to play the game.
- Punishment Points are assigned to guarantee the subjects putting efforts on their guess and calculated from the summation of
  - Mistake 1 = | Correct Answer – Pre-Individual Guess |
  - Mistake 2 = | Correct Answer – Post-Individual Guess |.
- Due to class experiment, it is prohibited to spend the “real” money.
- Every student will be assigned a probability to sing and dance in front of their friends relatively to their punishment points.
  - More punishment points, higher probability to sing and dance.

Preliminary Results

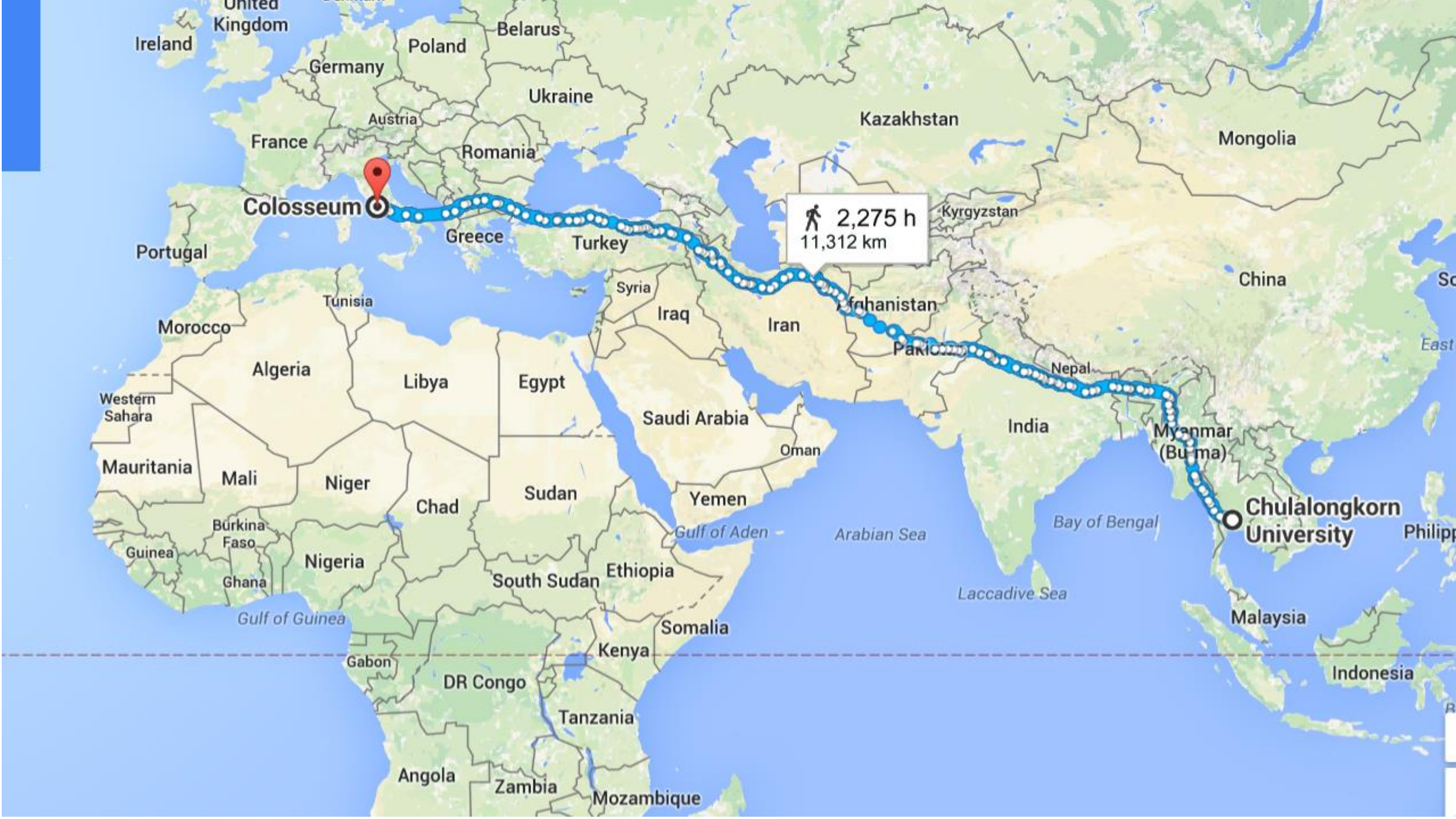
Former names	Royal Pages School, Civil Service College of King Chulalongkorn
Motto	• Knowledge with Virtue *(official)* • Honour of Chula is the Honour of Serving the Public *(unofficial)*
Established	March 26, 1917
Type	Public (National) research university
President	Professor Pirom Kamol-Ratanakul, M.D.
Students	38,456[1]
Undergraduates	25,697

