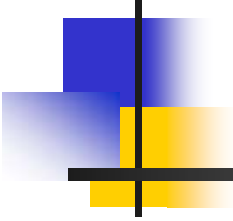


E-Learning Seminar  
Institute of Education Development  
University of Technology MARA

**Some e-Learning Approaches  
for Mathematics Courses  
– An NUS Experience**



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Department of Mathematics  
National University of Singapore



# Overview

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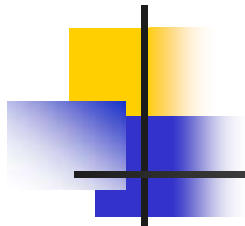
- Introduction
- IVLE system
- My e-Learning experience
  - Lectures
  - Tutorial classes
  - Lab sessions
  - Assessments



# National University of Singapore

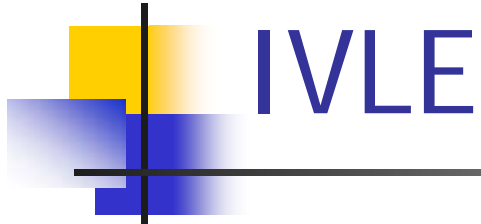
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- Facts and Figures
- Centre for Instructional Technology
- Centre for Development of Teaching and Learning

The logo for IVLE consists of a yellow square on the left, partially overlapping a blue square. A vertical black line passes through the center of the yellow square, and a horizontal black line passes through the center of the blue square. The text "IVLE" is written in a blue, sans-serif font to the right of the graphic.

# IVLE

- Integrated Virtual Learning Environment
- Online course management system
- Provides tools, resources, techniques
- Facilitate online learning
- Facilitate online interactions



## IVLE VS other CMS

- University based platform
- Linked with students' database
- Swift technical support
- Customized functionality



# IVLE: Course Outline

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- Basic module information
- Link to official module webpage
- Link to NUS libraries
- Class enrolment status
- Group emails to students



## IVLE: Workbin

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- Teachers upload course materials
- Students upload assignment
- Monitor upload/download statistics



# IVLE: Online Forum

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- Student to student interaction
- Student to teacher interaction
- Keep track of students' discussion
- Design various classroom activities



# IVLE: Assessment

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- Conduct online quizzes
- Self-practice exercises
- Analyze quiz results
- Monitor students' performance
- Incorporate with other e-learning activities
- Build question banks



# IVLE: Chat Room

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- Real time interaction
- “Meet-the-people” sessions
- Near tests and exams
- Clarify last minute doubts
- Getting feedback



# IVLE: Online Survey

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- Supplement the Teaching Evaluation
- Timely feedback
- Customized questionnaire
- Generic comments



# Courses I have taught

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- **MA1100**: Fundamental Concepts of Mathematics
- **MA1101R**: Linear Algebra
- **MA1506**: Engineering Mathematics
- **Teaching Mode**:  
Lecture + Tutorial + Lab
- **Assessment**:  
Exam + Test + Assignment



# Blended Learning

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- **Lecture**

- Webcast
- Breeze
- Courseware

- **Tutorial**

- Discussion Forum
- Virtual Class

- **Lab**

- Virtual Lab
- Hybrid Lab

- **Assessment**

- Online Quizzes
- Forum Participation



# Webcast Lectures

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- Real time recording
- **Software: Apreso**
- Screen capture feature
- For students who miss certain part or a whole lecture
- For students who want to review the lectures
- For slower learners



# Webcast Lectures

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Why many lecturers are not using webcast?

- Complicated
- Camera Shy
- Caught-on-tape
- Copyright issues
- Affect class attendance



# Breeze Presentation

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- DIY pre-recorded lectures
- **Software: Adobe Presenter (Breeze)**
- Preliminary lecture
- Revision lecture
- eLearning week
- Official leaves
- Software demonstration



# Breeze Presentation

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## Plus points

- Easy recording
- Easy editing
- Easy converting
- Easy publishing
- Easy viewing
- Demo



# Breeze Presentation

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## Minus points

- Not screen capture
- Need to use PowerPoint
- Time consuming
- Screen capture recording: Camtasia



# Courseware

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- Supplement the lectures
- Instructional websites introducing specific concepts
- Interactive multimedia simulations
- Demonstration during lectures
- Exploration by students after class



# Tutorial Class

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- Small class discussion
- Pre-assigned problem sets
- Tutors conduct the class
- Class participation



# Tutorial Class

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## Why Students Don't Discuss in Math Classes?

