

Harnessing data analytics for monitoring and evaluating funded technology enhanced learning projects

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Centre for Teaching Excellence
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25 May 2022

Greetings from sunny Singapore!



Background

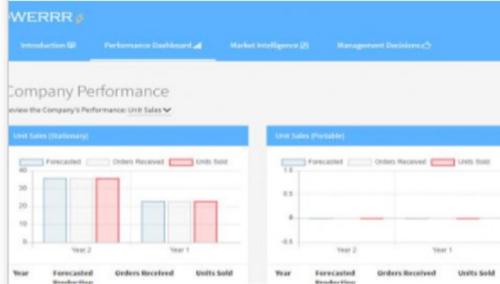
- TEL is about using technology to help students achieve the learning outcomes in a course by positively influencing their learning behaviour, as well as enhancing their knowledge construction and social interaction.
- The Singapore Management University Technology Enhanced Learning (SMU TEL) Grant is an annual competitive fund for (on average 5 per year) TEL projects.
- SMU TEL Grant supports projects that enhance student experiences in personalised learning, collaborative learning, etc.

Single-player Games/Simulations



Stranded - A Spark of Hope

Single-player Games/Simulations



Powerrr- Battery Pack

Single-player Games/Simulations



Inn or Out - Yield Management Simulation

Single-player Games/Simulations



STARS Cafe

Single-player Games/Simulations

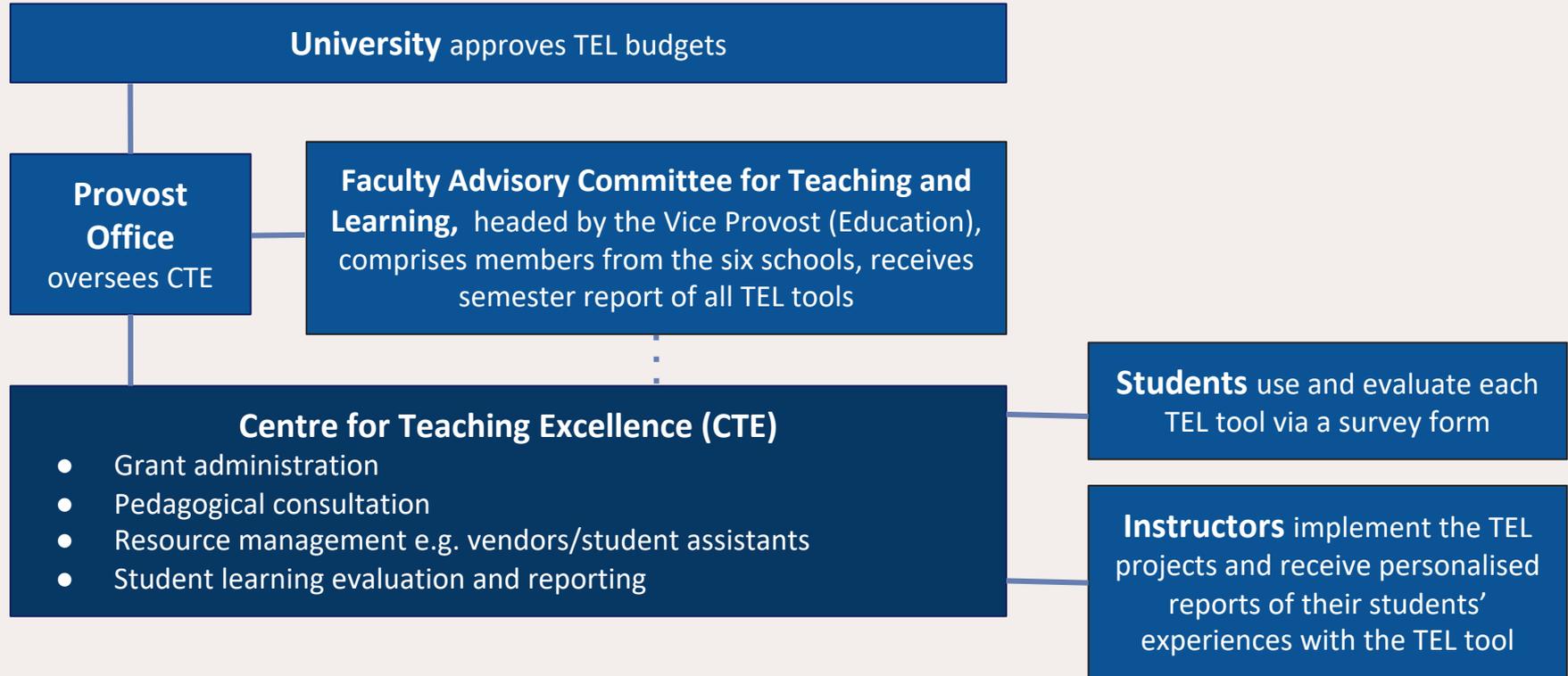


SMU Challenge

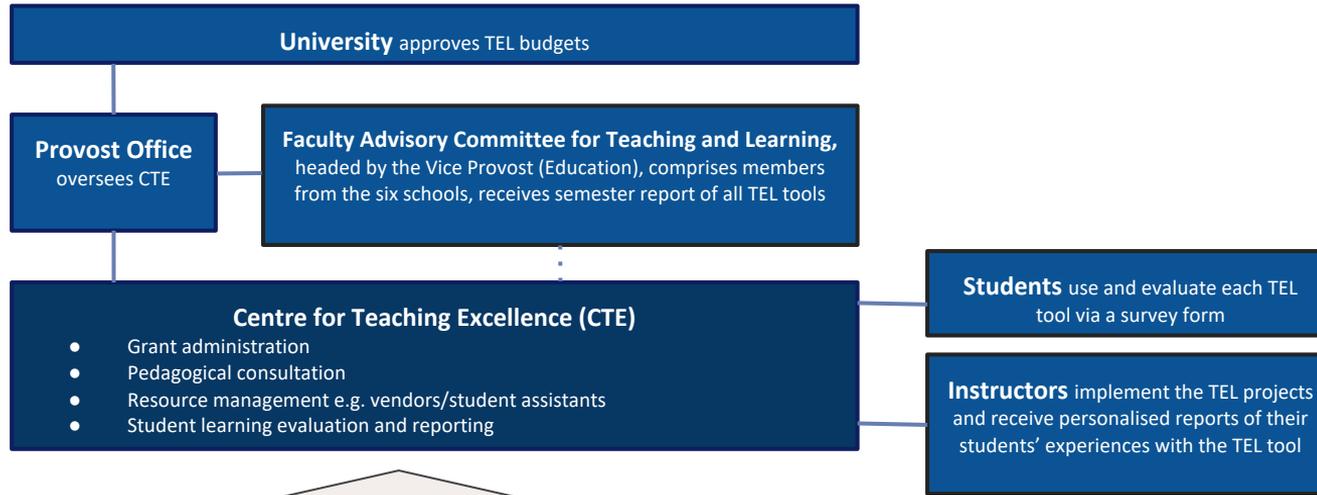
Single-player Games/Simulations



Accounting Assessment Generator



Organisation chart for Technology Enhanced Learning (TEL) Projects



- The Centre for Teaching Excellence (CTE) acts as the reviewer for the TEL project proposals to ensure sound alignment to learning objectives and to steer projects with the potential for wider application across SMU.
- In the context of SMU's blended learning initiative where instructors can substitute 1/3 of contact hours with online learning, CTE expects the SMU TEL Grant and TEL projects to grow.

