"*Powtoon for Innovative Teaching and Learning*"

by

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Presentation for eLearning Forum Asia 2016, June 13-15, 2016, Shanghai, China

Teaching Project

Motivation

- To redesign the teaching of MSc subject AF5916 *Research Methods and Market Research in China* with inclusion of:

1) animated videos (Powtoons) → focus of this presentation
2) interview videos and
3) new teaching approach

- To enhance students' understanding and interest of the subject and strengthen their engagement in class.

Evaluation

- To evaluate the overall effectiveness of the new design of the subject, we:

  1) collect (i) feedback from questionnaire regarding students' opinions about Powtoons; and (ii) students' marks in mid-term test, group project and the final examination; and

  2) use data collected from questionnaire to conduct statistical analysis

Background of the Subject

- I started teaching the subject in 2009/2010 semester 1.
- The subject aims (i) to introduce concepts and possible problems of regression analysis and (ii) to demonstrate proper procedures for conducting research.
- It was offered to part-time students as a compulsory subject from 2009 to 2013, and as an elective subject for full-time students since 2014 due to programme restructuring.
- Having the experience of teaching the subject for six semesters, I can clearly identify the topic areas which students might have difficulties with.

Previous Modifications in Teaching Approach and Results

Over the past semesters, I have done the followings:

1) Offered additional notes and exercises to enhance students' understanding of specific topics; and

2) Provided step-by-step instructions for students to conduct research project.

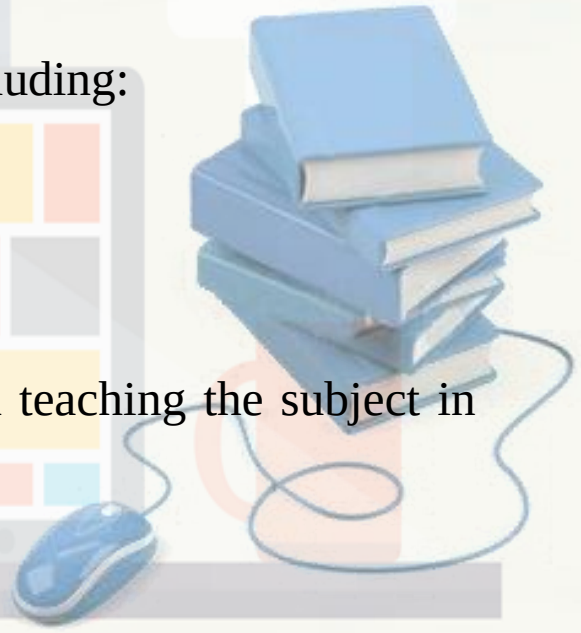
Results:

- I am still not satisfied with the teaching approach and students' learning motivation, pace and engagement in class.

- Apart from standard assessments (mid-term test, group project and final examination), there is no solid evidence of students' learning.

Construction of Powtoons

- I constructed a set of nine animated videos and used them for different purposes.
- For preparation of each animated video, I have to design a compelling short story about the topic, to outline a clear plan of cartoon characters and to convert the story into an animated video clip using PowToon (software for creating animated presentations and animated videos).
- I intended to use the Powtoons for different purposes, including:
  (i) increase students' preparation before class;
  (ii) enhance explanation of content during class; and/or
  (iii) assess students' learning at the end of class.
- Implementation: This first set of Powtoons were used in teaching the subject in S2 of academic year 2015/2016.



General Information of Powtoons and Their Uses

Topic of Powtoon	Length of Powtoon	Use of Powtoon	Description of Teaching Using Powtoon
1. Introduction to Regression Analysis	1.52 mins	In-class Demonstration and Assessment	*Share panda photos of my Chengdu trip which relates to the Powtoon example. *Use Powtoon as an assessment tool after students learnt about concepts of Regression. *Ask questions relating to Powtoons to inspire students' thinking.
2. Introduction to Ordinary Least Squares	2.02 mins	Preparation before Class + In-class Demonstration	*Explain the slides of lecture. *Collect students' weight and height and conduct regression in class as an example of using OLS to estimate regression.
3. Introduction to Classical Assumptions	2.13 mins	Preparation before Class	*Explain first few slides of the lecture and refer them to Powtoon for further discussion.
4. Introduction to Hypothesis Testing (1)	2.25 mins	Preparation before Class + In-class Demonstration	*Explain first few slides of lecture and engage students in doing the hypothesis testing exercises with step-by-step instructions. *Show the 2 Powtoons of Hypothesis Testing to strengthen students' understanding.
5. Introduction to Hypothesis Testing (2)	3.08 mins	Same as above	Same as above

