'Innovation in Learning Design' 9th International LAMS and Learning Design Conference (26 to 27 Nov 2014) held at the main campus of Nanyang Technological University (NTU) [http://lams2014.lamsfoundation.org/]

Building LAMS supported blended-learning communities:

Challenges in promoting thinking skills and attitudes for sustainable living

by
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Southeast Asian Ministers of Education Organisation

Regional Centre for Education in Science and Mathematics

Ministry of Education Malaysia

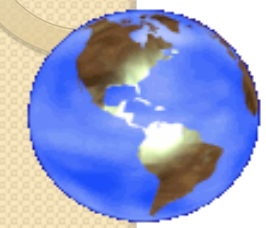
SEAMEO Borderless

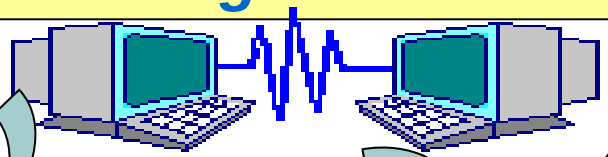
Recent advancement and global trends of ICT in teaching and learning

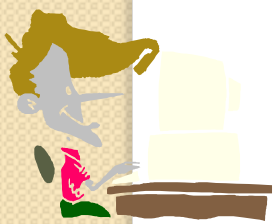
To ensure e-learning could be conducted efficiently to minimize barriers with optimum knowledge construction opportunities in an ever expanding global learning community

To bring people closer through effective communication channels and expedite learning processs in an unprecedented manner.

Use of interactive multimedia and increased reliance on new inter-active ICT





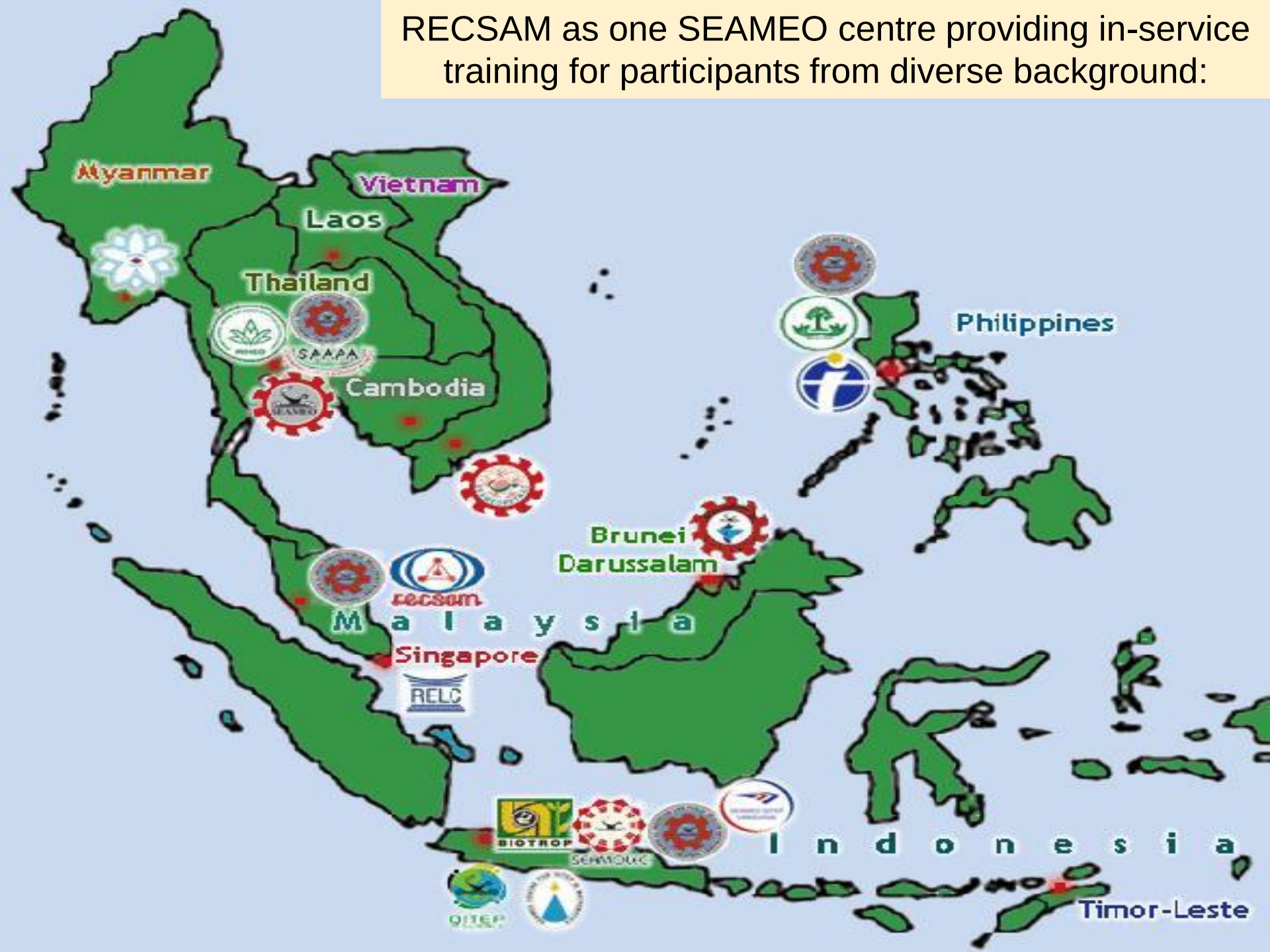


The irony of technological advancement also creates debates over various ethical and controversial issues, prompting the concerns of technology experts and academics to explore ways to manage e-learning

Constantly changing technological innovations and large number of multimedia titles

Increasing networking of computers for communications, research and remote collaboration.

RECSAM as one SEAMEO centre providing in-service training for participants from diverse background:



Scenario and concern in the region

The increasingly global world with learning in the borderless world is often linked with **participatory inquiry** knowledge construction involving contextual **problem-solving** activities using **interactive digital tools** for blended learning.

Objectives of this presentation

(1) To report on RECSAM's initiative as regional centre of excellence for **science and mathematics education** to promote **blended mode** of teaching and learning activities.

(2) To illustrate exemplary **learning designs** using LAMS-supported platform to promote **thinking skills** and **attitudes towards sustainable living**.

The most recent to develop OERs for borderless learning platforms

(B) SEAMEO Borderless School

OVERVIEW AND OBJECTIVES

A Borderless School is the school that prepares students to become global players who are enterprising, creative, innovative, equipped with 21st century skills and lifelong learners in cross-cultural learning environment. It is an area identified under the vision of Golden SEAMEO in the next decade. The learners from diverse background are expected to be actively involved in sharing resources through blended mode learning environment rich with easy access information mainly from Open Educational Resources (OER) including interdisciplinary and cross-curricular studies. Three essential skills to be developed from early education include thinking, technology and living (work and survival) skills.

Pilot phase (2013 to 2014):

The Borderless School project started in 2013 and continued in 2014 with piloting of instruments and trialling of e-platforms involving several groups of science and mathematics educators who provided feedback to improve the instruments and refine the Borderless School framework.

Phase 1 (2015 to 2018):

For the next three years from 2015 to 2018, two main implementation strategies are expected to be completed in collaboration with SEAMEO sister centres, national and international educational network and linkages. These include the preparation of curriculum resources and stable e-learning and/or m-learning platforms in at least five SEAMEO member countries with technological support. Among the suggested activities include:

(1) Developing cross-curricular and interdisciplinary studies to promote thinking and life skills in all subjects integrating Information and Communication Technology (ICT);

(2) Producing resources incorporating blended learning to promote cross-cultural understanding in all subjects using inquiry-based learning approaches such as Project-based Activities (PBA) and Problem-based Learning (PBL);

(3) Developing responsive and interactive web-portals incorporating e.g. 'Learning Activities Management System' (LAMS) and/or other technological tools;

(4) Conducting colloquia/seminars/workshops using blended learning approaches to share knowledge and disseminate findings as well as enhance thinking, technology and life skills of all stakeholders, to name a few.

(5) Monitoring and evaluating the project implementation yearly with mid-term review in 2018.