Phases of TEL project management & associated data

	(1) Proposal	(2) Approval	(3) Analysis & Design	(4) Development	(5) Implementation & Improvement
Subscription Fund (available tools, e.g. Wooclap, Padlet)	<ul style="list-style-type: none"> Tool information (Intended usage in class, anticipated benefits, etc.) 	<ul style="list-style-type: none"> Costs Projected Net Benefit 			<ul style="list-style-type: none"> Usage data (number of users, courses, schools) Student survey data
Exploration Fund (Internally or vendor-developed)	<ul style="list-style-type: none"> Project information (Description, learning content, anticipated benefits, etc.) 		<ul style="list-style-type: none"> Development timeline and milestones 	<ul style="list-style-type: none"> Updated development timeline and milestones 	

TEL Reporting System and Administration, TERESA

- Envisioned as a data analytics-oriented system that comprises both processes and software solutions, that monitors the following with respect to TEL projects:
 - Development milestones
 - Usage
 - Student learning outcomes

“Data analytics is a discipline focused on extracting insights from data. It comprises the processes, tools and techniques of data analysis and management, including the collection, organization, and storage of data.”¹

¹<https://www.cio.com/article/191313/what-is-data-analytics-analyzing-and-managing-data-for-decisions.html>

TEL Reporting System and Administration, TERESA

- **Features:**

- Repository of relevant documentation and authoritative source of data
- Shows progress and results from TEL projects at a glance
- Facilitates access to data by project, term, etc.
- Consolidates and visualises data used in reporting to management and instructors

