Basics of Innovation in Health Sciences: An Overview of a New Multidisciplinary Course

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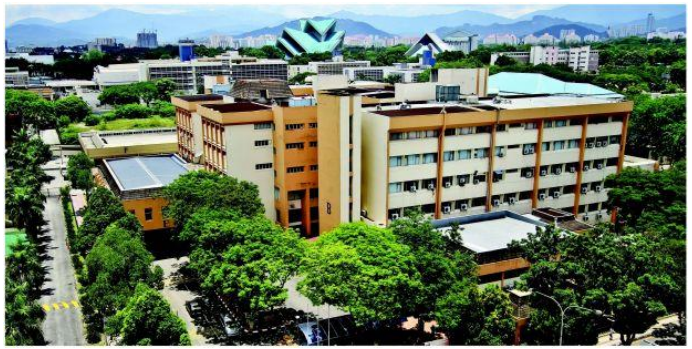
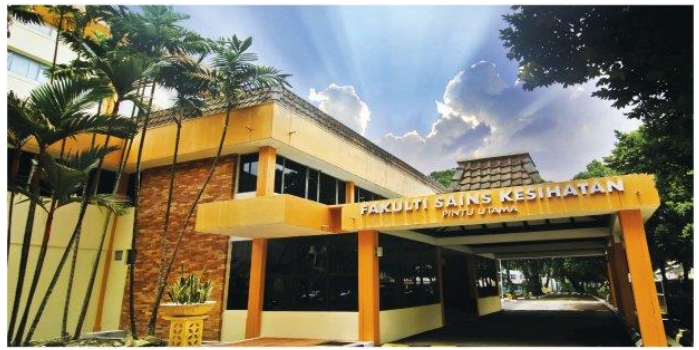
NNBB1042 Basics of Innovation in Health Sciences (2 credits)

- School of Rehabilitation Sciences, UKM (The National University of Malaysia)
  - **Occupational Therapy**
  - **Physiotherapy**
  - **Audiology**
  - **Speech Science**

4 year-bachelor's degree (honours)

- Since semester II, 2013/2014 (80 1st year students)
- Main lecturer – Engineer
- Facilitators – 6-8 from all 4 programmes



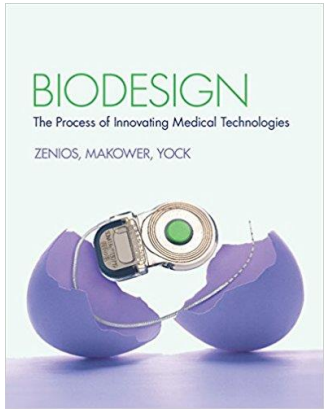


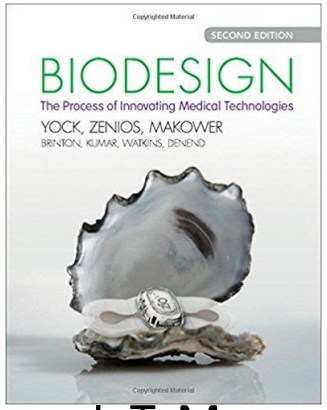
Innovation is a critical mechanism that brings new medical & health technology to markets

Biodesign is a systematic approach & design thinking used to verify, invent, & implement technology & new medicine

Objectives

1. Explain the content of basics of **innovation** & **biodesign** process in health sciences
2. Identify the needs & problems in health sciences
3. Apply knowledge of biodesign process for generating need statements





Yock, P. G., Zenios, S., Makower, J., Brinton, T. J., Kumar, U. N., Watkins, F. T. J., Denend, L., Krummel, T. M., & Kurihara, C. (2015) *Biodesign: The Process of Innovating Medical Technologies.* 2nd Ed. Cambridge University Press.
http://biodesign.stanford.edu/bdn/index.jsp