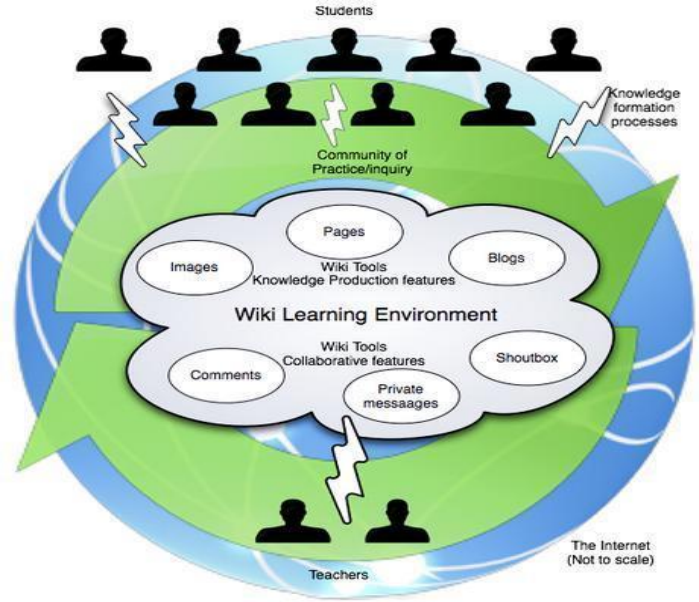
Global trends in science education

Social constructivist learning for knowledge construction and capacity building

More student-centered learning and with greater learners' autonomy

More collaborative learning and working in Community of Practice (CoP) guided by More Knowledgeable Others (MKO)

More Project/problem-based Learning solving real life problems



vicariousconversations.com/blog/wp-content/uploads/2008/07/wiki-pedagogy1.png

Theories (explaining nature and philosophy of BS)

Sociocultural framework [Community of Practice (CoP)(Lave & Wenger, 1991); More Knowledgeable Others (MKO) (McConnell,2000; Larkin, 2002); Situated learning (Wenger, 2000)]

Education for all (EFA) (UNESCO, 1990) ***Education for Sustainable Development (ESD)*** (UNESCO, 2002)

'Science across the World' (SAW) curriculum (*SAAP Books 1-3 and SAW global*) (1) rewriting (*19th to 20th June*) and (2) editing (*1st to 3rd October 2014*) workshops

*New topic suggested to combine Bk1-3	Curriculum rewriting (19-20/6/2014)		Curriculum editing and uploading (1-3/10/2014)		Advisor/Reviewer and/or Editor	
#Bio/Chem/Phy/Maths/Social science	Writer (&SEAMEO)	Co-Writer/Editor	Editor/Proofreader	ICT-based Lesson Designer	Attending (1)&/or(2)	On-line (1)&/or(2)
Drinking water (Bk 1)[U r what u eat OR]	LT/[illegible]/SM/RNA	SP/CNW/NKT	[illegible]/CNW/NKT	LT/NKT/RMI/KAKN/TP/DSST	SP/DSST/NKT	EW/CNW
What do you eat (Bk 1) [Tele-care/health]	SM/RNA/MW	HAB/NKT/MW	MW/NKT	DCYS/RMI/KAKN/TP	MW/FSF/NKT	PAKP
Diseases: Cause, cure and care (Bk 3)	SMY/[illegible]	[illegible]	[illegible]	[illegible]		
*DR RED (Disaster Risk Reduction/Prepared-ness Educ'n) & CCA (Climate Chg Awareness)	BML/LSL/[illegible] DDM/KAKN/DQN/NKT	[illegible] MI/TS/SEAMEO	EW/NKT/MW/ED/ AHBPB/MI/DDM/JCA	[illegible] I/MI/KAKN/TP/PB/DSST/WOU	[illegible] NKT	EW/RF/MI/NBK/ ED
Disappearing Wetlands (Book 3)	KM/TV	DDM/MW/EW/NKT	MW/LC	KAKN/NKT		
Tropical forest (Book 2)	LEO/NA/DQN	[illegible]	[illegible]	[illegible]		
Acid rain (Bk 3) CCA/Global warming (Bk 2)	BML/LSL	[illegible]	AHBPB/DDM/JCA	BML/LSL		
#DR RED integrating science/social science	CHY/BML/NKT/EW/RF/SP	EW/NKT/RF/CNW	NKT/EW/RF/MI/JCA	RF/NKT/EW/CHY/MI		
*Conservation and wise use of resources	CCK/TKA/NA/[illegible] DQN/KM/LEO/ TV/KD/[illegible]	[illegible]	MW/LC/NKT	[illegible]	MW/ZI/NKT	LYF/ST/ISMU/BPK
Domestic waste (Book 2)	TKA/CCK	LYF/EW/NKT	EW/NKT	TKA/EW/NKT		
Plants in our lives (Bk 3) *Nature study	NA/NKT/DQN/TV/KM/SM/LEO	HAB/ZI	[illegible]	[illegible]		
#Biotechnology or genetic engineering	CCK/TKA	[illegible]	MW/LC	[illegible]		
Chemistry in our Life (SAW global unit)	NKT/NIA/TS	CAT/ZI/ISMU/LYF	ISMU/BPK	NIA/ISMU/CAT/TS/NKT		
*Sustainable energy for all (SE4ALL)	[illegible]	[illegible]	[illegible]	[illegible]	TSMM/MG/NKT	LH
Using energy at home (Book 1)	DCYS/TSM[illegible]	[illegible]	[illegible]	[illegible]		
Renewable energy in Asia Pacific (Book 2)	SST/TSMM/KD/TV/WSS	APK/DCYS/NRJ/MG	TSMM/NRJ/LT	DCYS/MG/MI/KD/TP/WOU		

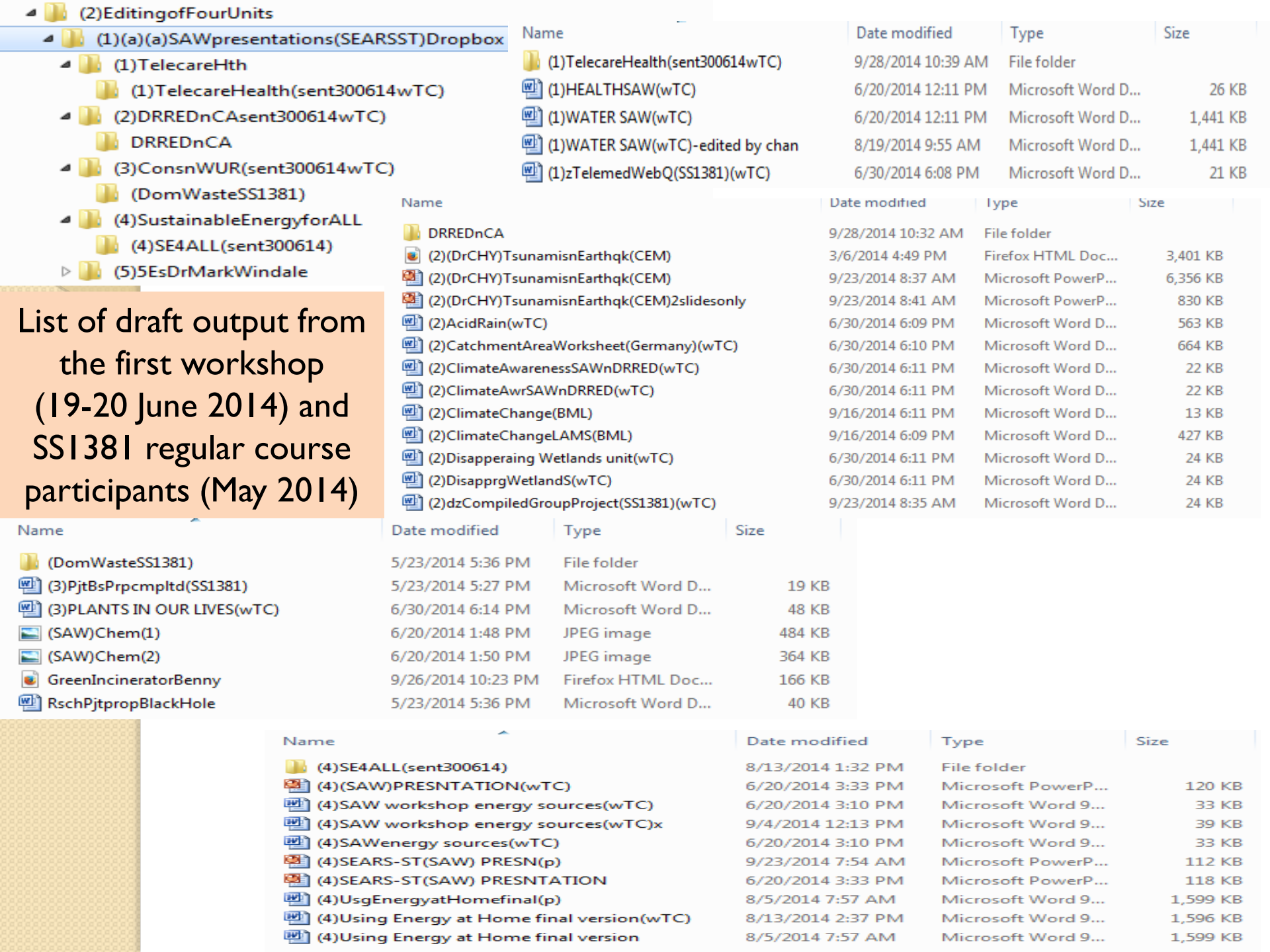
Experts in CoP from diverse socio-cultural backgrounds and expertise were involved in curriculum re-writing and editing to prepare Open Educational Resources (OER) for Borderless learning using various digital tools and platforms such as 'Learning Activity Management System' (LAMS) under 4 main focus areas:

