

Design Choices in a University-wide Learning Outcome Feedback System for 21st Century Skills

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19 June 2020
3.30-4.30 (SGT)

Outline

1. ***Background***: Improving Graduate Learning Outcomes through curriculum design and feedback to students
2. Design choices for a learning outcome feedback system
 - a. Feedback to *students* via dashboard developed at SMU
 - b. Standard, development-focused scale
 - c. *Grade-linked* assessment-based feedback from instructors and peers in a wide set of courses
 - d. Linked to course learning outcomes
 - e. Integrated with learning management system
 - f. Gradual, managed rollout
3. Initial feedback from instructors and students

About Singapore Management University (SMU)

- SMU offers a wide range of bachelors', masters' and PhD degree programmes in the disciplinary areas associated with the six schools, and a growing number of executive development and professional programmes.



Our Students

8,656

full-time undergraduates*

2,184

full-time & part-time
postgraduates*

* As of 16 September 2019

Our Graduates

22,800

undergraduate and
postgraduate alumni

DISCIPLINARY AND MULTIDISCIPLINARY KNOWLEDGE**INTELLECTUAL AND
CREATIVE SKILLS**

- a. Critical thinking and problem solving
- b. Innovative and entrepreneurial skills

INTERPERSONAL SKILLS

- a. Collaboration and leadership
- b. Communication

GLOBAL CITIZENSHIP

- a. Intercultural understanding and sensitivity
- b. Sensitivity towards developments in Asia
- c. Ethics and social responsibility

PERSONAL MASTERY

- a. Self-directedness and meta-learning
- b. Resilience and positivity

Improving Graduate Learning Outcomes (GLOs) through curriculum design (✓) and feedback to students

- Curriculum design (✓):
 - Courses in core curriculum specifically targeted at GLOs
 - More structure for internship and community service requirements
- But
 - Many GLOs need to be combined with a disciplinary context in order to create varied opportunities for practice and demonstration - one dedicated course is not enough
- So
 - Can we give students additional opportunities to work towards, and get feedback on, GLOs in a wide set of courses?

Feedback to Students Via A Dashboard (Developed at SMU)



Graduate Learning Outcome Report

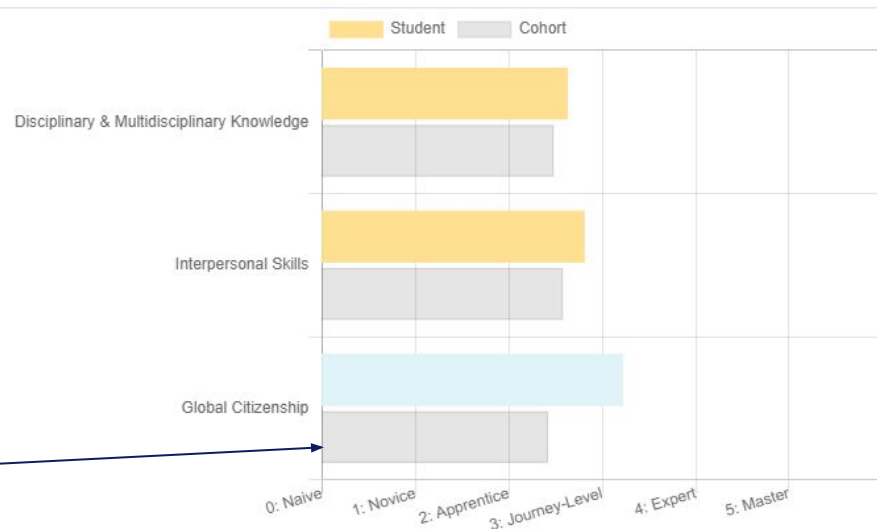


[View Learning Outcomes Mapping](#)



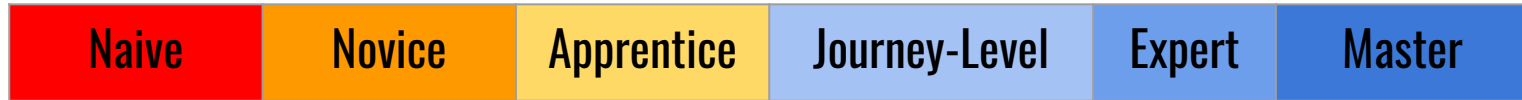
Overall	Learning Plan	Learning Reflection
	Disciplinary	Interpersonal
AizaDoss.2005	2.63 / 6 Apprentice	2.81 / 6 Apprentice
Cohort	2.48 / 6 Apprentice	2.58 / 6 Apprentice