General Information of Powtoons and Their Uses

Topic of Powtoon	Length of Powtoon	Use of Powtoon	Description of Teaching Using Powtoon
6. Introduction to Model Specification and Functional Form	3.00 mins	Preparation before Class	*Explain the slides of lecture. *Require students to do in-class exercises to check their understanding of how to detect and remedy the problem of omitted variable bias. *Remind students about the Powtoon to strengthen students' understanding.
7. Introduction to Multicollinearity	3.20 mins	Preparation before Class + In-class Demonstration	*Explain the slides of lecture. *Require students to do in-class exercises to check their understanding of how to detect and remedy the problem of multicollinearity. *Show the Powtoon again to strengthen students' understanding.
8. Introduction to Serial Correlation	2.38 mins	In-class Demonstration	*Explain the slides of lecture. *Require students to do in-class exercises to check their understanding of how to detect and remedy the problem of serial correlation. *Show the Powtoon for the first time to strengthen students' understanding.
9. Introduction to Heteroskedasticity	2.35 mins	Preparation before Class + In-class Demonstration	*Start the lecture with discussion of questions mentioned in the Powtoon. *Explain the slides of lecture. *Go through Eviews exercises step-by-step to help students understand how to detect and remedy the problem of heteroskedasticity.

Student Feedback

- We design a questionnaire to collect feedback from students, asking them for their opinions about:

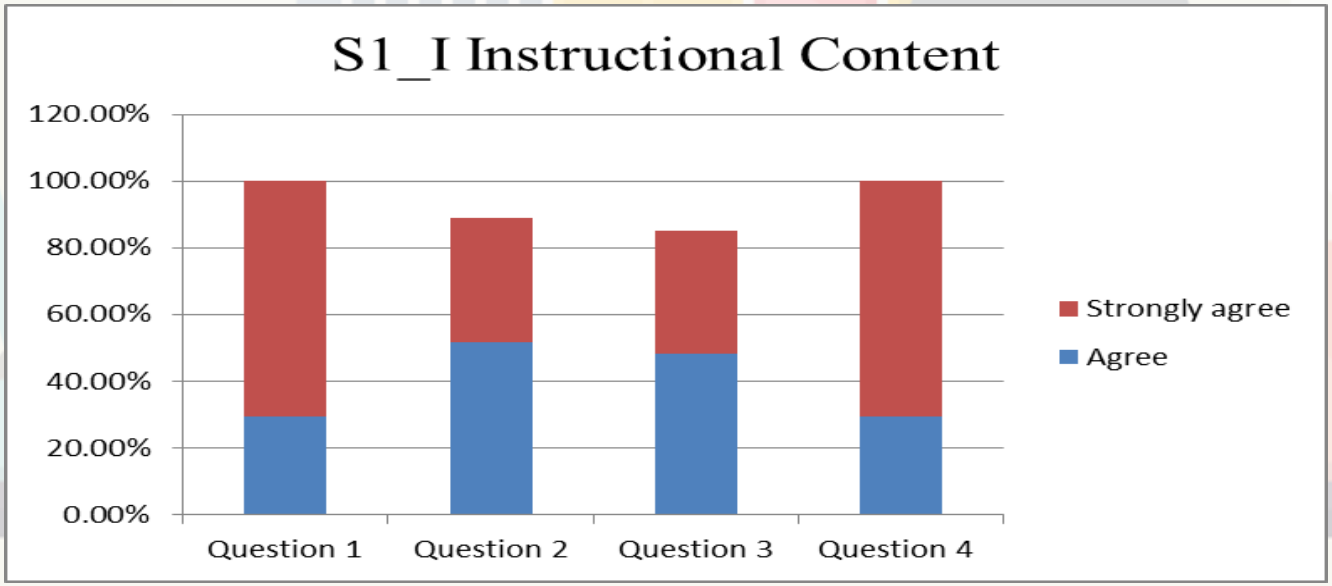
1) Instructional content;
2) Powtoon characteristics;
3) Learning outcome; and
4) General preference for Powtoons.

Instructional Content

Section 1 - Attitude of students towards the use of Powtoons in the teaching of AF5916

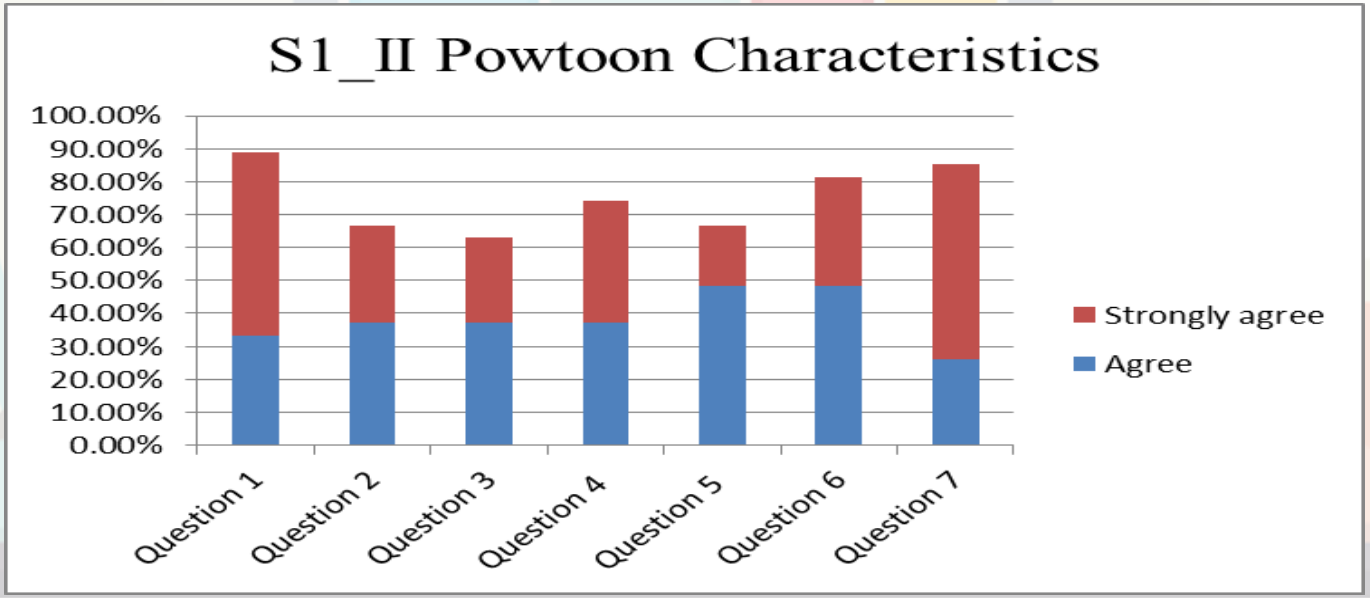
Indicate your opinions concerning the following aspects of Powtoons by putting a circle on a scale of 1-5, where 1=strongly disagree and 5=strongly agree