(1) Telecare/Telehealth

(2) DR RED and Climate Awareness

(3) Conservation and wise use of resources

(4) Sustainable Energy for All (SE4ALL)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DRREDnCA
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List of draft output from the first workshop (19-20 June 2014) and SS1381 regular course participants (May 2014)
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(2)(DrCHY)TsunamisnEarthqk(CEM) 9/23/2014 8:37 AM Microsoft PowerP... 6,356 KB
(2)(DrCHY)TsunamisnEarthqk(CEM)2slidesonly 9/23/2014 8:41 AM Microsoft PowerP... 830 KB
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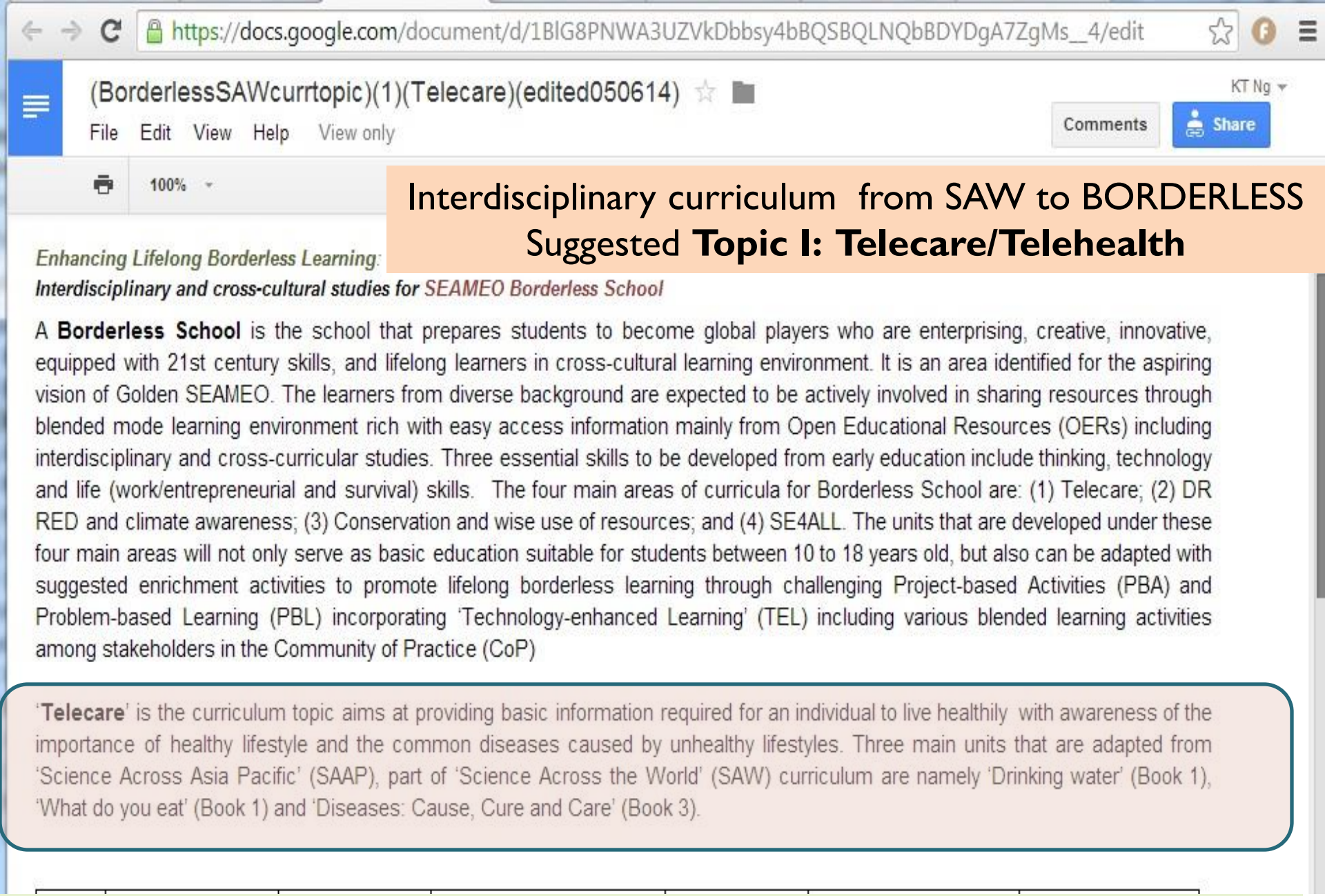
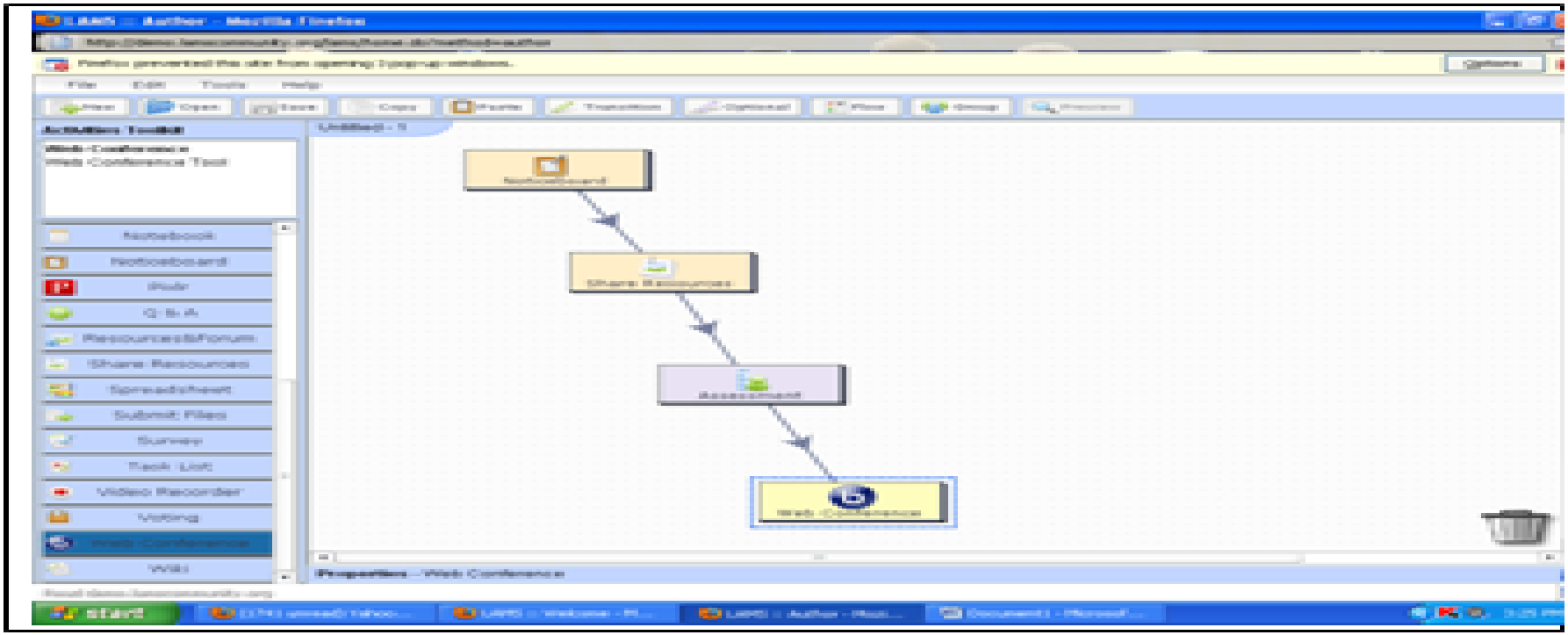


Figure A(ii)(a). Template prepared in Google.doc for the development and on-line editing of curriculum for (1) Telecare