Comparison with cohort



A standard scale that suggest further development, emphasizing the formative aspect

- Six levels:



- The scale applies to all assessment parts and can then be **aggregated** by course learning outcomes and graduate learning outcomes, within a course, and across courses for the graduate learning outcomes

TABLE 1 BASIC PROFICIENCY CATEGORIES (ADAPTED FROM HOFFMAN, 1998)

Naïve	One who is ignorant of a domain.
Novice	Someone who is new—a probationary member who has had some (“minimal”) exposure to the domain.
Initiate	Someone who has been through an initiation ceremony—a novice who has begun introductory instruction.
Apprentice	One who is learning—a student undergoing a program of instruction beyond the introductory level. Traditionally, the apprentice is immersed in the domain by living with and assisting someone at a higher level. The length of an apprenticeship depends on the domain, ranging from about one to 12 years in the craft guilds.
Journeyman	A person who can perform a day’s labor unsupervised, although working under orders. An experienced and reliable worker, or one who has achieved a level of competence. It is possible to remain at this level for life.
Expert	The distinguished or brilliant journeyman, highly regarded by peers, whose judgments are uncommonly accurate and reliable, whose performance shows consummate skill and economy of effort, and who can deal effectively with certain types of rare or “tough” cases. Also, an expert is one who has special skills or knowledge derived from extensive experience with subdomains.
Master	Traditionally, a master is any journeyman or expert who is also qualified to teach those at a lower level. A master is a member of an elite group of experts whose judgments establish regulations, standards, or ideals. Also, a master can be that expert who is regarded by other experts as being “the” expert, or the “real” expert, especially with regard to subdomain knowledge.

^Jung, E., Kim, M., & Reigeluth, C. (2016). Learning in Action: How Competent Professionals Learn. *Performance Improvement Quarterly*, 28(4), 55-69. ([link](#))

Not a replacement for free-form feedback

Free-form Feedback

Specific, timely, action-oriented feedback (e.g. written or verbal comments on deliverables)



Specific, immediate, general, how-to type corrections

Structured Feedback

Aggregated performance feedback on a set of fundamental capabilities (e.g. GLOs)



Longer term, larger, fundamental interventions: courses to take or improvement programmes to follow. (Self-directed, life-long learning)

Grade-linked Assessment-Based Feedback From Instructors and Peers In a Wide Set of Courses

- By using **grade-linked** assessments we reduce the risk of students dismissing the feedback
- We also use **peer assessments** to generate individual assessments within group work , to take advantage of close observations by peers, and to give students practice in assessing and giving feedback
 - Peer assessments have been shown to positively improve the development and transfer of student teamwork skills to the workplace (Donia, O'Neill, & Brutus, 2018)
- By assessing graduate learning outcomes in a **wide set of courses** we benefit from context-specific application of skills, multiple data points for students, and collaboration between instructors

Assessments mapped to Course Learning Outcomes, mapped to GLO

SMU Graduate Learning Outcomes Level 1

Interpersonal Skills

Intellectual & Creative Skills

SMU Graduate Learning Outcomes Level 2

Communication

Critical Thinking & Problem Solving

Course Learning Outcomes (CLO)

Communicate effectively in different genres and using appropriate modalities

Versatile and holistic use of reasoning, logic and evidence to evaluate information and make judgments

Solve problems with high levels of complexity and uncertainty

Assessment parts

Assignment 1
Rubric Item 1

Assignment 1
Rubric Item 2

Quiz 1
Section 1

An example of the mapping of **Course Learning Outcomes** & **Assessments** to the **Graduate Learning Outcomes**