- **Benefits:**

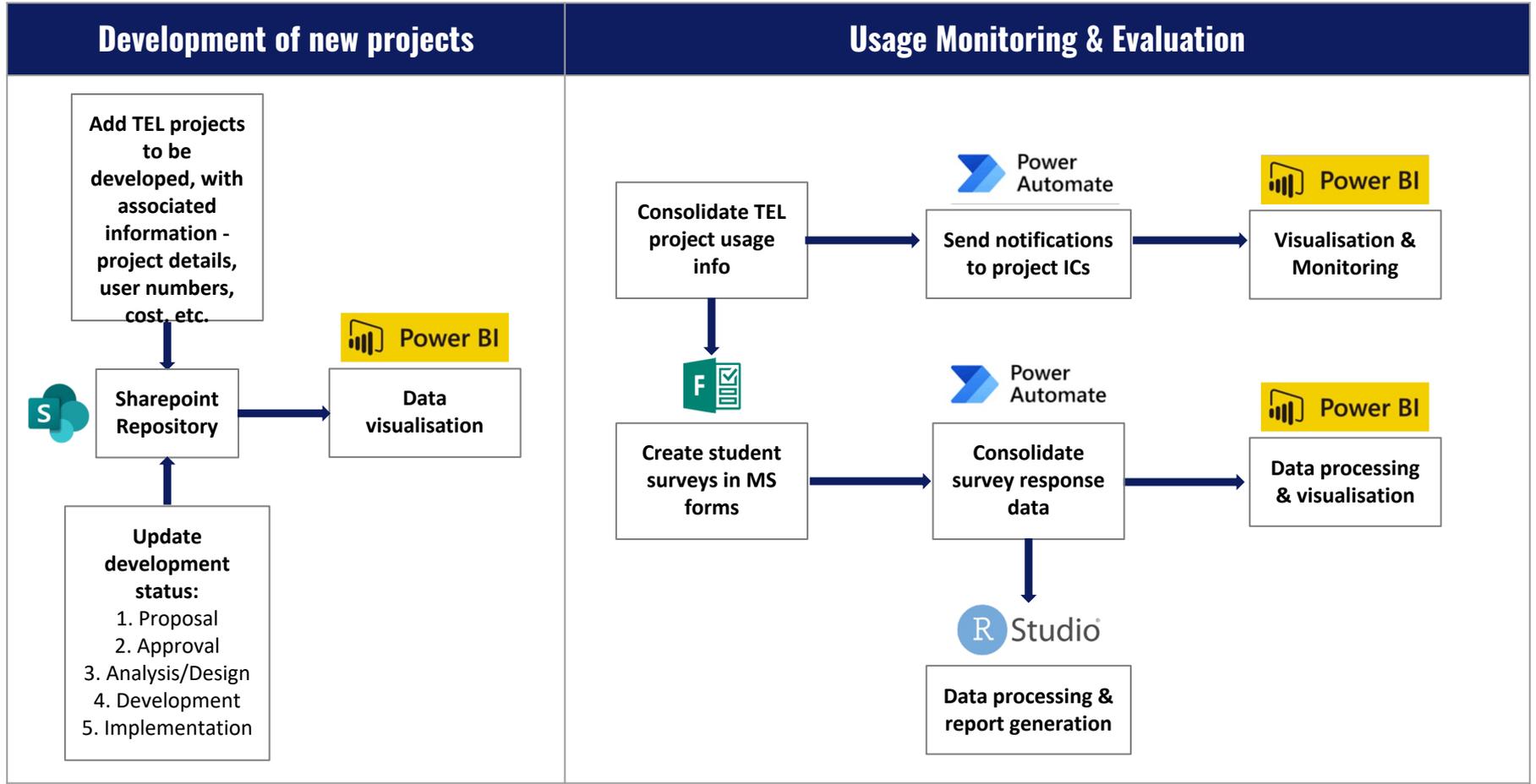
- Better-informed decision making (starting, maintaining, upgrading, stopping projects)
- Personalised feedback to the instructors (Improving the tool and/or its usage)
- Increase in efficiency of operations (e.g., ease of monitoring and reporting)

TEL Reporting System and Administration, TERESA

- Utilises a variety of solutions, from the Office 365 ecosystem, and Rstudio

Solution	Usage
 Teams	Consolidated interface, storage, access rights management
 Sharepoint	Database, storage
 Forms	Survey creation and distribution
 Power Automate	Move survey data, send email notifications
 Power BI	Data processing and visualisation
 Rstudio	Report generation (with R markdown to Word document)

TERESA: Snapshot of Components in Use



SMU INSTITUTE FOR MANAGEMENT INNOVATION A TEL project example - Co-Founders of the North



- Developed in 2017 for the Lee Kong Chian School of Business
- A multiplayer strategy game that is played in class to teach the concepts of factors involved in making strategic decisions.
- Popularity of the game among students led to use among other courses

- Initial Run (50+ students per term)

Managing Strategic Change

- Current use (400+ students per term)

Managing Strategic Change, Strategy, Managing in a VUCA Context, various external institutions (through case and teaching notes)



Navigation



Project Title

Co-Founders of the N... ▾

Project Information:

- Faculty Lead -

Assoc Prof Geng Xuesong

- School -

LKCSB

- DLR Type -

Collaborative team-based
game/simulation

- TEL Framework Alignment -

Personalised Learning
Collaborative and Interactive
Learning

Projected Net Benefit	Annual server cost	Annual support cost
(Blank)	(Blank)	(Blank)

View Form

Project Usage

Survey Respondents

1329

Courses used in

10

Semesters Used

6

Respondent Distribution



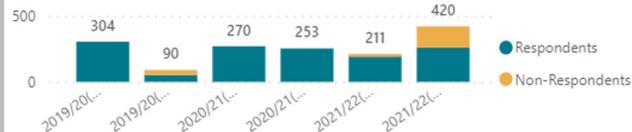
Course

COR1703 Managing in a VUCA Context
MGMT005/COR1703 Managing in a Volatile, Uncertain, Complex and Ambiguous Context

Semester Course

2021/22(2)	COR1703 Managing in a VUCA Context
2021/22(2)	MGMT102 Strategy
2021/22(2)	MGMT236 Managing Strategic Change
2021/22(2)	MGMT698 Strategic Management

Usage and Survey Responses



How has the DLR helped you to learn the topic?