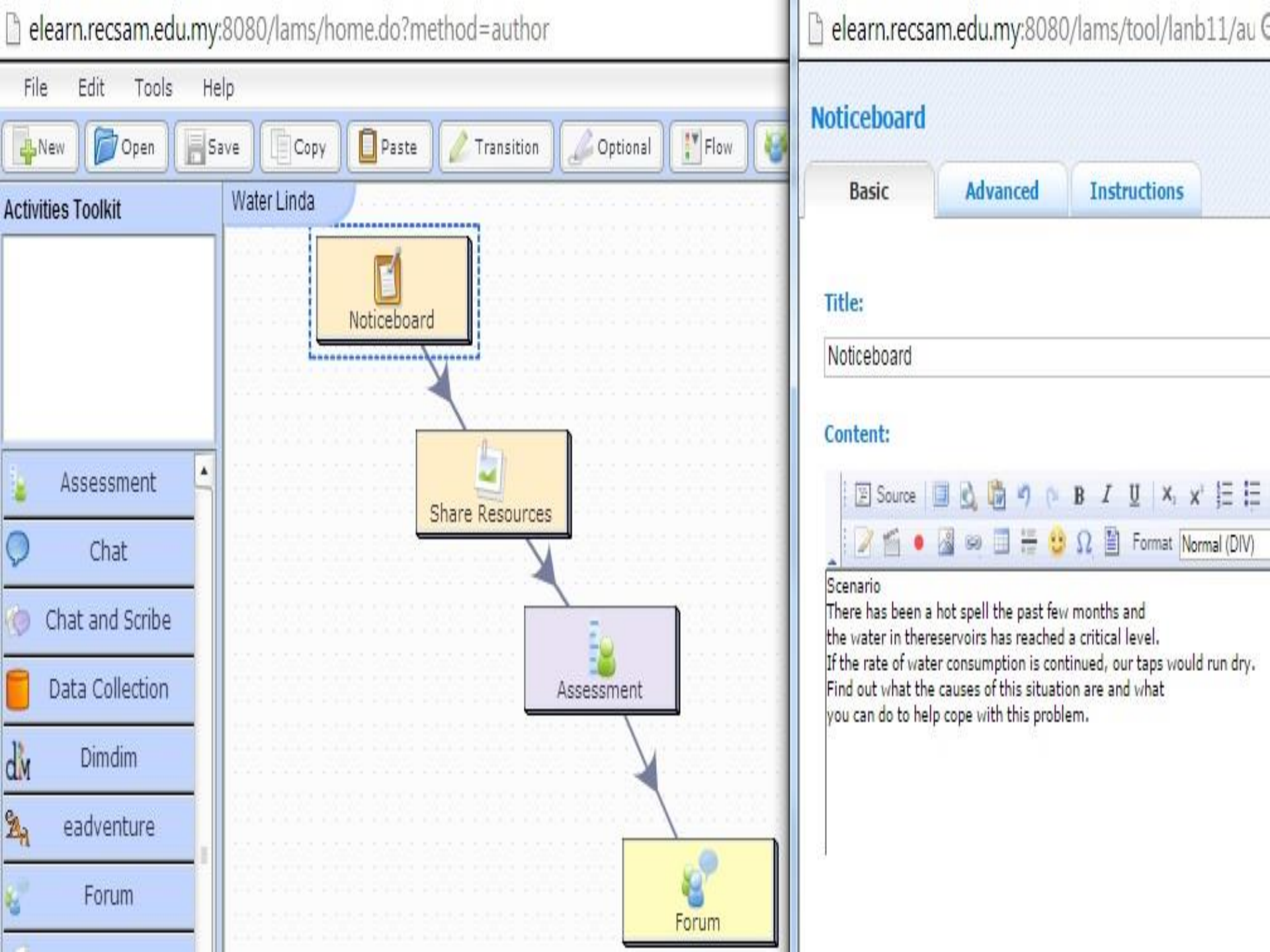
[URL: https://docs.google.com/document/d/1BlG8PNWA3UZVkDbbsy4bBQSBQLNQbBDYDgA7ZgMs__4/edit]

Exemplary lesson ideas to be incorporated with blended learning activities: Flowchart using 'Learning Activities Management System' (LAMS) on 'Drinking Water' presented by **Linda Toh (**Penang Free School Excellent teacher)



Activity	Content
Noticeboard	1. Give instructions to students what to do.
Share Resources	1. URL of drought 2. URL of Climate Change 3. URL of Penang Water Authorities Webpage
Assessment	1. Prepare 5 MCQ. (5 marks) 2. Prepare 2 matching pairs questions. (2 marks) 3. Prepare 3 true-false questions. (3 marks) 4. Prepare 1 short answer question. (5 marks)
Web Conference	1. Ask students to sign up and participate in the web conference.

Prepared by: Mr. Wan Mohd. Zulkifli and Ms Linda Toh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Activities Toolkit
Water Linda
Noticeboard
Share Resources
Assessment
Forum
Assessment
Chat
Chat and Scribe
Data Collection
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eadventure
Forum
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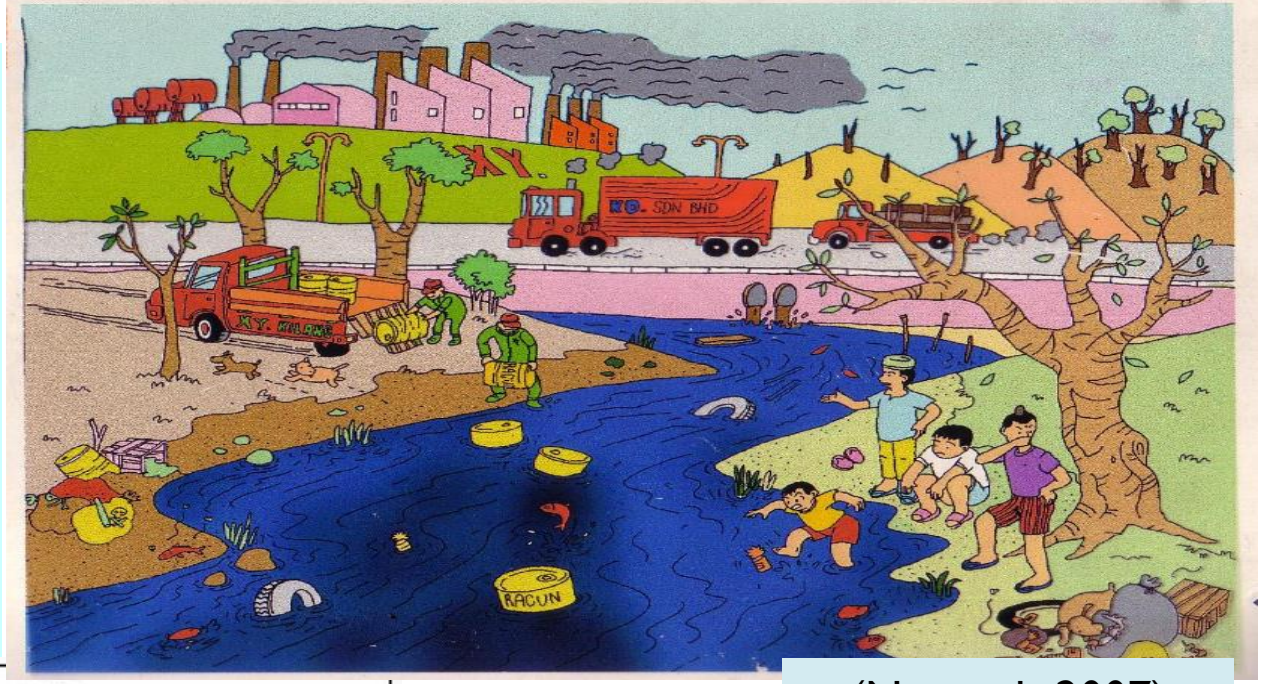
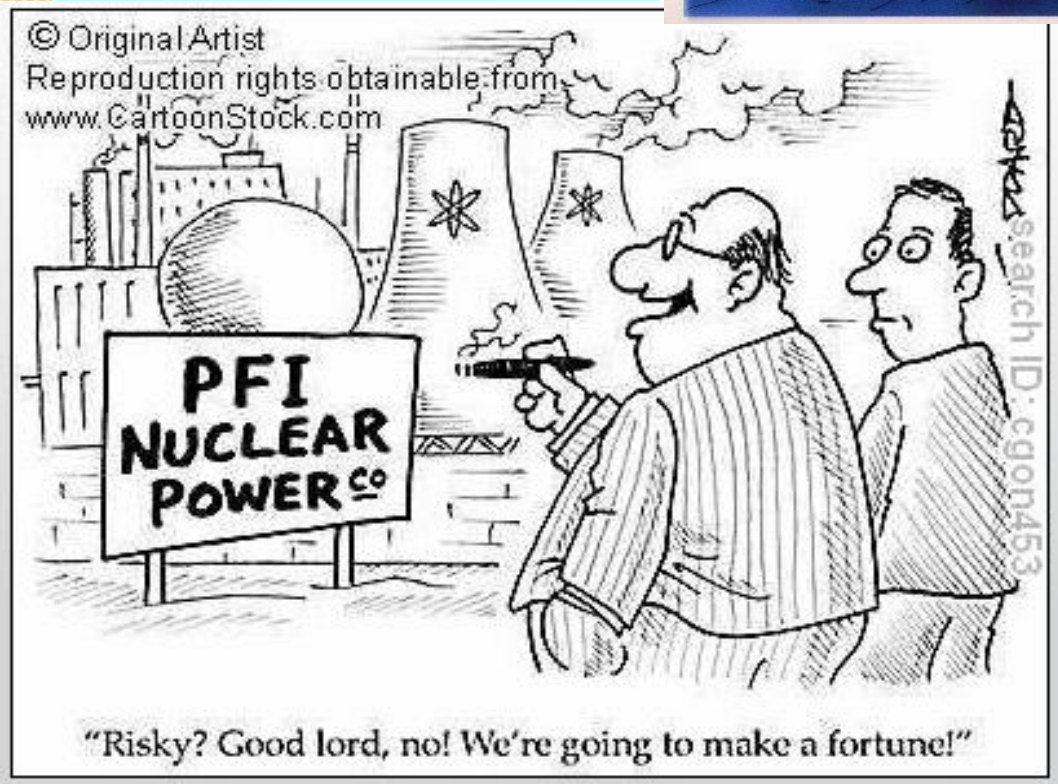
Noticeboard
Basic
Advanced
Instructions
Title:
Noticeboard
Content:
Source
Format
Normal (DIV)
Scenario
There has been a hot spell the past few months and
the water in thereservoirs has reached a critical level.
If the rate of water consumption is continued, our taps would run dry.
Find out what the causes of this situation are and what
you can do to help cope with this problem.