Week	Topic	1	2	3	4	5	6	7
2	Introduction to innovation	1						
3	The innovation environment & design thinking (ideal patient scale)	1	1				1	
4	Biodesign process (reflection of design thinking video presentation)	2				0.5		1
5	Strategic focus (team's mission, strength/weaknesses, & acceptance criteria)	1	1					
6	Need identification 1: observation & problem identification	1						
7	Need identification 2: documentation (fact finding sheet)	1						
9	Need identification 3: analysis	1	1					1
10	Fieldwork 1: observation at the centres			3.5				
11	Fieldwork 2: interview & fact finding			3.5				
12	Fact finding discussion (fact finding video presentation & report)				1	0.5		
13	Need statement development	1	1					
14	Final need statement presentation					4		
	Total	9	4	7	1	5	1	2

1 – Lecture
2 – TBL
3 – Fieldwork
4 – Assignment
5 – Presentation
6 – e-Learning
7 – Quiz

Total (hours)
= contact + self-learning
= 29 + 66
= 95

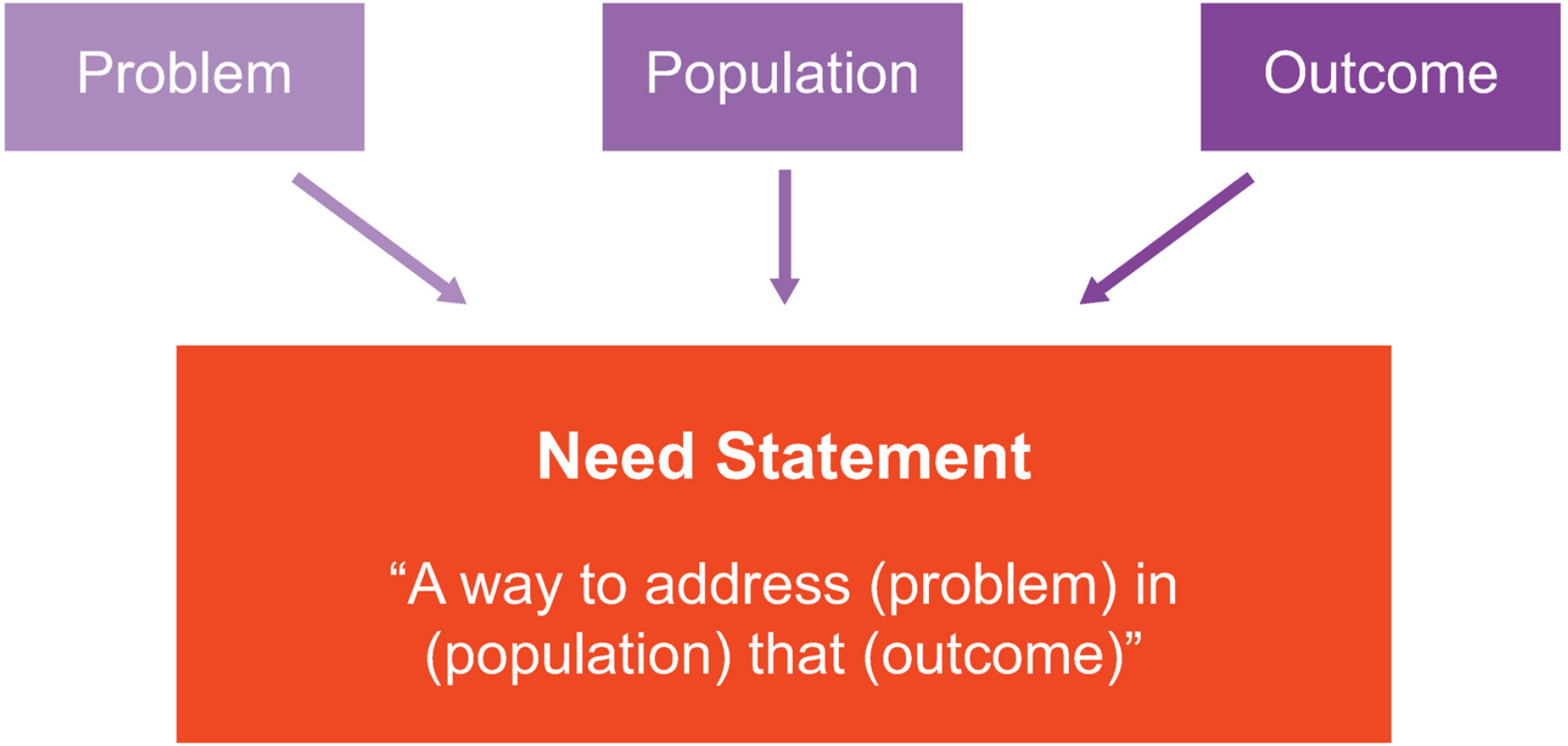
Assessment	%
Quiz	20
Fact finding report	10
Reflection of design thinking video presentation	10
Fact finding video presentation	10
Final need statement presentation	30
Fieldwork participation	10
Peer-evaluation	10
Total	100