I. Instructional Content	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. The instructions given by the lecturer regarding how to watch Powtoons are easy to follow.	1	2	3	4	5
2. It was clear to me how my understanding of Powtoon in each topic would be assessed.	1	2	3	4	5
3. It was clear to me what I was expected to learn from each Powtoon.	1	2	3	4	5
4. There are clear goals of each Powtoon.	1	2	3	4	5



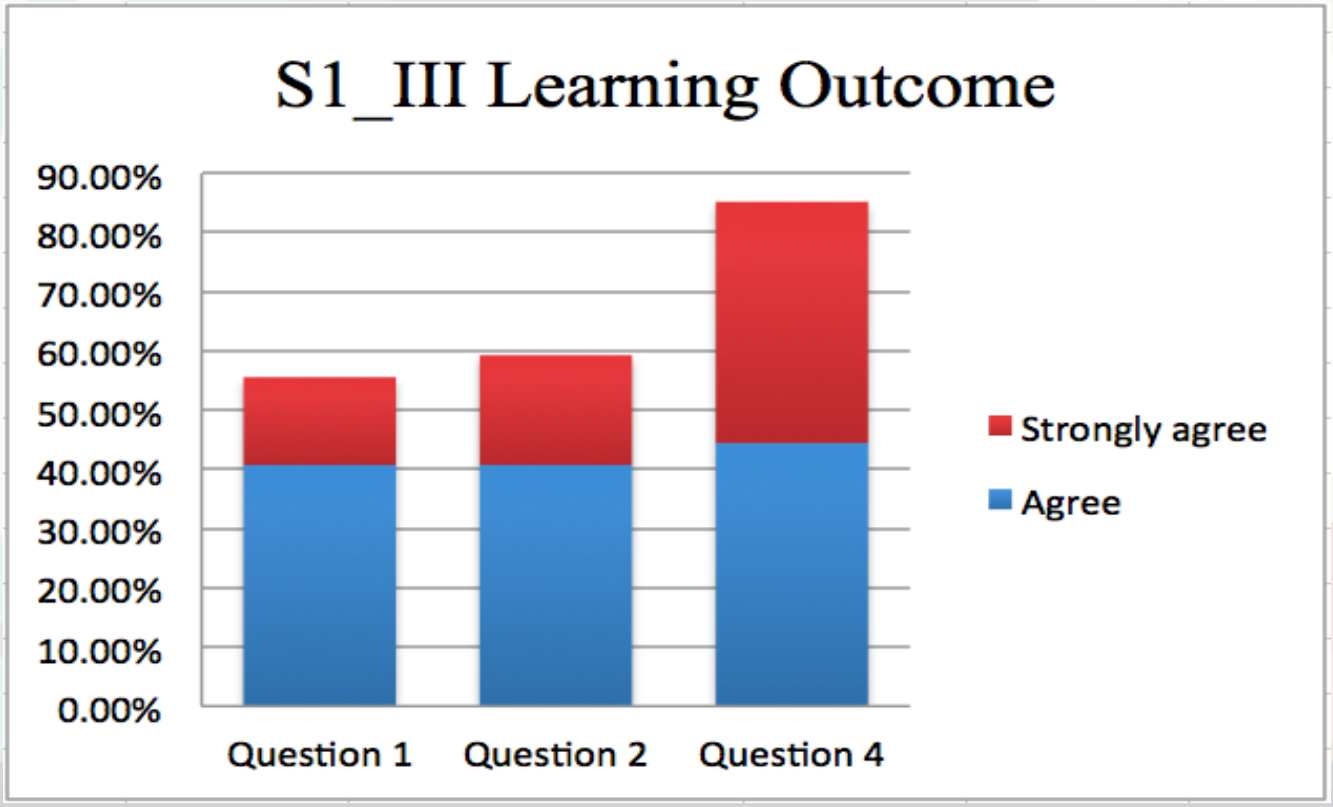
Powtoon Characteristics

II. Powtoon Characteristics	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. Story of each Powtoon is easy to understand.	1	2	3	4	5
2. The characters in each Powtoon are interesting.	1	2	3	4	5
3. The background music of each Powtoon is suitable.	1	2	3	4	5