MGMT317-Managing Process Improvement-G1

Course Learning Outcome	GLO Level 2	GLO Level 1	Learning Plan	Learning Reflection	Peer Evaluation	Week 16 Peer Evaluation
Versatile and holistic use of reasoning, logic and evidence to evaluate information and make judgments	Critical Thinking & Problem Solving	Intellectual & Creative Skills	✓	✓	✓	✓
Solve problems with high levels of complexity and uncertainty	Critical Thinking & Problem Solving	Intellectual & Creative Skills	✓	✓	✓	✓
Demonstrate empathy, emotional and situational intelligence in persuasion, negotiation and conflict resolution	Collaboration & Leadership	Interpersonal Skills	✓		✓	✓
Collaborate effectively in different settings in the pursuit of shared goals	Collaboration & Leadership	Interpersonal Skills	✓		✓	✓
Communicate effectively in different genres and using appropriate modalities	Communication	Interpersonal Skills			✓	✓
Plan and take action for personal growth and development	Self-Directedness & Meta-Learning	Personal Mastery	✓	✓		
Persevere and recover quickly in the face of disruptions and challenges	Resilience & Positivity	Personal Mastery		✓	✓	✓

Integration with Learning Management System and Relevant Tools

Assessments

Learning Management System

- Quizzes
- Assignments with rubrics

Peer Evaluation and Feedback Tool

- Likert scales
- Text feedback

Manual for now

Aggregate GLO Feedback to Students

Student-facing Dashboard for Learning Outcomes

- Personalised feedback features
- System integration / ease-of-use


Setting up Assignment (with Rubrics) In SMU LMS





Assignments

New Assignment

Edit Categories

More

 Bulk Edit

	Assignment	Learning from Experience - Plan						
	No Category	Criteria	Naive 1 point	Novice 2 points	Apprentice 3 points	Journey-level 4 points	Expert 5 points	Master 6 points
<input type="checkbox"/>	Workbook - Week 2 and NDA  	Learning Goal based on gap assessment and interests	No learning goal is identified	A learning goal is identified but there is no evidence that the learner has tied this goal his or her interests or his or her competency gaps	The learning goal is based on an identified competency gap and learning interests.	The learning goal is based on a rich, mature and well-thought out competency assessment and development plan	(generic description) Highly regarded by peers; uncommonly reliable and accurate judgments; display of consummate skill, economy of effort, and ability to deal with rare and tough cases	(generic description) Qualified expert and experts; a set regular standards
<input type="checkbox"/>	Workbook - Week 3 plus Catapult Gage R&R Report	Construction check	Plan for what learning activity will be performed is not clear	A challenging activity has been identified and some predictions are made. Major issues with respect to relevance (for the learning goal) specificity and feasibility of the plan and the predictions.	A relevant, specific and feasible plan for a challenging activity has been described and predictions have been made with some minor issues.	Excellent plan and predictions for a challenging activity for learning that is relevant, specific and feasible.	(generic description) Highly regarded by peers; uncommonly reliable and accurate judgments; display of consummate skill, economy of effort, and ability to deal with rare and tough cases	(generic description) Qualified expert and experts; a set regular standards
<input type="checkbox"/>	Learning Plan  	Community check	There is no sign that the learner has identified role models/coaches or communicated with them	A role model/coach has been identified	A role model/coach has been identified and has been engaged. There is some uncertainty about suitability/engagement	One or more clearly suitable role models/coaches have been identified and engaged. Role models/coaches are	(generic description) Highly regarded by peers; uncommonly reliable and accurate judgments; display of	(generic description) Qualified expert and experts; a set regular standards

More detailed mapping of one assessment and its parts to the course learning outcomes

MGMT317-Managing Process Improvement-G1

Learning Plan

Course Learning Outcomes	Construction check	Community check	Emotion check	Learning Goal based on gap assessment and interests
Plan and take action for personal growth and development	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Persevere and recover quickly in the face of disruptions and challenges	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Versatile and holistic use of reasoning, logic and evidence to evaluate information and make judgments	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Solve problems with high levels of complexity and uncertainty	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Demonstrate empathy, emotional and situational intelligence in persuasion, negotiation and conflict resolution	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Collaborate effectively in different settings in the pursuit of shared goals	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Communicate effectively in different genres and using appropriate modalities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Mapping Assessment Part Scores onto the Standard Scale

- Using the maximum scores for the linked assessment parts (rubric items/quiz sections) in SMU LMS a default mapping on the standard scale is used. This can be adjusted based on how the nature of the assessment part and how it is graded. The maximum score also determines the weight of the part in aggregation.
- Implied requirement: Each assignment item/ quiz section linked to course learning outcomes needs to provide an opportunity to show expertise and mastery: e.g. quiz sections need to contain some difficult questions or questions need to be graded such that only experts and masters get the highest scores.