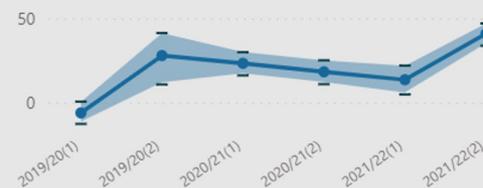
Selected Comments

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- intuitive
- resembles reality
- I felt that playing the game really help me appreciate what could happen in the real environment.
- It was fun and easy to absorb

Evaluation

Overall NPS

18



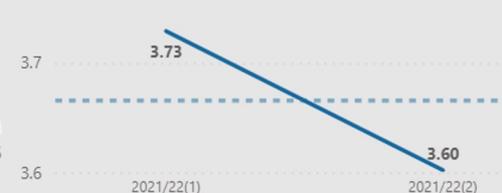
Avg Knowledge Gain



Mean Learning Effectiveness



Average Satisfaction



Navigation



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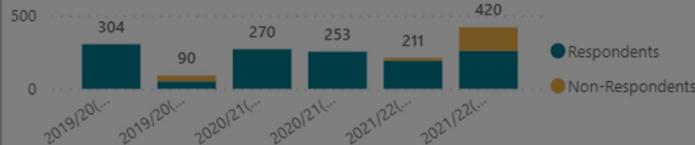
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Usage and Survey Responses



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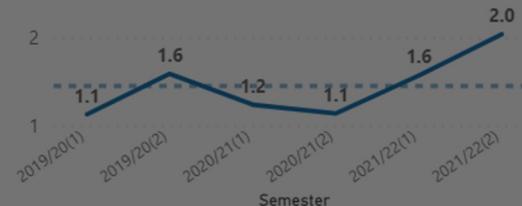
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Evaluation

Project usage data includes:

- Distribution of respondents across schools
- Usage across courses and semesters

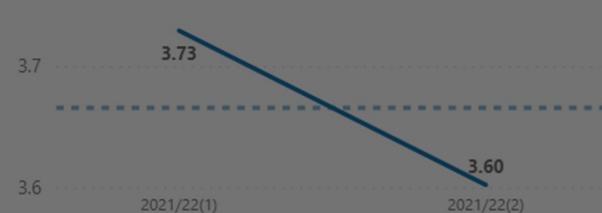
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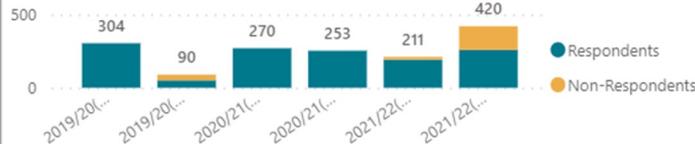
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Usage and Survey Responses



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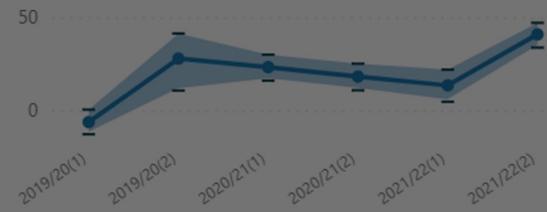
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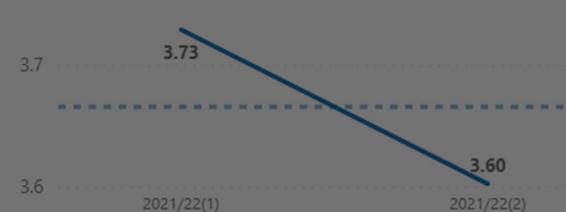
Avg Knowledge Gain



Mean Learning Effectiveness



Average Satisfaction



Courses used in

10

Course

COR1703 Managing in a VUCA Context
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Semesters Used

6

Semester Course

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Usage and Survey Responses



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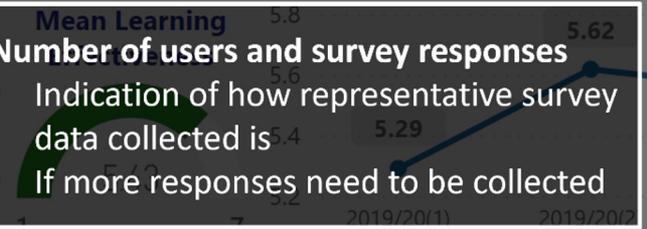
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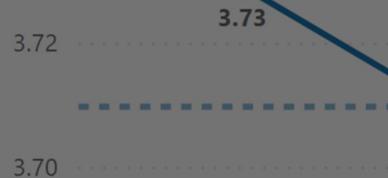