4. The text in each Powtoon is clear and easy to read.	1	2	3	4	5
5. The speed at which each textbox appears is appropriate.	1	2	3	4	5
6. The length of each Powtoon is appropriate.	1	2	3	4	5
7. I find the slide-show feature helpful because I can pause the video manually, and replay the important features of the topics/ video.	1	2	3	4	5



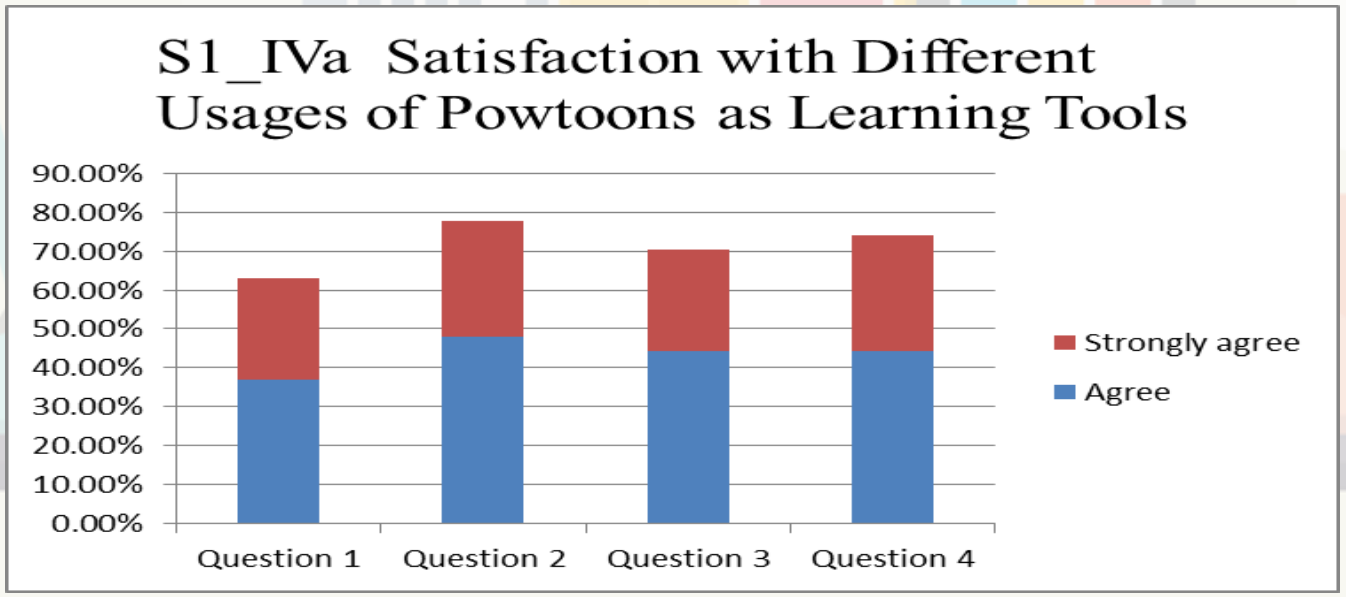
General Learning Outcome

III. Learning Outcome	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1.Powtoons motivate me to learn the subject contents.	1	2	3	4	5
2.Powtoons help stimulate my interest in the subject contents.	1	2	3	4	5
4. In general, watching Powtoons for the subject has provided me with knowledge to do the research project.	1	2	3	4	5