Other **problem scenario** faced in many cities that can be posted on Noticeboard :

E.g. **all types of pollution!**



(Ng, et al., 2007)



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File Edit Tools Help

New Open Save Copy Paste Transition

Activities Toolkit

Water Linda

Noticeboard

Share Resources

Assessment

Chat

Chat and Scribe

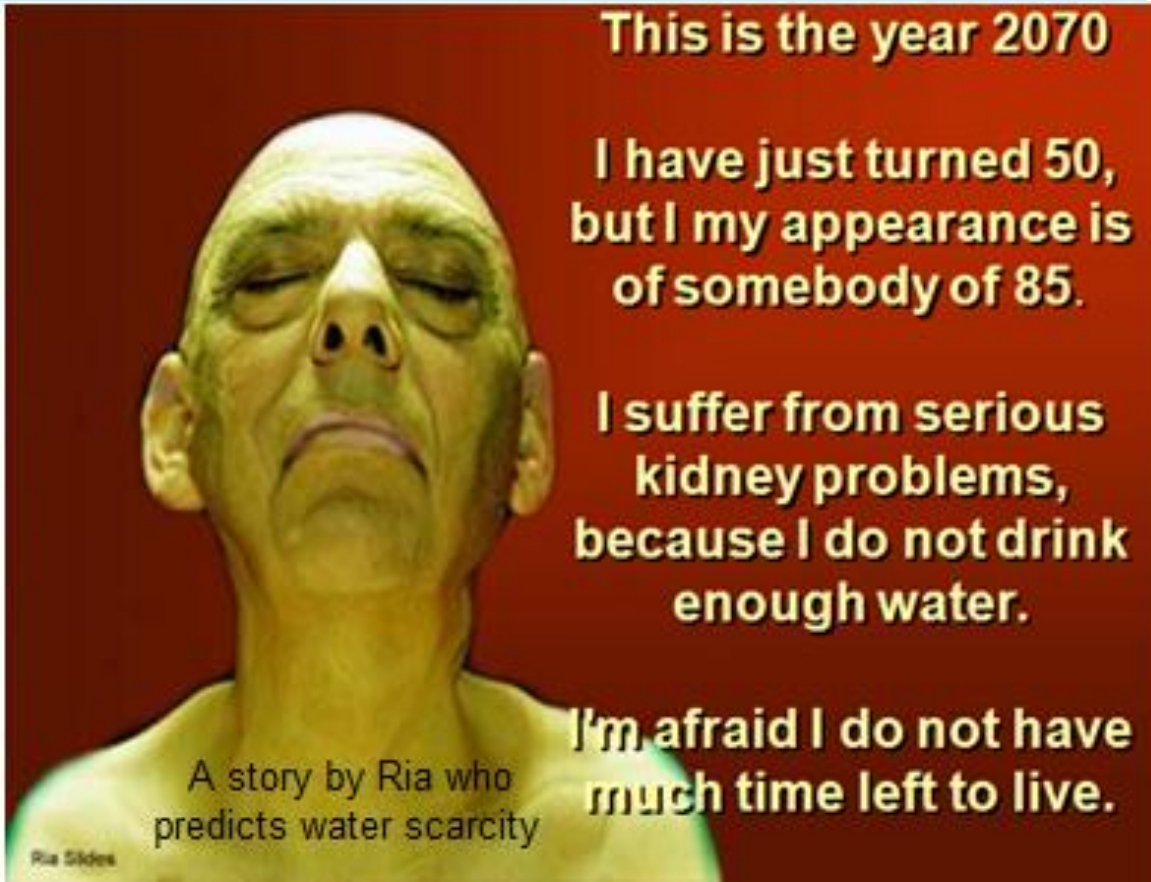
Data Collection

Dimdim

eadventure

Forum

Sharing photos or resources on issues about Dwindling of water resources



Issues faced in developing lessons

(1) Challenges to promote Thinking Skills considering the aspects such as,

Ability to promote students' skills in:

- ***organising information*** *and making* ***logical inferences***
- ***pattern recognition***
- ***sequential*** *thinking skills and thinking diagram*
- ***mental flexibility***

…More Thinking Skills (cont'd)

- *Ability to **categorise options*** (e.g. push, pull, lift, slide, pour, etc.)
- *strategic attack*
- ***creative** thinking*
- *deductive **reasoning***
- ***visualisation** (e.g. futuristic thinking, the story by Ria about water scarcity) and **spatial reasoning***
- *critical perception*

Current Trends, Issues, Concerns and Challenges in Science Education : *A Paradigm Shift in Science Teaching and Assessment*

The year 2000 and above

Traditional Views → **Current Perspective**

Paper and pencil

- Emphasis on product(s) of learning and 'correct' answers

Alternative methods

- Emphasis on ***thinking*** and ***process of learning***
- Portfolio
- Project
- Self-assessment
- Journal

(emphasizing *'learning by doing'*)

1

A change of one or two degrees in global average temperatures can cause a reduction in the yield of crops currently grown.

Answer:

- True
- False

2

Emissions of carbon dioxide from human activities do not have a big impact on Earth's climate.

Answer:

- True
- False

3

In Malaysia, the hot spell has also contributed to more cases of dengue fever as it speeds up the life cycle of the aedes mosquito that carries the virus and enhances replication of the pathogen, experts say.

Answer:

- True
- False

Finish Submit All

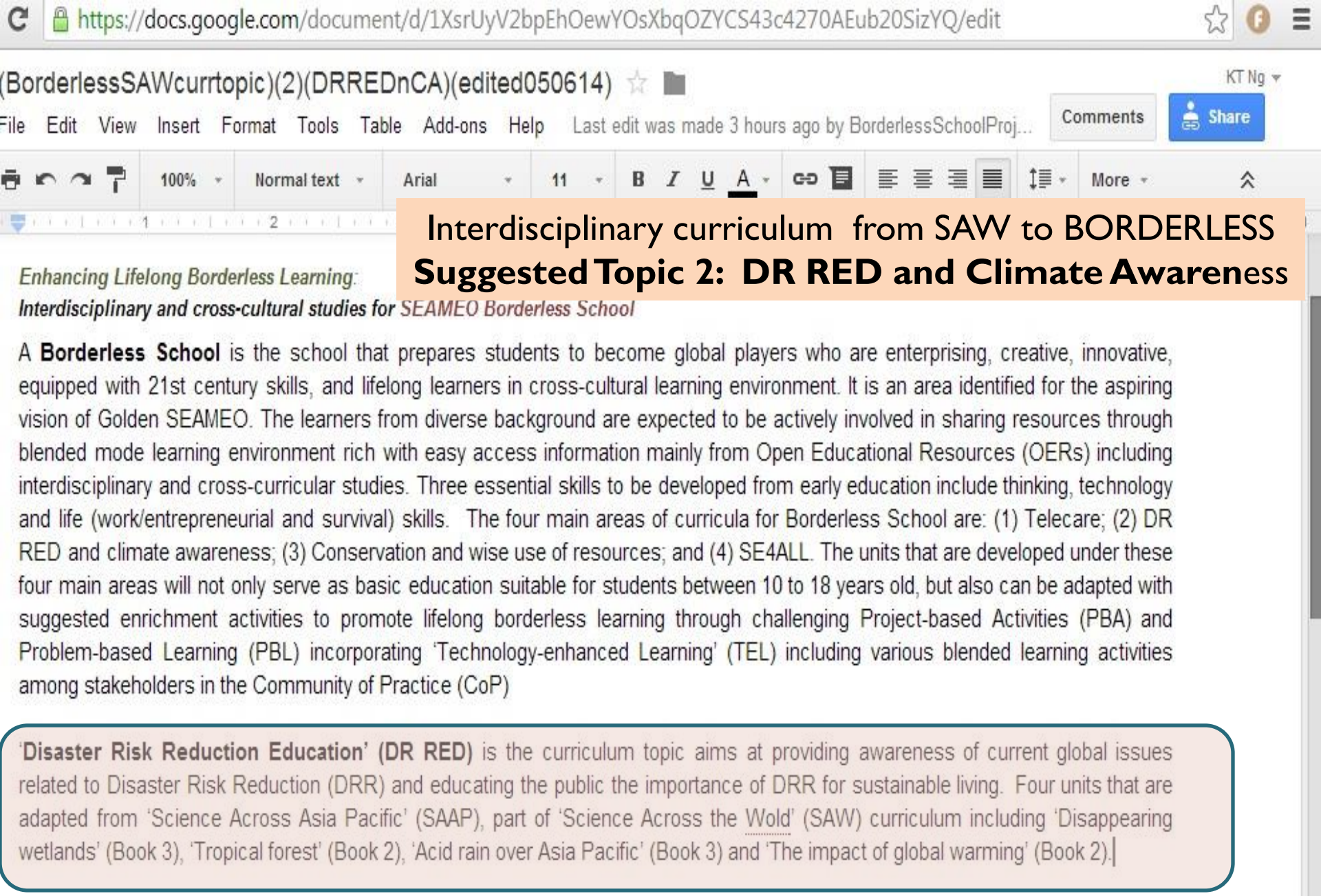
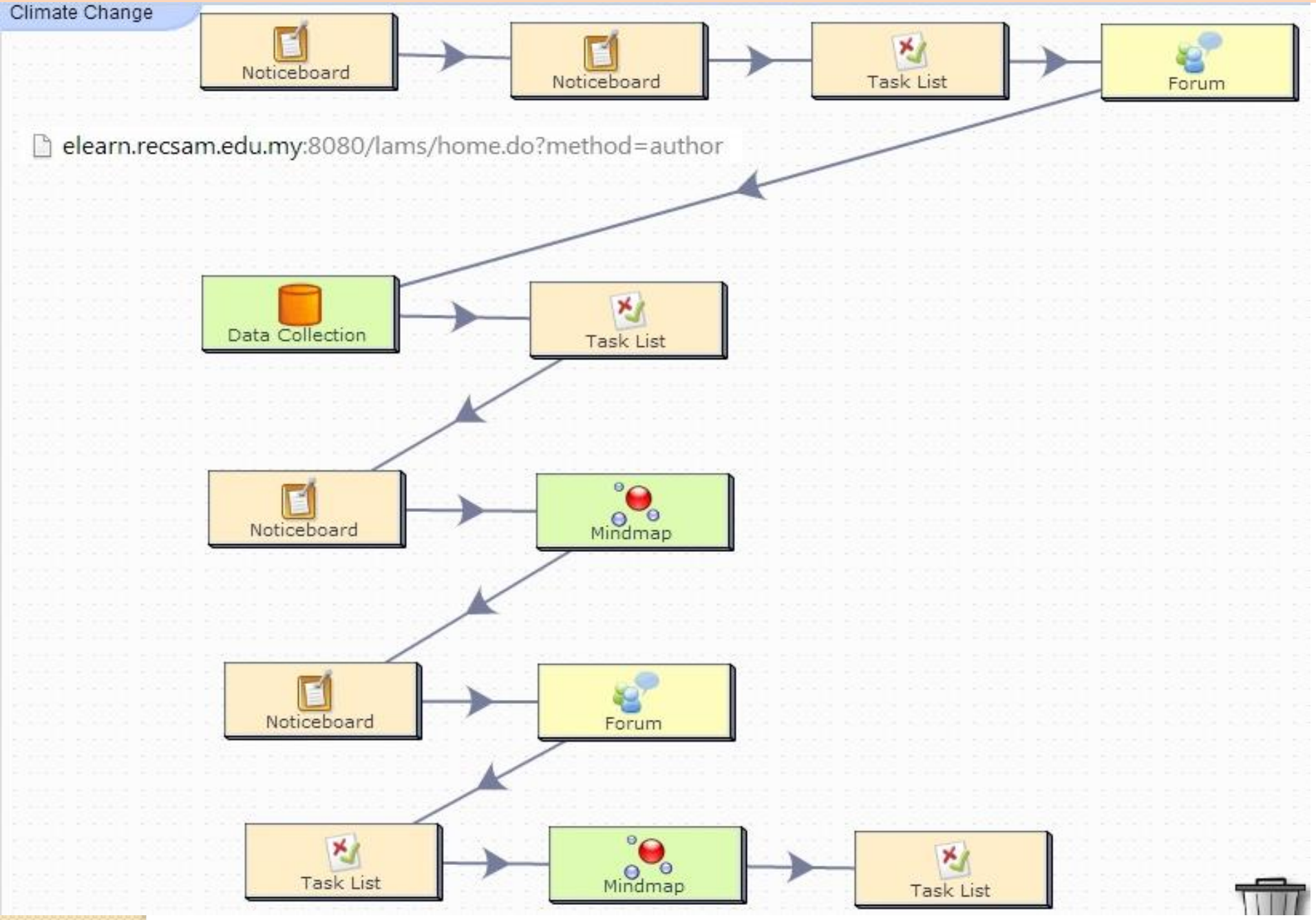