Mean Learning

- Indication of how representative survey data collected is
- If more responses need to be collected



Average Satisfaction



Courses used in

10

Course

COR1703 Managing in a VUCA Context
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Complex and Ambiguous Context

Semesters Used

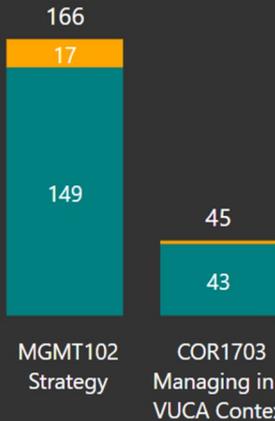
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Semester Course

2021/22(2) MGMT102 Strategy
2021/22(2) MGMT236 Managing in a
2021/22(2) MGMT698 Strategic
2021/22(1) COR1703 Managing in a

Usage and Responses by Course

Respondents Non-Respondents



Course

Response Rate (%)

MGMT102 Strategy	90
COR1703 Managing in a VUCA Context	96
Average Response Rate	91

Usage and Survey Response



How has the DLR helped you to learn the topic?

Selected Comments

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5.43

5.2

2019/20(1)

2019/20(2)

MLE

Quality of Content Motivation

Average Satisfaction

3.71

3.72

3.70

3.73

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support
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Respondent Distribution

Learning metrics consisting of:

- Net Promoter Score (NPS)

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Usage and Survey Responses



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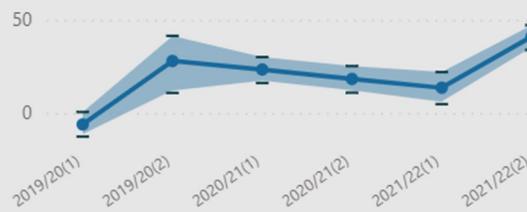
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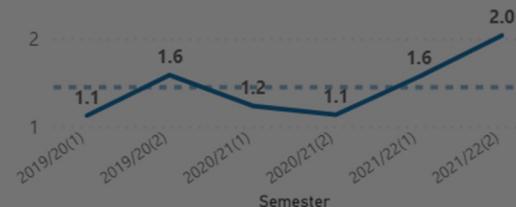
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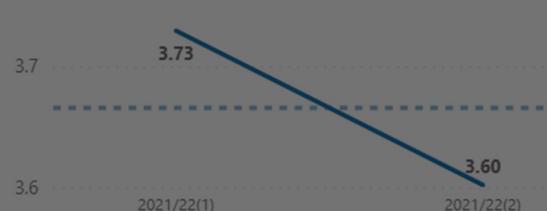
Avg Knowledge Gain



Mean Learning Effectiveness



Average Satisfaction



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Projected Net Benefit	Annual server cost	Annual support cost
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Project Usage

Survey Respondents

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Courses used in

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Semesters used

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Respondent Distribution

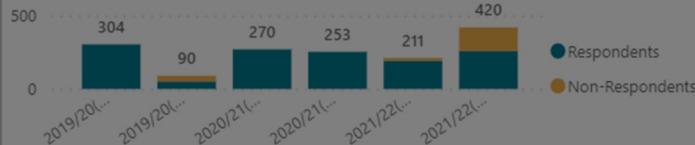


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2021/22(2) MGMT102 Strategy	
2021/22(2) MGMT236 Managing Strategic Change	
2021/22(2) MGMT102 Strategic Management	

Learning metrics consisting of:

- Net Promoter Score (NPS)
- Perceived knowledge gain

Usage and Survey Responses



How has the DLR helped you to learn the topic?

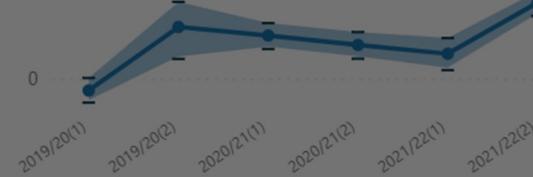
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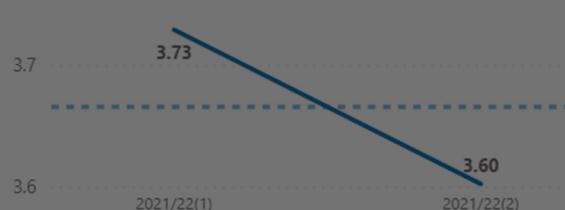
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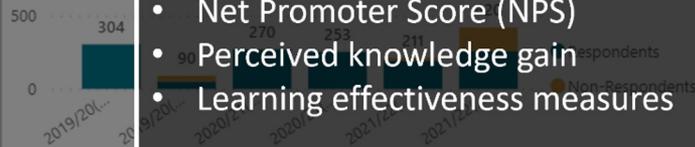
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Learning metrics consisting of:

- Net Promoter Score (NPS)
- Perceived knowledge gain
- Learning effectiveness measures



How has the DLR helped you to learn the topic?