Rubric Item / Quiz Section	Maximum Score	Standard Scale					
		Naive : Default Score ≥ 0%	Novice : Default Score ≥ 25%	Apprentice : Default Score ≥ 40%	Journey-Level : Default Score ≥ 60%	Expert : Default Score ≥ 75%	Master : Default Score ≥ 90%
Construction check	6	0	1.5	2.5	3.5	4.5	5.5
Community check	6	0	1.5	2.5	3.5	4.5	5.5

Gradual, managed roll-out

- Work with instructors and university leaders who have an interest in trying out the system
- Approach as action research - learn fast
- Invite Instructors to participate in order to populate the student dashboard
- Invite instructors to be part of a network for sharing assessment and instructional strategies focused on specific learning outcomes

Gradual, managed rollout

	Disciplinary & Multidisciplinary Knowledge	Intellectual & Creative Skills		Interpersonal Skills		Global Citizenship			Personal Mastery	
		Critical Thinking & Problem Solving	Innovative and Entrepreneurial Skills	Collaboration & Leadership	Communication	Intercultural Understanding & Sensitivity	Sensitive Towards Development in Asia	Ethics & Social Responsibility	Self-Directedness & Meta-Learning	Resilience & Positivity
MGMT317 - Managing Process Improvement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
COR1701 - Critical Thinking in the Real World	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
COR3001 - Big Questions	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COR2601 - Urban Cultures*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COR2611 - Cultural History of the Cold War in Asia*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OPIM101 - Decision Analysis	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LAW106 - Legal Research and Writing I	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LAW105 - Law of Torts	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LAW202 - Law of Property	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COR3303 - Ethics and Social Responsibility for LAW	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PYSC110 - Psychology Research Methods I	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IS210 - Business Process Analysis and Solutioning	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IS213 - Enterprise Solutions Development	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<Add your course here!>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<Add your course here!>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Rather than focusing on involving all instructors, we work towards providing most students with a comprehensive view of their progress in the GLOs

DEMO OF THE GLO SYSTEM



FEEDBACK ON GLO SYSTEM FROM STUDENTS AND INSTRUCTORS

Student Survey on the Graduate Learning Outcomes (GLO) Dashboard

Purpose

- To understand student experiences in using the dashboard for improving GLO attainment levels

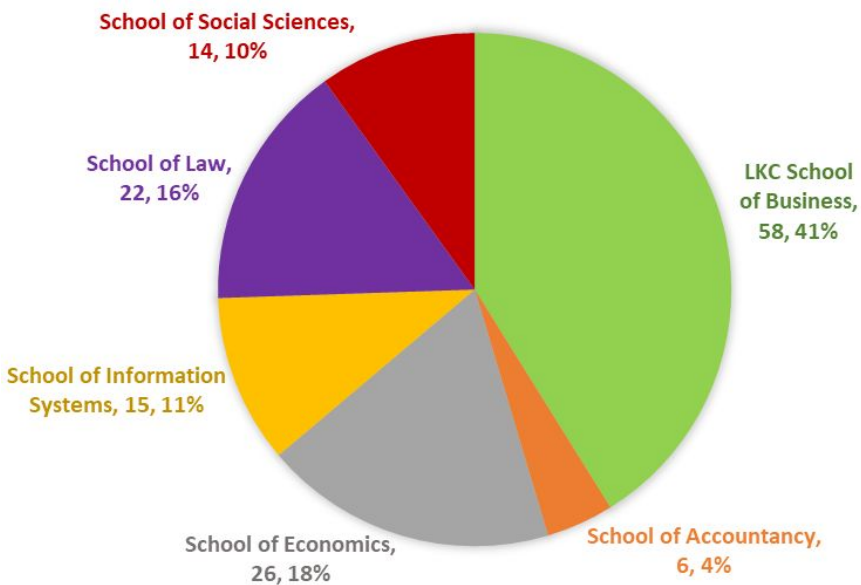
Survey Design

- 7 point likert scale (15 items) on learning experiences with the GLO dashboard
- 5 sub-scales, 3 items per sub-scales on
 - Clarity
 - Meaningfulness
 - Usefulness
 - Satisfaction
 - Ease of Use
- Net Promoter Score
- 5 Open-ended questions