Game 1: Familiar Guesswork

Correct Answer = 38,546 km

	Mean (PRE)	Crowd	Mean (POST)	%Δ|POST-PRE|	%Δ|POST-CROWD|	SD (PRE)	SD (POST)
Inter	45,971	39,910	44,667	2.92	10.65	14,266	8,617
Thai	48,204	37,550	45,318	6.37	17.41	18,764	10,837

- observe SMALL change between PRE and POST
- so individuals attach more on themselves
  - in FAMILIAR issue
- Moreover, SD decreases 40%.


Colosseum
2,275 h
11,312 km
Chulalongkorn University
United Kingdom
Ireland
Poland
Belarus
Germany
Ukraine
Austria
France
Romania
Kazakhstan
Mongolia
Kyrgyzstan
Greece
Turkey
Portugal
China
Syria
Iraq
Iran
Tunisia
Morocco
Algeria
Libya
Egypt
Nepal
India
Western Sahara
Saudi Arabia
Oman
Mauritania
Mali
Niger
Chad
Sudan
Yemen
Burkina Faso
Guinea
Nigeria
Ethiopia
Ghana
South Sudan
Gulf of Aden
Arabian Sea
Bay of Bengal
Laccadive Sea
Gulf of Guinea
Somalia
Kenya
Malaysia
Gabon
DR Congo
Indonesia
Tanzania
Angola
Zambia
Mozambique

Game 2: Unfamiliar Guesswork

Correct Answer = 11,312 km

	Mean (PRE)	Crowd	Mean (POST)	%Δ|POST-PRE|	%Δ|POST-CROWD|	SD (PRE)	SD (POST)
Inter	18,512	20,953	19,979	7.34	4.87	6,973	1,005
Thai	13,538	16,743	16,481	17.86	1.59	5,783	1,616

- observe BIG change between PRE and POST
- value between POST and CROWD is relatively CLOSE
  - even if crowd values is farther than correct value
- so individuals attach more on crowd
  - in UNFAMILIAR issue
- Moreover, SD decreases 80%.
  - Crowd can reduce dispersed decision to well-organized.

Crowd Effects on Individual Decision

	Familiar case	Unfamiliar case
INTER	21.51%	60.12%
THAI	27.08%	91.82%

$$Crowd\_effect = \frac{|\ PRE\ -POST\ |}{|\ PRE\ -\ Crowd\ |}$$

- If individual is confident in his answer, he changes little.
  - | Pre - Post | is low relatively to | Pre - Crowd |
  - Crowd effect is low.
- If individual is not confident in his answer (he trusts in crowd decision), he changes much.
  - | Pre - Post | is high relatively to | Pre - Crowd |
  - Crowd effect is high.

Conclusion of #1 Objectives

- To investigate effects of the wisdom of crowds in the case of more complex and without clue among familiar / unfamiliar issues.
- Crowd affects individual decision in case of UNFAMILIAR higher than FAMILIAR one, no matter what the correct answer is.
  - BANDWAGON effect holds, especially in unfamiliar case.
- Also Crowd can organize how people decide, especially in unfamiliar issue.
  - GROUPTHINK phenomenon also holds, especially in unfamiliar case.
- So the wisdom of crowd holds, both how people think and organize groupthink.

#2 Objective

To prioritize the aspects of the wisdom of crowds on individual decision.