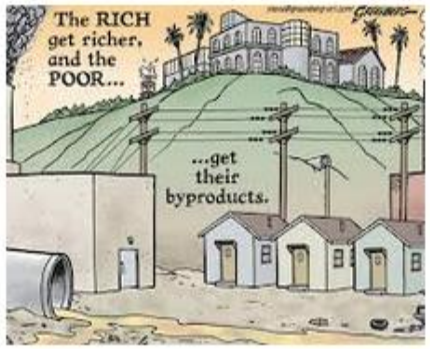
Figure A(ii)(b). Template prepared in Google.doc for the development and on-line editing of curriculum for (2) DR RED and climate awareness [URL: https://docs.google.com/document/d/1XsrUyV2bpEhOewYOsXbqOZYCS43c4270AEub20SizYQ/edit]

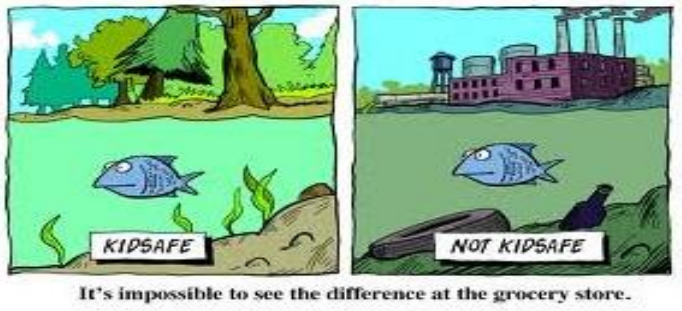
Exemplary lesson ideas to be incorporated with blended learning activities: Flowchart using 'Learning Activities Management System' (LAMS) on 'Climate Change' presented by Boey Mei Li (Sri Mutiara Secondary School Excellent teacher)



Accelerated *natural disasters* with drastic changes in *climate patterns*

Forests and other *ecosystems* are disappearing …
Global *fish stock* is dwindling …

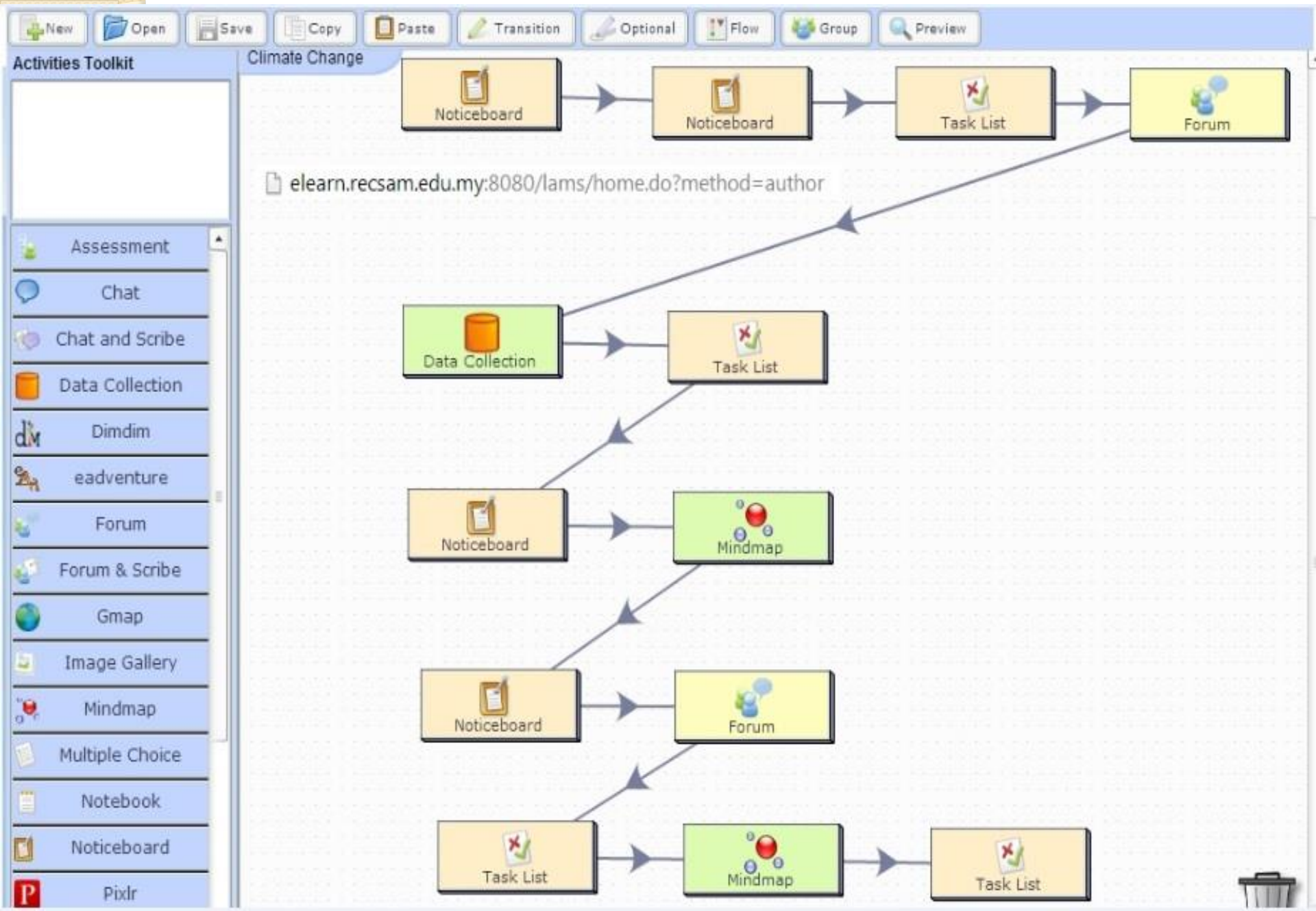




Loss of *Habitats* and *Biodiversity* …

Only when the last tree has died, the last river has been poisoned and the last fish has been caught, …will we realize that we cannot eat money….