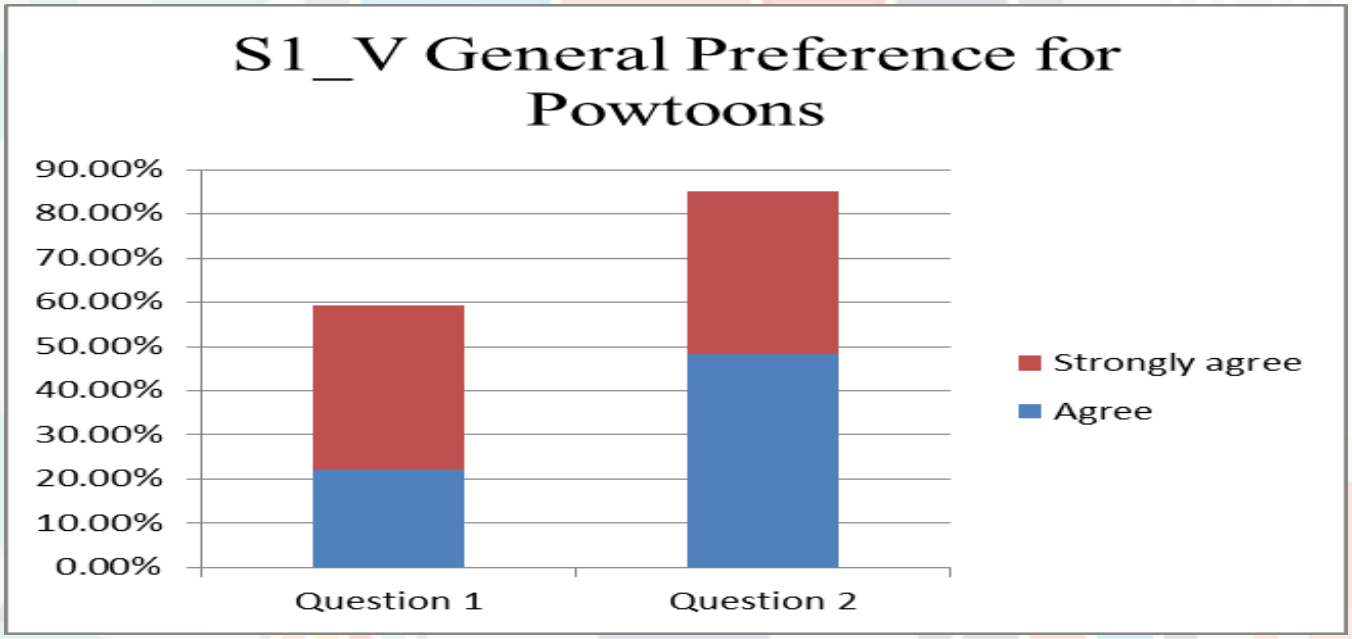
Satisfaction with Different Usages of Powtoons as Learning Tools

IV. Satisfaction with Different Usages of Powtoons as Learning Tools	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. The use of Powtoons as preparation material motivates me to prepare before class which helps enhancing my learning in class.	1	2	3	4	5
2. The use of Powtoons as in-class demonstration strengthens my understanding of concepts in class.	1	2	3	4	5
3. The use of Powtoons as in-class assessment tool helps to assess my progress of learning.	1	2	3	4	5
	Very poor	Poor	Average	Good	Excellent
4. Overall, as a learning experience, I would rate viewing Powtoons as	1	2	3	4	5



General Preference for Powtoons

V. General Preference for Powtoons	Strongly disagree	Disagree	Netural	Agree	Strongly agree
1.In general, I enjoyed watching Powtoons for the subject.	1	2	3	4	5
2.In general, watching Powtoons for the subject has provided me valuable learning experience and knowledge.	1	2	3	4	5



Effort Spent on Watching Powtoons

Section 2 – Effort spent on watching Powtoons

Q1: Level of preference for watching Powtoons over reading lecture notes for preparation of the subject		
Not Preferred	Somewhat preferred	Highly preferred
18.5%	44.4%	37.0%

Q2: Times per week to watch Powtoon of each topic for preparation before class		
0 time	Between 1 to 2 times	Over 2 times
14.8%	77.8%	7.4%

Q3: Times per week to watch Powtoon of each topic for revision after class		
0 time	Between 1 to 2 times	Over 2 times
44.4%	51.9%	3.7%

Q4: Times on average to watch Powtoon of each topic for revision during the week before the examination		
0 time	Between 1 to 2 times	Over 2 times
11.1%	55.6%	33.3%

Learning Outcome of Different Topics

Section III, Question 3:
"Powtoons allows me to have a brief understanding of":

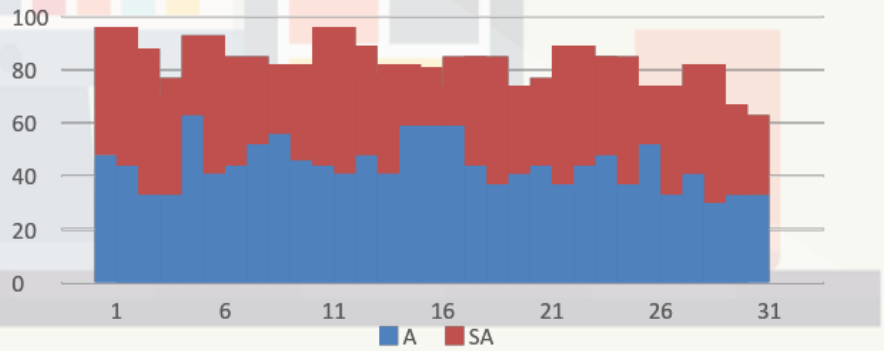
- 8 topics (30 items)
  - Regression
  - Ordinary least squares
  - Classical assumption
  - Hypothesis testing
  - Multicollinearity
  - Model specification
  - Serial correlation
  - Heteroskedasticity

- E.g., Classical assumption
  - The regression model is linear, is correctly specified, and has an additive term
  - The error terms has a zero population mean
  - All explanatory variables are uncorrelated with the error term

Some Descriptive Highlights

- From 1= strongly disagree to 5 = strongly agree, e.g.:
  - No one rated “1” on any item
  - Student #1 rated all items as “5”(=perfect score)
  - Student #5 rated most of the items as “3”