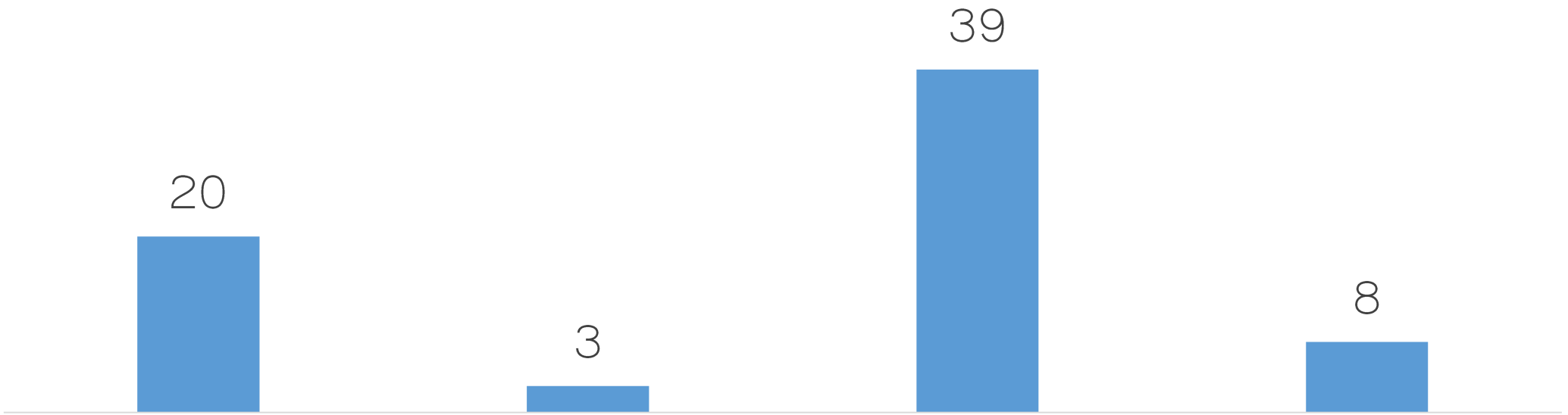
Game 3: Aspects of Bandwagon Effects

"What is the area of Swaziland (in sq.km)?"

- Step *: Before the first guess, students answer
  - Relative to other students in high school class, what is your ranking of 50 students in Geography subject? >> Expert
- Step 1: Pre- Guess (5 digits)
- Step *: Answer
  - Rate your confidence (between 1-9) that your value is in range +/-5% from correct answer. >> Confidence
- Step 2: Aspects of the Wisdom of Crowd
  - A. Mean from Crowd
  - B. Mean from Experts (who ranks less than 3)
  - C. Mean from Confident Students (who ranges more than 8)
- Step 3: Post- Guess
  - Choose between A, B, C or their answer

Choices of 70 students

Correct Answer is 17,364 sq.km.



	A. Mean from Crowd	B. Mean from Experts	C. Mean from the Confidents	D. Their own answer
Value	(22,283)	(16,742)	(30,048)	
Student	(70)	(7)	(8)	

Conclusion of #2 Objectives

- To prioritize the aspects of the wisdom of crowds on individual decision.
- Inside Bandwagon effect, there are several aspects, then people can choose some to believe.
- They believe in the confidents > crowd > themselves > the experts.
- “crowd > themselves” means that Bandwagon effect still holds.
- “the confidents > the experts” proposes LEMON PROBLEM in Bandwagon effects because people tend to believe in confidence higher than capacity.
- In the real world, LEMON problem is worse in term of ADVERSE SELECTION because confidence is easier to be observed than capacity.

Conclusive Remarks

- The wisdom of crowds, even cannot identify who's who, can affect individual decision (how people choose) and group organized (how guess varies), no matter what answer is correct or not.
  - Bandwagon effect and Groupthink phenomenon hold, especially in the unfamiliar case.
- Each aspect of crowd data influences decision differently.
  - "Confidence > Crowd > Themselves > Capacity" suggests LEMON problem (Adverse Selection).
- We can think about how to achieve good democracy which no one know the correct answer, so role of media, rumour, social trend, Hyde Park, … play role as a Wisdom of Crowd and can affect the way how citizens make decision.
  - Moreover, citizens may "wholeheartedly" follow the confidents in the wrong way to good democracy, even if the crowd or the experts suggest opposite.

Thank you