- Feel intimidated
- Lack confidence
- Do not want to “show off”
- “Math classes are for copying solutions”



# Discussion Forum

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## Advantage

- Less intimidating
- Encourage more students to discuss
- More time to digest
- Not restricted by time and space
- No limit to the number of participants
- Easily integrating internet resources



# Discussion Forum

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## Limitation

- No face-to-face interaction
- Not easy to type math symbols
- Small class limitation



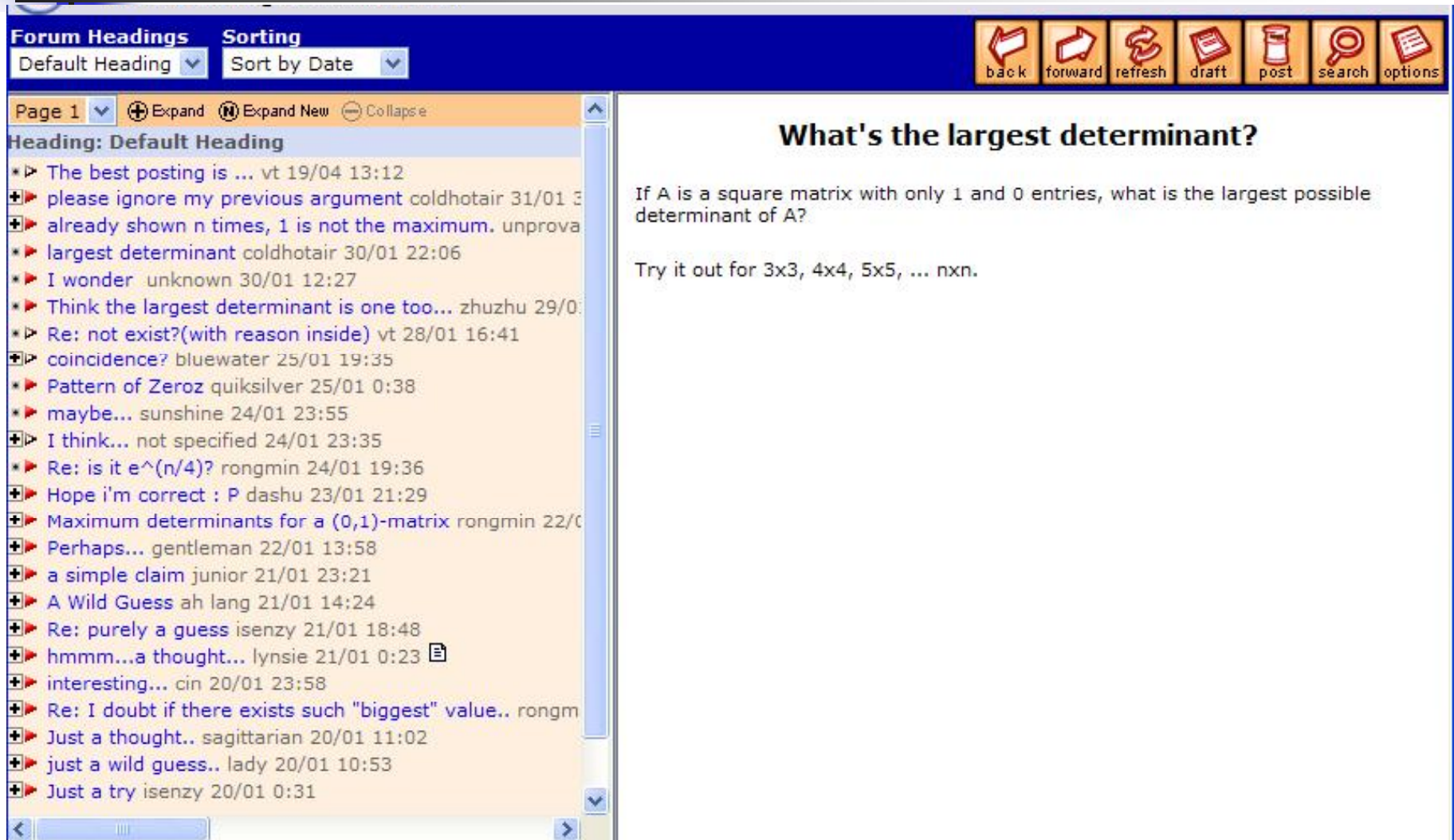
# Discussion Forum

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## Format

- Free discussion
- Structured discussion
- Small group discussion
- Teacher initiated discussion

# Teacher Initiated Discussion



The screenshot shows a forum interface with a blue header. On the left, there are navigation options: "Forum Headings" (Default Heading), "Sorting" (Sort by Date), and a toolbar with icons for back, forward, refresh, draft, post, search, and options. Below this is a list of forum posts under the heading "Default Heading". The right side of the interface shows a detailed view of a post titled "What's the largest determinant?".