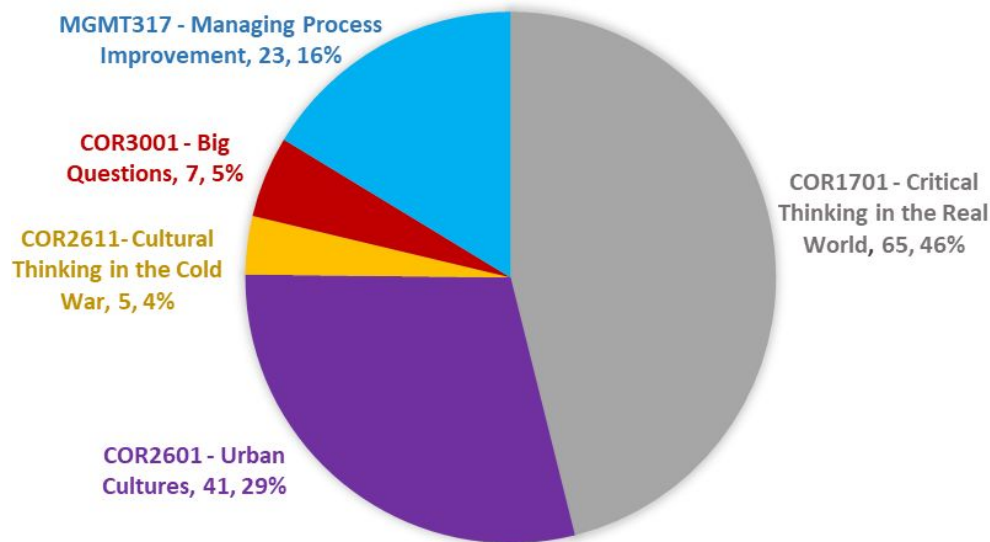
Student Survey on the GLO Dashboard

- Data collection : from March 2020 to June 2020
- 141 participants (Male = 67, Female =73, 1 did not indicate gender)

PARTICIPANT BY SCHOOL (Total = 141)

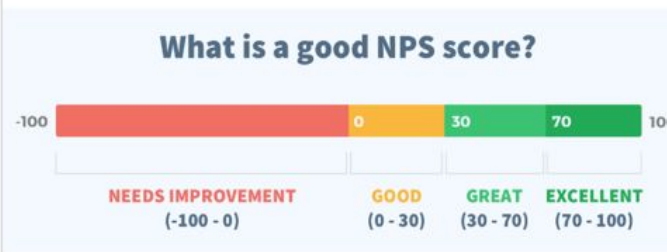
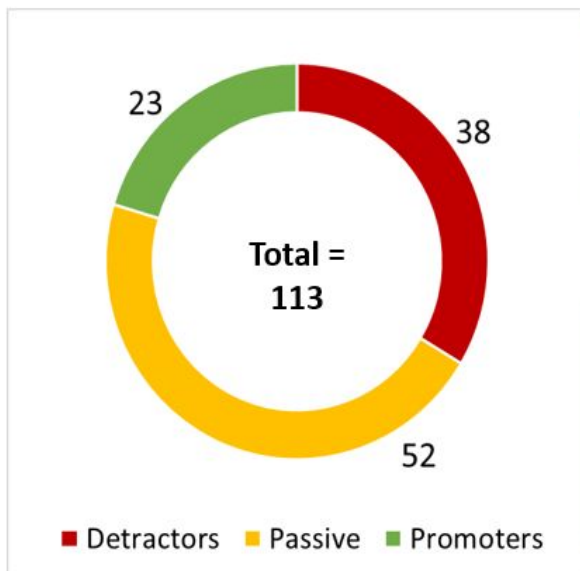


PARTICIPANT BY COURSE (Total = 141)



Student Survey on the GLO Dashboard

Net Promoter Score for all courses (n = 113), 5 courses with 5 instructors



NPS for a previous iteration of GLO, i.e. Competency Analytics System (CAS) = **-30.5%** based on 3 courses and n = 82