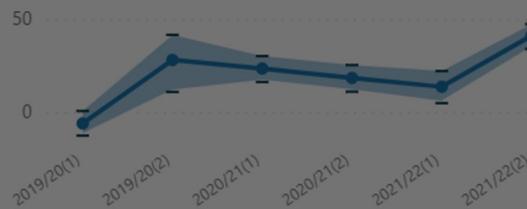
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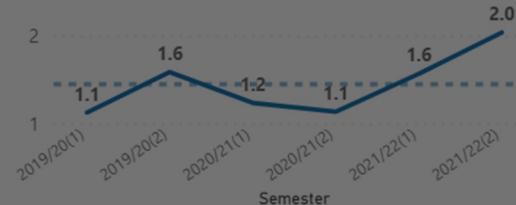
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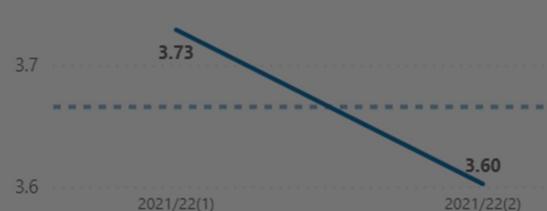
Avg Knowledge Gain



Mean Learning Effectiveness



Average Satisfaction



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Annual support cost (Blank)

View Form

Project Usage

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1329

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Semesters Used

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Respondent Distribution

LKCSB

SOA

SOE

208

94

877

Course

COR1703 Managing in a VUCA Context
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Semester Course

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Usage and Survey Responses



How has the DLK helped you to learn the topic:

Selected Comments

- Don't quite see the link between the DLK and engaging tool.
- intuitive
- resembles real life
- I felt that playing the game really helped me appreciate what could happen in the real environment.
- It was fun and easy to absorb.

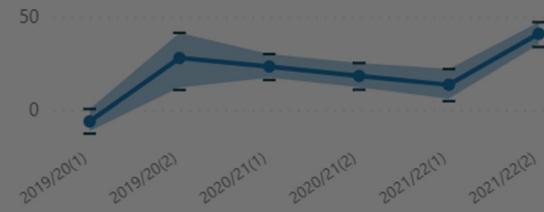
Learning metrics consisting of:

- Net Promoter Score (NPS)
- Perceived knowledge gain
- Learning effectiveness measures
- Satisfaction

Evaluation

Overall NPS

18



Avg Knowledge Gain

1.41



Mean Learning Effectiveness

5.43



Average Satisfaction

3.66





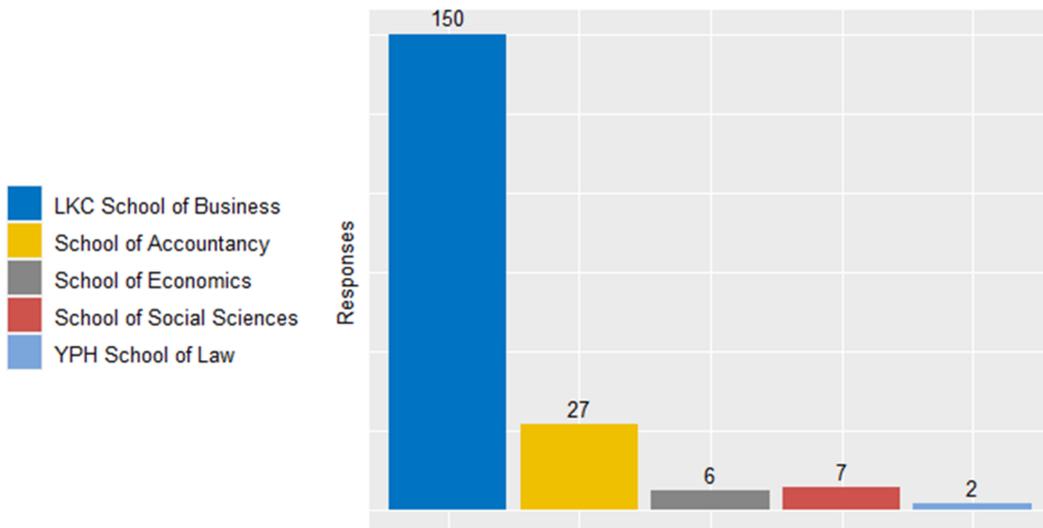
Analysis of student feedback on Co-Founders of the North Term 1 AY2021/22

Evaluation report prepared for Instructor 1
5 January 2022

Co-Founders of the North Questionnaire

1. A total of 192 (Male: 66, Female: 126) students participated in the Co-Founders of the North Questionnaire that contains 11 questions: 4 background information, 4 Likert items and 3 open-ended.
2. The charts below show the distribution of participants by school and by course.