Problem identification skills, soft skills, work quality & creativity, group preparedness etc

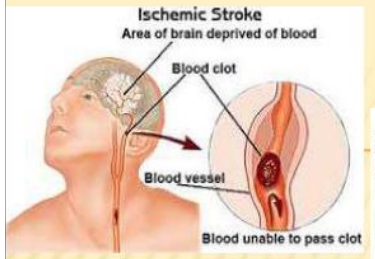
2014/2015 → 2016/2017 (3 cohorts)

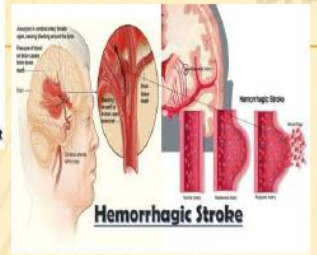
- 210 students
- > 10 facilities
- > 60 need statements
  - A better way to improve comfort level in patients with physical problems during therapeutic exercises

Components of a Need Statement



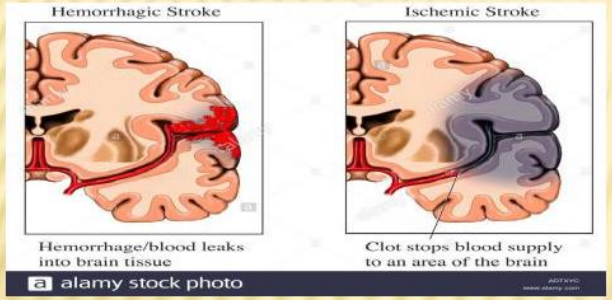
Example of Need Statements





NEEDS PRESENTATION

A better way to reduce tedious treatments in hemiplegia upper limb stroke patients



- Background
  - A stroke is a condition when the blood supply to part of your brain is interrupted or reduced,depriving brain tissue of oxygen and nutrients.Within minutes,brain cells begin to die.A stroke may be caused by a blocked artery (ischemic stroke) or the leaking or bursting of a blood vessel (hemorrhagic stroke).
  - Hemiplegia upper limb mainly cause by ischemia stroke. About 80% of strokes are ischemic strokes.It occur when the arteries to your brain become narrowed or blocked,causing severely reduced blood flow.
  - Current prevention methods include exercise program that consisted of isotonic, isokinetic, and isometric resistance exercises and passive, active, and active-assistive range of motion exercises. These exercises were pursued with the intention of increasing dynamic strength, endurance, and overall functional recovery of the flexor muscles.Besides, the dynamic splint is used to help in lengthening of extensor tendons and wrist joint capsule.For example,wrist and extension aid, such as SaeboFlex. It costly RM 3k-4k/device.
  - Within this 15 years, SaeboFlex has helped over 250,000 clients around the globe, achieved a new level of independence.
- Market
  - Saeboflex user >250000 around the globe(within 15 years)which slightly costs>RM9.74 M.
  - Each Saeboflex costs RM3k-4k

https://www.saebo.com/news-blog/

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