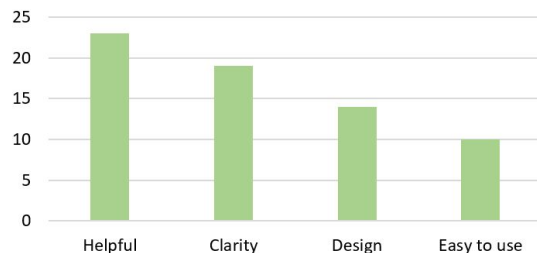
Net Promoter Score = -13% **NEEDS IMPROVEMENT**

Summary of Student Feedback

What Students like about the GLO dashboard

- Helpful to show course relevance to graduation requirements
- Clear in showing standing relative to cohort, skills learnt and areas for improvement
- User-friendly interface which is also aesthetically appealing
- Easy to use

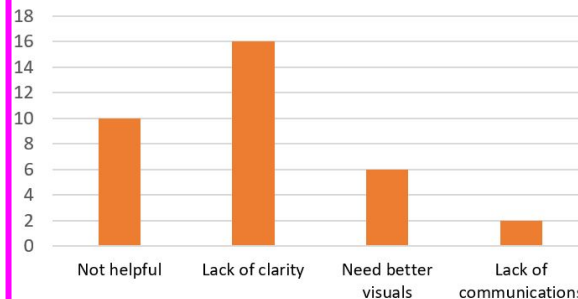
Q17. What do you like about the dashboard?



What Students dislike about the GLO dashboard

- Does not show feedback from instructors and peer
- Unclear about scoring matrix
- Demoralising to see performance relative to cohort
- Lacks clarity of purpose by instructors

Q17. What do you like about the dashboard?



Suggestions for Improvement

- More description about scoring matrix
- Instructors to brief purpose and intent beforehand
- More guidance by instructors on, workshops and tips to improve GLO attainment

Instructor Interviews on the GLO Dashboard (Qualitative Comments)

Purpose

- To learn the instructors' understanding about the Graduate Learning Outcomes, their motivation in using the GLO system, their experiences using the dashboard, and their suggestions for improvements.

Process

- One to one interviews conducted using Zoom.
- 2 interviews in total.
- Audio and video recorded and transcribed.

Description of Interviewees

- Instructor 1 is a faculty member who has less than 2 years of teaching experience.
- Instructor 2 is a faculty member who has less than 3 years of teaching experience.

Summary of Instructor Feedback

What Instructors like about the GLO System

- Granularity of details in students' attainment of course learning outcomes
- Rubrics provided consistency in marking
- Helped in providing individualised feedback to students
- Informed the need to adjust instructional strategies mid-term

What Instructors dislike about the GLO System

- Challenging to track individual student's progress
- Extra time and effort spent on marking
- Difficult to assess students given the Covid-19 pandemic situation and teaching was moved online
- Unsure about how to provide differentiated feedback to students based on the six different attainment levels
- Difficult to explain to students on the different attainment levels from one term to another

Suggestions for Improvement

- More guidance by system developer on navigating the system
- Better communication to students on the intent and purpose of GLO System
- Workshops for instructors on how to use the GLO System

Next Step: Prescriptive Recommendations for Graduate Learning Outcomes

Learning Outcome Report For

		Naive	Novice	Apprentice	Journey-Level	Expert	Master
Graduate Learning Outcome Level 1	Graduate Learning Outcome Level 2	My Current Level		University Level		Feedback	
Intellectual & Creative Skills	Critical Thinking & Problem Solving	3.12 / 6 Journey-Level		4.20 / 6 Expert		Excellent work in critical thinking. Improvements can be made by attending forums.	
Intellectual & Creative Skills	Innovative & Entrepreneurial Skills	N.A.		N.A.			
Interpersonal Skills	Collaboration & Leadership	2.50 / 6 Apprentice		3.93 / 6 Journey-Level		Good use of collaboration techniques. Consider working more in teams	

An aerial night view of the Singapore Management University (SMU) campus, showing modern buildings with illuminated windows and a prominent SMU logo on one of the structures. In the background, the dense, brightly lit skyline of Singapore is visible under a dark sky.

Thank You

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