- Cree Proverb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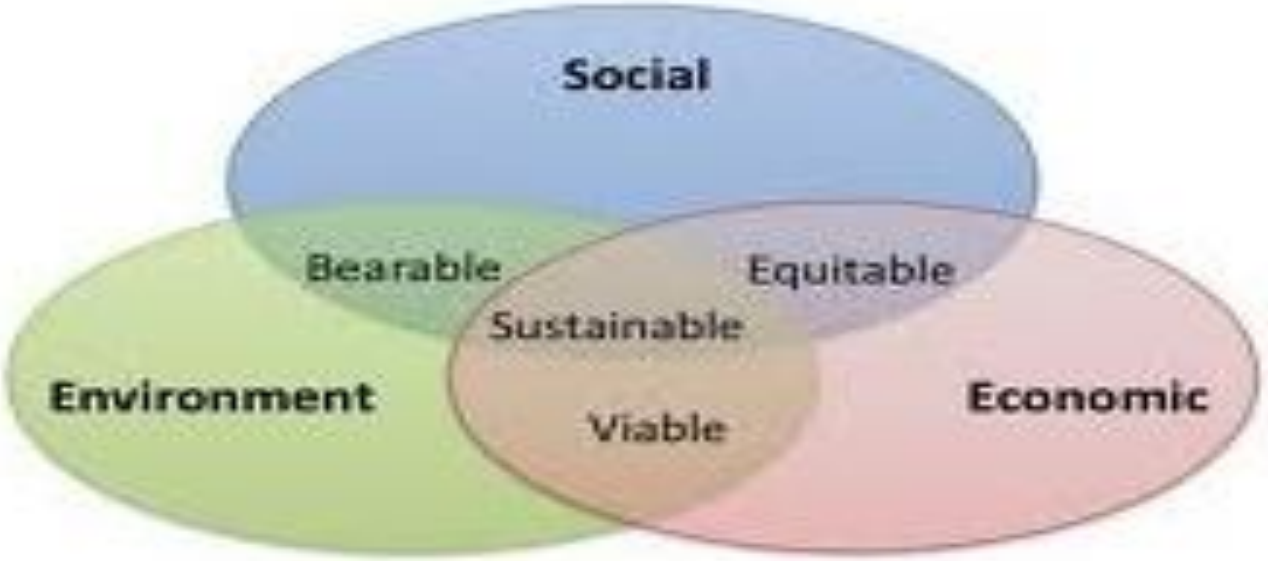
Task List

(2) Challenges to promote attitudes for sustainable living considering the following:

Sustainable living is fundamentally the application of ***sustainability*** to lifestyle choice and decisions that meets the present ***ecological/environmental***, ***societal***, *and* ***economical needs*** without compromising these factors for future generations.



Current Trends, Issues, Concerns and Challenges in Science Education: *Paradigm Shift in Science Teaching and Learning*

The year 2000 and above

Traditional Views	→	Current Perspective

Learning methods

Rote and receptive learning

Discovery and inquiry

- *process skills*
- *higher-order thinking* (HOT) skills
- *problem solving*

(emphasizing *'learning by doing'*)

Current Trends, Issues, Concerns and Challenges in Science Education: *Paradigm Shift in Science Teaching and Learning*

The year 2000 and above

Traditional Views → **Current Perspective**

Creative thinking skills

- Brainstorming
- Visualizing
- Inventing
- Associating relationships
- Inferring
- Predicting
- Hypothesizing
- Making analogies
- Dealing with ambiguity

Discovery and inquiry

- process skills
- higher-order thinking skills
- problem solving

(emphasizing *'learning by doing'*)

Current Trends, Issues, Concerns and Challenges in Science Education: *Paradigm Shift in Science Teaching and Learning*

The year 2000 and above

Traditional Views → **Current Perspective**

Creative thinking skills

- Brainstorming
- Visualizing
- Inventing
- Associating relationships
- Inferring
- Predicting
- Hypothesizing
- Making analogies
- Dealing with ambiguity

Critical thinking skills

- Attributing
- Comparing/Contrasting
- Classifying
- Sequencing
- Prioritizing
- Drawing conclusions
- Determining cause/effect
- Analyzing for assumptions
- Evaluating

Lessons Learnt and Future Direction

(1) Preparing more LAMS supported blended-mode learning design incorporating plethora of teaching and learning pedagogies e.g. use of concept map to elicit prior knowledge, etc.

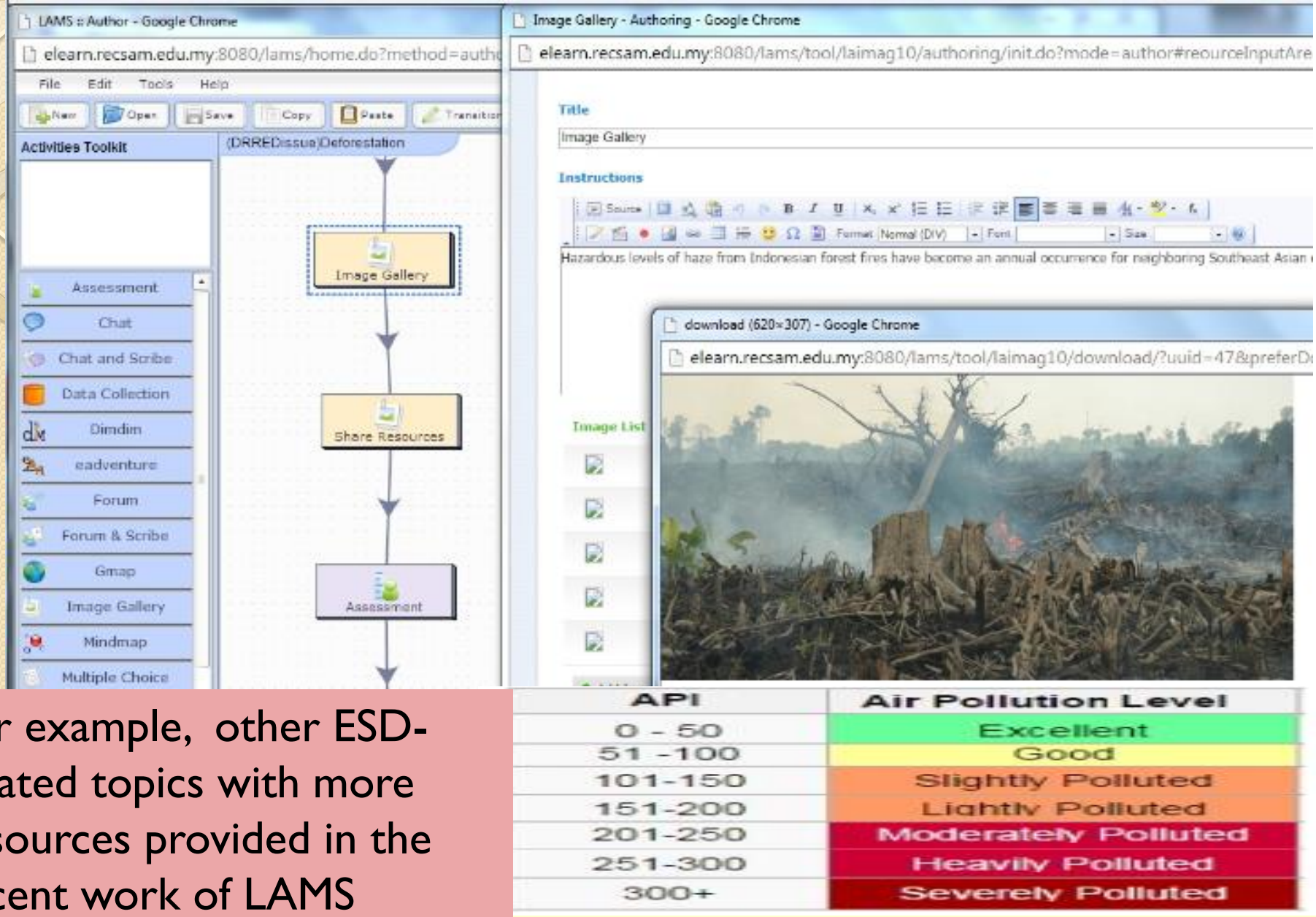
(2) Anchoring the learning design with social constructivist and socio-cultural framework

(3) Keeping abreast with current trends and in line with SEAMEO Borderless School as well as Malaysian 2013-2025 Education Blueprint

(4) Sharing more values-based resources to promote thinking skill and sustainable living

(5) Conduct R&D activities for the initiatives

(6) To solve technical problems related to LAMS, seek advice to imbibe into centre's Moodle, etc.



API	Air Pollution Level
0 - 50	Excellent
51 -100	Good
101-150	Slightly Polluted
151-200	Lightly Polluted
201-250	Moderately Polluted
251-300	Heavily Polluted
300+	Severely Polluted

For example, other ESD-related topics with more resources provided in the recent work of LAMS supported learning design on topic '**Deforestation**'

Figure 3. Pictures of forest fire, haze, Air Pollution Index (API).