School:



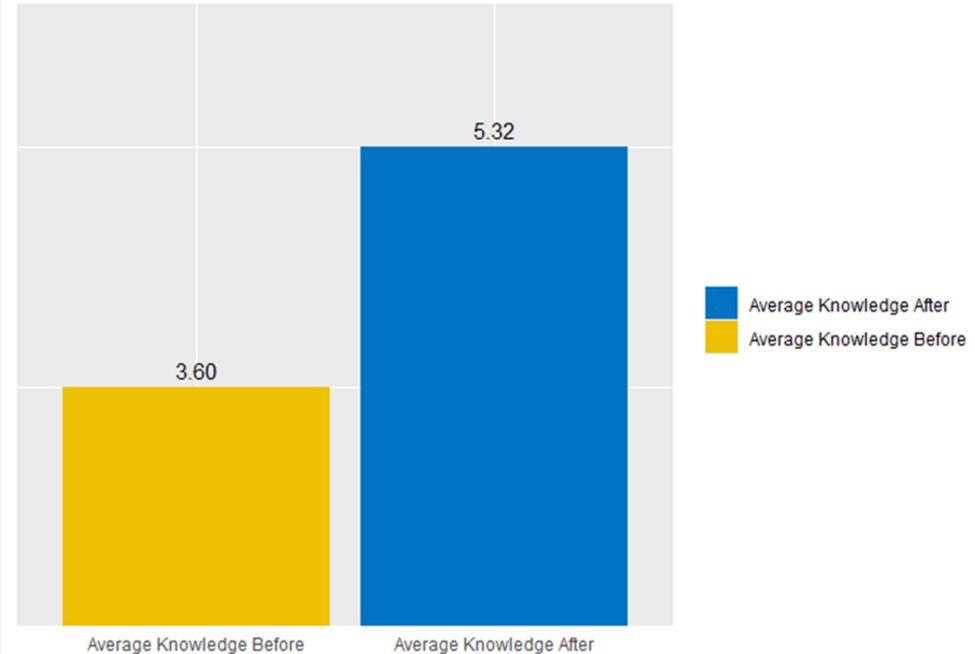
Course:



Knowledge before and after using Co-Founders of the North

- 149 students from the Strategy course rated their perceived knowledge about the course content using a 7-point Likert scale (1 = Very Low to 7 = Very High). They reported an increase in perceived knowledge after using the DLR (M= 5.32, SD= 1.07) versus before using it (M= 3.60, SD= 1.55).
- A paired samples t-test was conducted to compare both sets of ratings and the results show a statistically significant difference, $t(148) = 1.72$, $p < 0.000$ (one-tailed). This suggests that Co-Founders of the North was effective in improving students' knowledge about the content.

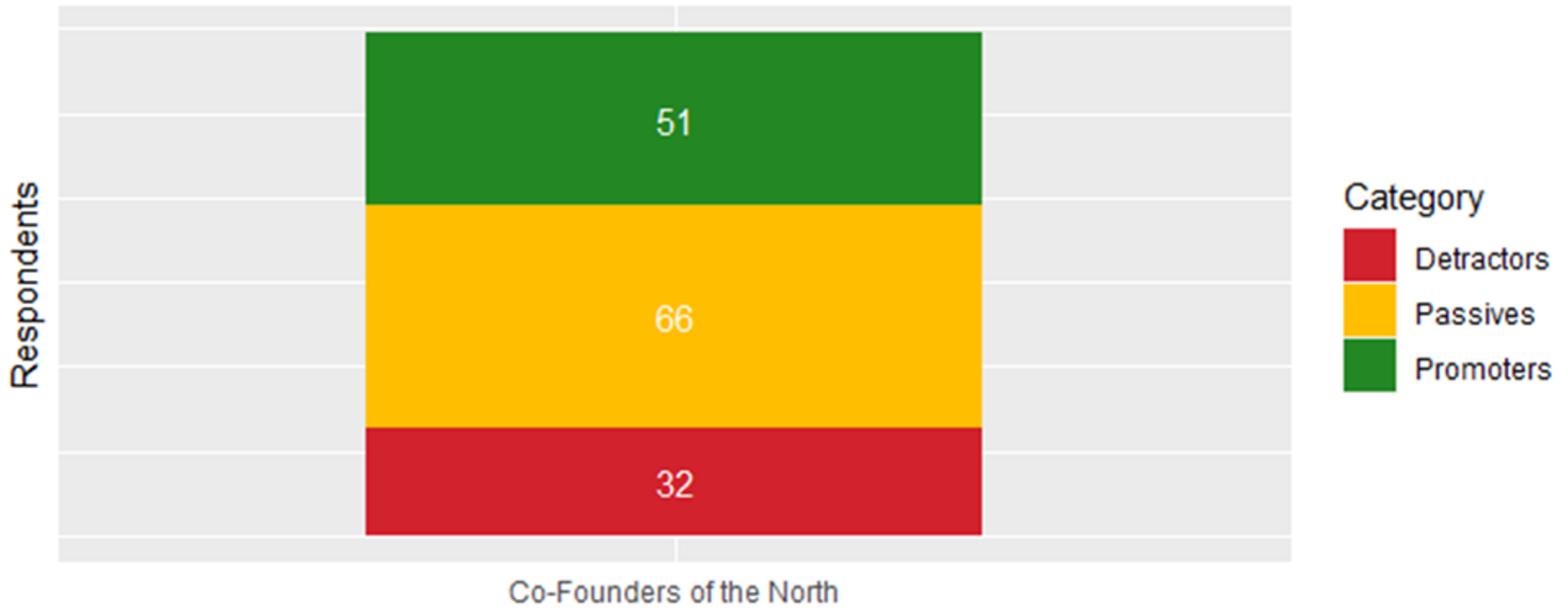
Average Knowledge Before & After DLR Use