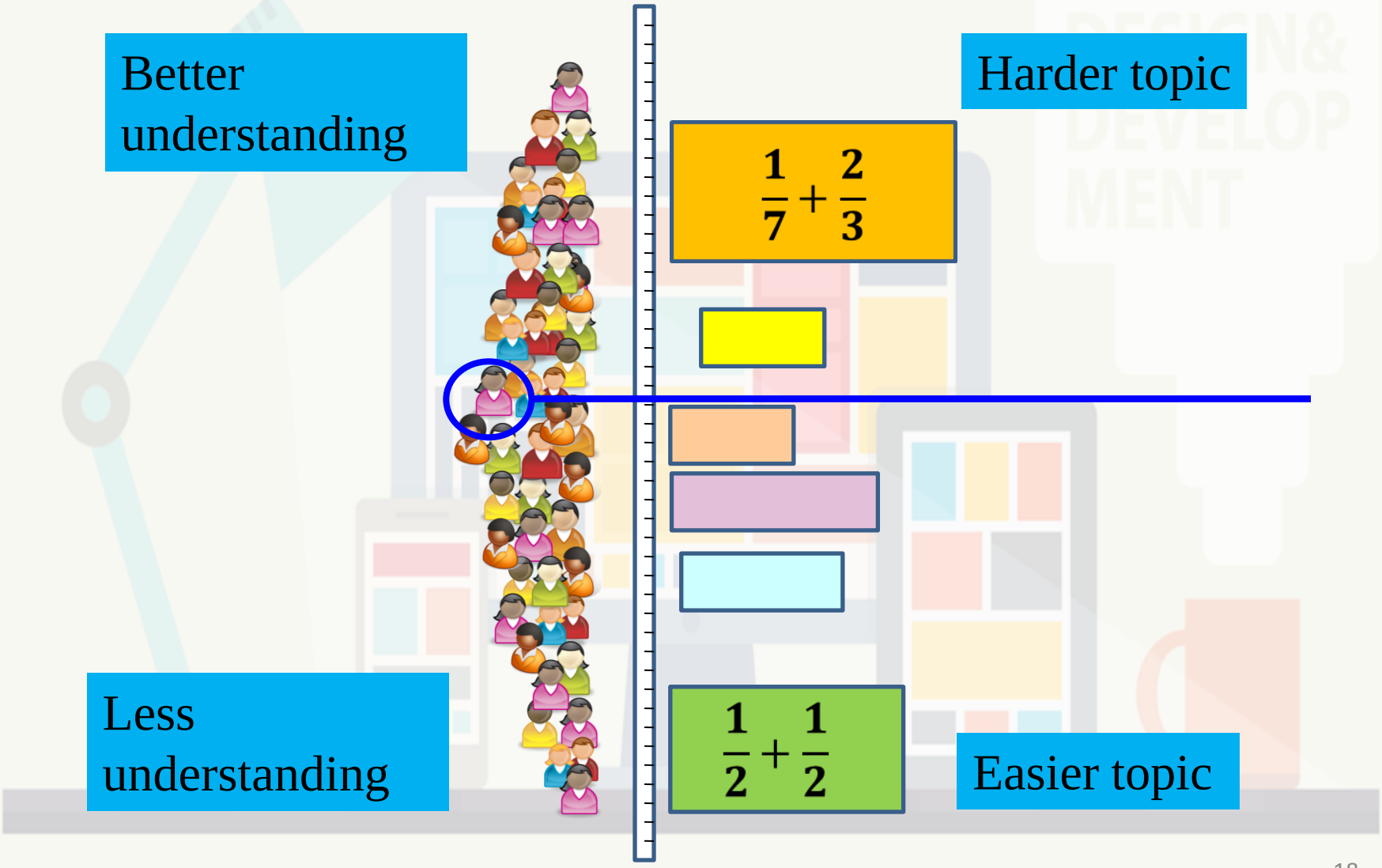
- Majority chose “agree” or “strongly agree”: 63% (item 30) - 96% (item 1)
- “Agree”: 30% (item 29) - 63% (item 5)
- “Strongly agree”: 15% (item 16) - 52% (item 22)



Rasch Analysis

- A psychometric model for analyzing categorical data, such as answers to questions on a reading assessment or questionnaire responses.
- Generally shows distribution of student measures (e.g. level of understanding, whether they put the correct or incorrect answers) and item measure (e.g. level of difficulty).
- Typically used in testing situation, e.g., scoring in public exams.
- Allows student ability and item difficulty to be
  - 1) shown on the same map and
  - 2) compared on the same measurement metric (e.g. same units of measurement for "level of understanding" and "item difficulty" – with item difficulty being constant, the probability of answering an item correctly increases when students' level of understanding increases)
- Also applicable in rating scale (e.g., strongly disagree=1, strongly agree=5) in student survey in this study.
- "Easy" items: easier to agree; "Hard" items: harder to agree.
- Provides an overall picture of students' feedback.