**Forum Headings**    **Sorting**  
Default Heading    Sort by Date

Page 1    Expand    Expand New    Collapse

**Heading: Default Heading**

















- \*▶ The best posting is ... vt 19/04 13:12
- +▶ please ignore my previous argument coldhotair 31/01 3:12
- +▶ already shown n times, 1 is not the maximum. unprova
- \*▶ largest determinant coldhotair 30/01 22:06
- \*▶ I wonder unknown 30/01 12:27
- \*▶ Think the largest determinant is one too... zhuzhu 29/01 12:27
- \*▶ Re: not exist?(with reason inside) vt 28/01 16:41
- +▶ coincidence? bluewater 25/01 19:35
- \*▶ Pattern of Zeroz quiksilver 25/01 0:38
- \*▶ maybe... sunshine 24/01 23:55
- +▶ I think... not specified 24/01 23:35
- \*▶ Re: is it  $e^{(n/4)}$ ? rongmin 24/01 19:36
- +▶ Hope i'm correct : P dashu 23/01 21:29
- +▶ Maximum determinants for a (0,1)-matrix rongmin 22/01 22:06
- +▶ Perhaps... gentleman 22/01 13:58
- +▶ a simple claim junior 21/01 23:21
- +▶ A Wild Guess ah lang 21/01 14:24
- +▶ Re: purely a guess isenzy 21/01 18:48
- +▶ hmmm...a thought... lysesie 21/01 0:23
- +▶ interesting... cin 20/01 23:58
- +▶ Re: I doubt if there exists such "biggest" value.. rongmin 20/01 23:58
- +▶ Just a thought.. sagittarian 20/01 11:02
- +▶ just a wild guess.. lady 20/01 10:53
- +▶ Just a try isenzy 20/01 0:31

**What's the largest determinant?**

If  $A$  is a square matrix with only 1 and 0 entries, what is the largest possible determinant of  $A$ ?

Try it out for  $3 \times 3$ ,  $4 \times 4$ ,  $5 \times 5$ , ...  $n \times n$ .

# Demo

	Names	User ID	Topics	Replies
	HU YI	U0305931	3	7
	LEE JIA JIN GEORGETTE	U0203721	2	2
	LEE XIAOHUI	U0203796	1	2
	LIM MEI MEI	U0202207	1	1
	LIU LANG	U0200989	1	0
	MAIMUNAH BINTE ISKHANDER	SCI10342	1	3
	NG WEI YI	U0203046	0	1
	NGUYEN MINH THANG	ISC10442	1	0
	PHUA QIAN QI	U0203170	0	3
	SENG SHU FANG MICHELLE	U0202467	1	0
	SHEN REN	ISC10487	4	7
	WANG HAIBIN	U0301505	3	7
	WANG MURAN	U0305925	5	13
	WANG QUAN	ENG02256	1	0
	WEE KHENG LEONG	U0206473	2	2
	XU JIA	U0201028	3	7



# Discussion Forum

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## Involvement of Teachers

- Keep track of discussion
- Participate in the discussion
- Identify and summaries misconceptions
- Give encouragement



# Virtual Class

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- Real time online class
- **Software: Centra**
- Two-way Audio-Visual feature
- Virtual Whiteboard
- Text Chat
- Share Applications
- Can be recorded



# Virtual Class

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## Limitation

- Limited by license
- Writing in virtual class



# Lab Sessions

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- Visualization & exploration
- Lab sessions conducted in computer lab
- Licensed software are installed in lab pc
- Worksheets provided
- Students come at fixed schedule
- Lab assistants assigned at the lab
- Students expected to complete the tasks in the worksheets.



# Lab Sessions

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## Problems with physical lab sessions

- fixed timeslots
- logistic issues
- quality of lab assistants



# Virtual Lab

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- Web-based activities
- Anytime Anywhere
- Use Web tools instead of CAS



# Virtual Lab

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## Design

- Topic and Objective
- Web Tool
- Activities
- Quiz
- Discussion Forum
- Help



# Virtual Lab

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## Web Tools

- Relevant to the course
- Interactive
- Multiple features
- User friendly and self-explanatory
- Multiple access
- [Online demonstration](#)



# Virtual Lab

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## Activities

- Main component of the lab session
- Self-exploration
- Guided instructions and references
- Apply what they learn in class
- Not assessed



# Virtual Lab

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## Quiz

- The other main component
- Track students' progress
- Related to the activities
- Given deadline
- Using IVLE course management system



# Hybrid Lab

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- Students download freeware onto their pc
- Worksheets provided
- Students do the lab activities anywhere anytime on their own pc
- Lab Clinic set up at computer lab at fixed schedule
- Students required to complete an online assessment related to the lab activities.



# Assessment

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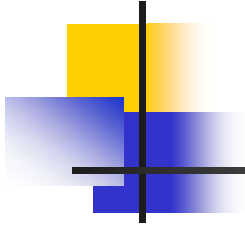
- Limitation
- Randomize the questions
- Varying the parameters
- Small weightage



# Concluding Remarks

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- You don't have to be IT savvy
- Use IT effectively
- Use IT creatively
- Understand how students learn



THANK YOU!

Questions and Suggestions