Net Promoter Score

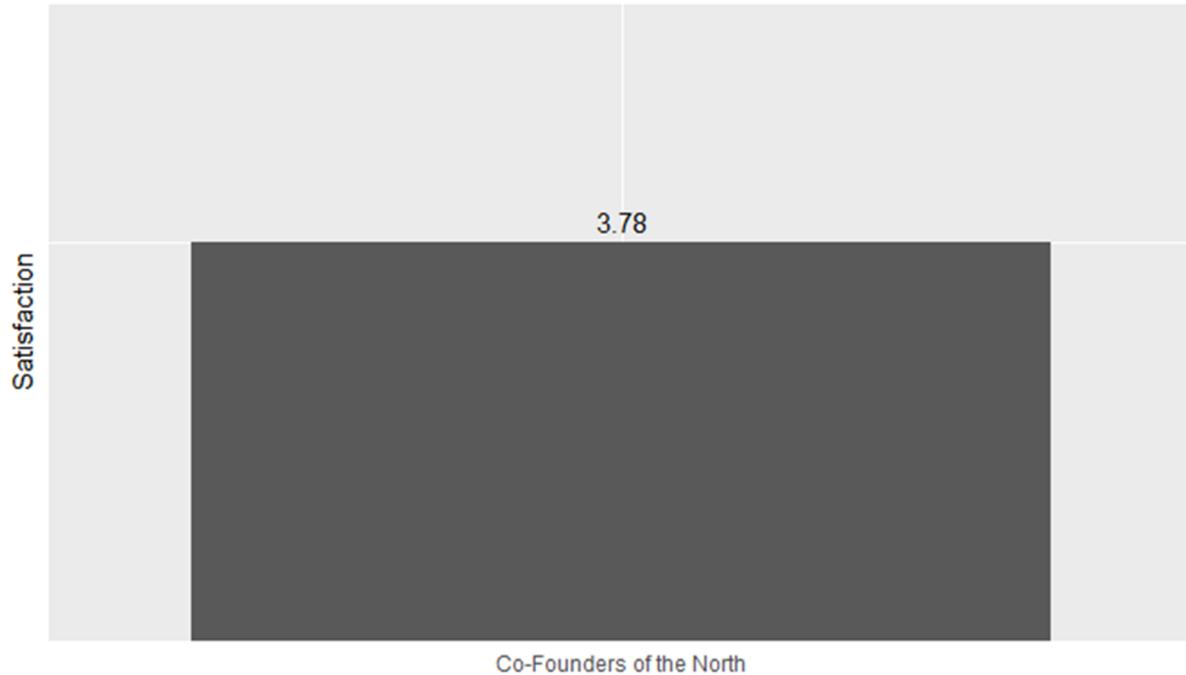
- A positive NPS (>0) is generally considered as good. Co-Founders of the North's net promoter score is 13 suggesting that students from the Strategy course were likely to recommend it to their peers

NPS Response Breakdown



Satisfaction

6. Using a 5-point Likert scale, the mean value for satisfaction was 3.78, suggesting that the students from the Strategy course were satisfied with their learning experiences with Co-Founders of the North.



Open-ended responses

7. The students found the real-life context and realistic learning experience helpful for understanding the lesson topic, illustrated by the quotes below:
 - real life visualizations and made me walk through the thought process
 - experiencing it for myself
 - It gives us a clear example of what we are learning can be applicable to real life
 - Games are always a great way to get someone to learn about something bc it becomes more immersive! you have to put yourself in the the shoes of someone who has to apply the lessons taught in class in real life. you have to think like that. so it really helps put things into perspective and adds a fun element to it to.
 - It helped me map the components in the game to real life.
 - It is quite similar to real life situations
 - It showed me the importance of not putting all eggs in one basket (with the earthquake element)

Who benefits from TERESA?

Students

- Reap the benefits of improved teaching practices with TEL tools

Instructors

- Learn from students' feedback through personalised reports and improve teaching for future cohorts

Faculty developers

- Identify instructors who excel in the usage of a particular tool and invite them to share at CTE workshops
E.g. use of Padlet to conduct group consultations and brainstorming

Grant administrators

- Monitor response rate and seek assistance from instructors/teaching assistants
- Identify trends by semester, instructor, tool, usage, etc.

Improved student satisfaction and better learning outcomes through iterative rounds of feedback and improvement

Thank You!



For Enquiries:



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Neo Wei Leng

✉ wlneo@smu.edu.sg