An Illustrative Example: Item-person Map

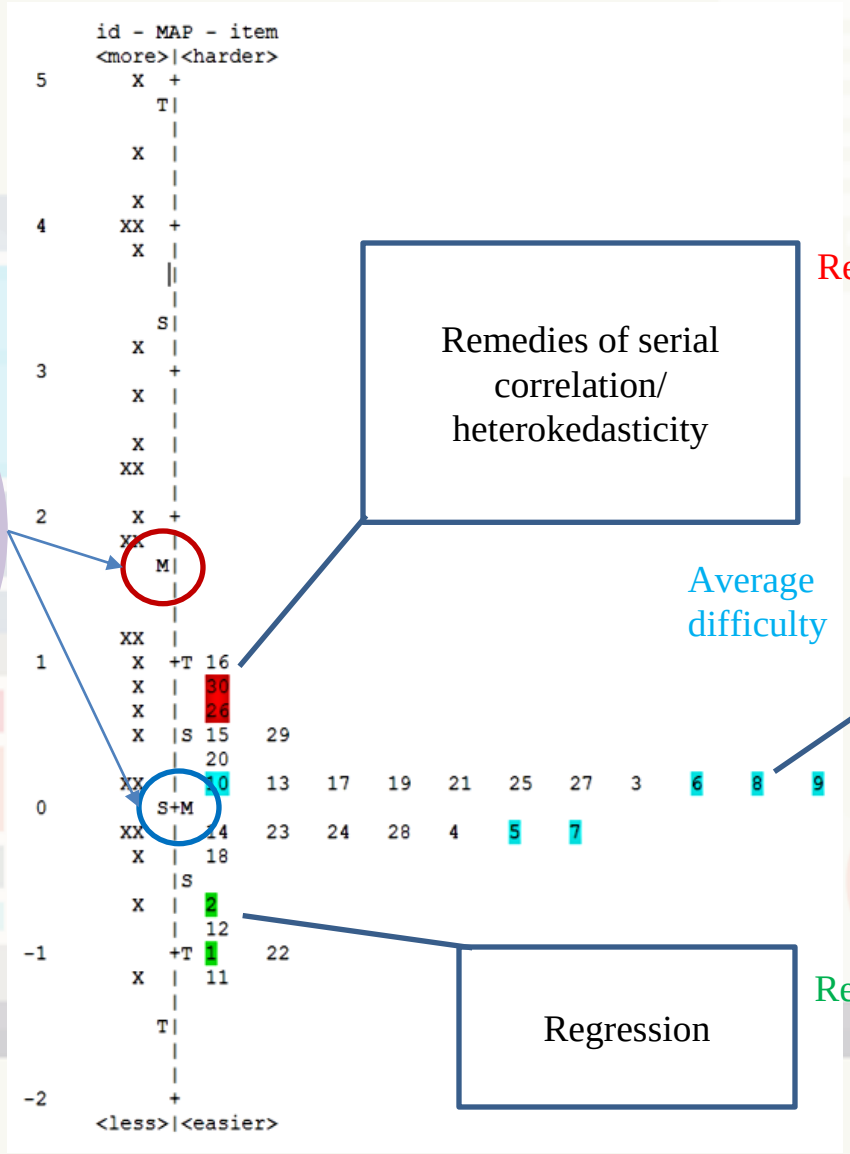


Item-person Map

Analysis done in Winsteps (Linacre, 2007)

Better understanding

The average level of understanding (1.86 logit) is **higher** than the average item difficulty (0.00 logit), showing on average, **the Powtoons are useful.**



Less understanding

Interpretation of the Item-person Map

- Each X represents a student and 1-30 indicate the 30 items on learning outcomes of 8 topics (Section III, Question 3 of the questionnaire).

- In general, results showed that students' ratings and expected level of difficulty of each topic have an inverse relationship, e.g.:
  - Heteroskedasticity and serial correlation, both harder topics, receive lower ratings.
  - Classical assumptions, a topic of average difficulty, receives average ratings.
  - Regression analysis, an easier topic, receives higher ratings.

Conclusions:

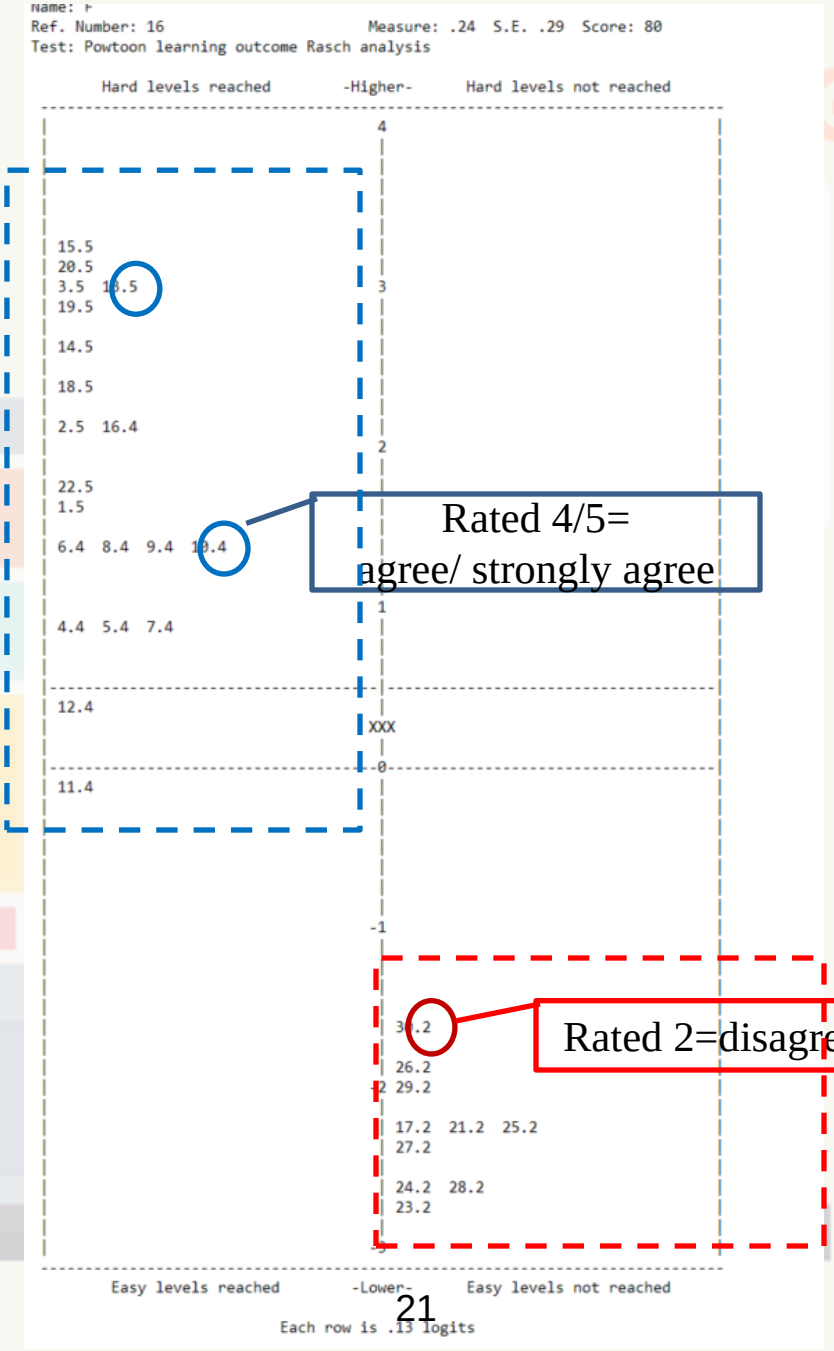
- Most of the Xs (students) locate at positions higher than 30 items under study → indicate that most students have good understanding of the 8 topics → Powtoons are useful for learning.

- Powtoons are more effective in promoting some student learning outcomes over others → suggests lengthening and enriching of content of those Powtoons with difficult topics to enhance students' understanding.

- The more difficult topics are identified → provides hints of time allocation to re-design the face-to-face lectures.

Selected KidMaps

- PKMap shows the response pattern of individual student .
  - May indicate some unexpected ratings/ areas worth attention.
- E.g., This student showed quite positive ratings (=4 or 5) in most of the items but only a few very low rating (=2) for some items (the two most difficult topics: serial correlation and heteroskedasticity) → indicating that Powtoons have done a good job in helping the student to understand most of the topics, but for the two most difficult topics, Powtoons may be less effective for her).



Preference of Usage of Powtoons

Section 3 – Open-ended questions

Open-ended Question 1: Which Powtoon do you think is the most useful in helping you to have a general idea about the topic's concepts?

Introduction to regression analysis	Introduction to ordinary least squares	Introduction to classical assumptions	Introduction to hypothesis testing (1) and (2)	Introduction to model specification and functional form	Introduction to multicollinearity	Introduction to serial correlation	Introduction to heteroskedasticity
7	1	1	9	0	2	1	4

Open-ended Question 4: Which is the best way to use Powtoons?

No. of students who prefer using Powtoons for…			
preparation before class	in-class discussion	assessment of learning in class	after class revision/no comment
14	5	5	3

Students' Written Suggestions

- The Powtoons should include voice explanations.
- The background music can be excluded.
- Should allow more time for one slide to appear.
- The duration of Powtoons can be lengthened to include more details of concepts.
- Words in Powtoons expressed in capital letters are difficult to read.
- Can lengthen and connect the story lines.
- Characters in Powtoon can be drawn better.
- Constant motion of Powtoon characters is distracting.
- Sentences in Powtoons can be shortened and details can be explained by voice.
- Include more details for difficult topics.

Improvement and Further Research

- Investigate possible changes, if necessary, to the Powtoons of which the topics were found to be “harder”.
- Align separate Powtoons to flow in a more coherent storyline.
- Produce Powtoons as a form of assessment.
- Allow students to develop animation on their own and use it among peers.
- Investigate how Powtoons may be tailor-made/ fine-tuned (e.g., in terms of length, content, format, or level of difficulty) to meet the different learning needs for viewing before class (for preparation) and during class (for discussion).

-Thank You-