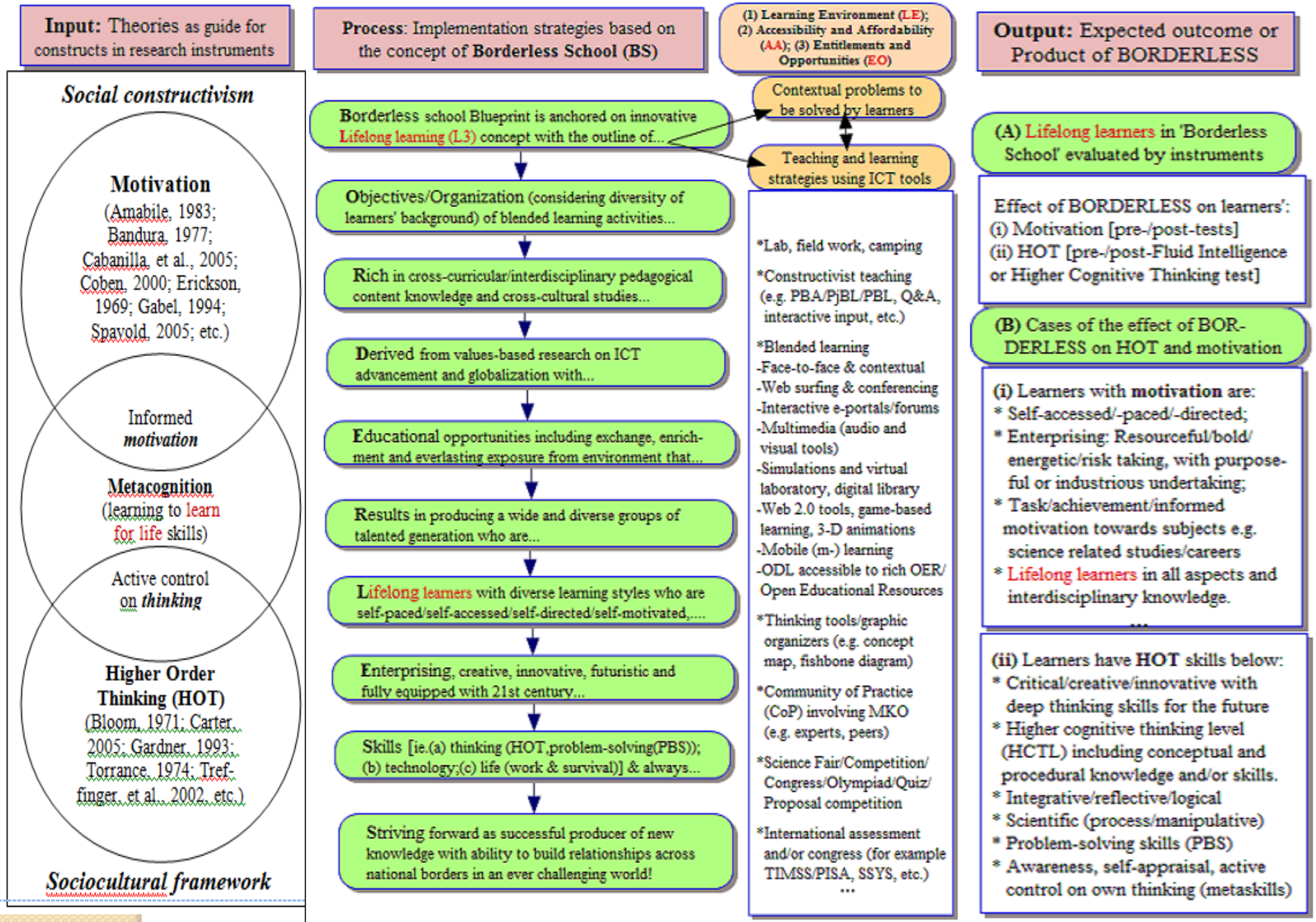


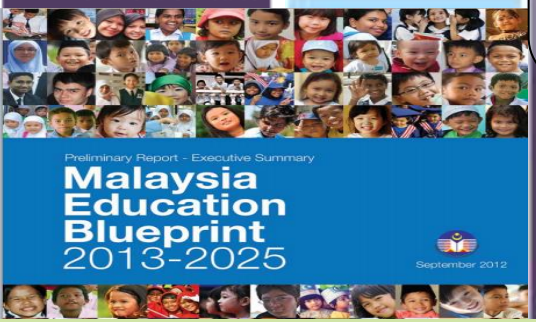
Figure A(i). The conceptual framework for the 'Lifelong Borderless Learning'

(Ng, 2014)

Eleven shifts to transform the system

PROVIDE EQUAL ACCESS TO QUALITY EDUCATION OF AN INTER-NATIONAL STANDARD

- Benchmark the learning of languages, Mathematics and Science to international standards



SHIFT 1

PROVIDE EQUAL ACCESS TO QUALITY EDUCATION OF AN INTER-NATIONAL STANDARD

- Benchmark the learning of languages, Mathematics and Science to international standards
- Launch new Secondary (KSSM) and revised Primary Curriculum (KSSR) in 2017
- Revamp examinations and assessments to increase focus on testing higher-order thinking skills by 2016
- Raise quality of preschools and push to 100% enrolment by 2020
- Move from 6 to 11 years of compulsory schooling, starting at age 6+; supported by retention initiatives and job-ready vocational training
- Increase investment in physical and teaching resources for students with specific needs

SHIFT 2

ENSURE EVERY CHILD IS PROFICIENT IN BAHASA MALAYSIA AND ENGLISH LANGUAGE

- Introduce a common Bahasa Malaysia curriculum at the primary level, with earlier intensive remedial support for students that struggle to allow for removal of *pemulihan* class
- Expand the LINUS programme to include English language literacy
- Upskill English language teachers and expand opportunities for greater exposure to English language
- Encourage every child to learn an additional language by 2025

SHIFT 3

DEVELOP VALUES-DRIVEN MALAYSIANS

- Strengthen civics elements by making community service a pre-requisite to graduation by 2017
- Enhance Islamic and Moral Education with greater focus on core values and underlying philosophies of major religions by 2017
- Develop students holistically by reinforcing requirement to participate in 1 Sport, 1 Club and 1 Uniformed Body
- Enhance and expand RIMUP from 2016 to facilitate interaction across school types, ethnicities and socio-economic groups

SHIFT 4

TRANSFORM TEACHING INTO THE PROFESSION OF CHOICE

- Raise entry bar for teachers from 2013 to be amongst top 30% of graduates
- Upgrade the quality and personalisation of CPD from 2013 with greater emphasis on school-based training
- Focus teachers on their core function of teaching from 2013 by reducing administration burdens
- Implement competency and performance-based career progression by 2016
- Enhance pathways for teachers into leadership, master teaching and subject specialist roles by 2016
- Peer-led culture of excellence and certification process by 2025

SHIFT 5

ENSURE HIGH-PERFORMING SCHOOL LEADERS IN EVERY SCHOOL

- Competency-based selection criteria and enhanced succession planning processes for principals from 2013
- New Principal Career Package rolled-out in waves from 2013, with greater support (for example via coaches, on-boarding programmes), greater operational flexibility for school improvement, curriculum and co-curricular planning, and sharper accountability for improving student outcomes

http://www4.unescobkk.org/nespap/sites/default/files/Preliminary-Blueprint-ExecSummary-Eng_0.pdf

EXHIBIT 3

Comparison of Malaysia's PISA 2009+ ranking against other countries

TIMSS and PISA International Assessments

TIMSS is an international assessment based on the Mathematics and Science curricula of schools around the world. It assesses students in Grades 4 (the Malaysian equivalent is Year 4) and 8 (the Malaysian equivalent is Form 2) along two aspects: content such as algebra and geometry, and cognitive skills, namely the thinking processes of knowing, applying, and reasoning. The test was first administered in 1995. Today, over 59 countries participate in the assessment which is conducted every four years. Malaysia has participated in TIMSS since 1999, although only with Form 2 students.

PISA, co-ordinated by the OECD, is another widely recognised international assessment. Conducted every three years, PISA aims to evaluate proficiency in Reading, Mathematics, and Science in students aged 15 years old. Its focus is not on curriculum content, but on students' ability to apply their knowledge in real-world settings. Participant countries extend beyond OECD members, with 74 countries taking part in the most recent assessment in 2009. Malaysia participated for the first time in 2010, as part of the 2009 PISA assessment cycle.

Regional peers

2 Mathematics

Rank	Country	Mean score
1	Shanghai-China	600
2	Singapore	562
3	Hong Kong	555
4	Korea	546
5	Taiwan	543
⋮		
20	Austria	496
	OECD Average	
21	Slovak Republic	497
⋮		
41	Croatia	460
	International Average	
42	Israel	447
⋮		
52	Thailand	419
⋮		
57	**MALAYSIA**	**404**
⋮		
68	Indonesia	371

3 Science

Rank	Country	Mean score
1	Shanghai-China	575
2	Finland	554
3	Hong Kong	549
4	Singapore	542
5	Japan	539
⋮		
20	Ireland	508
	OECD Average	
21	Czech Republic	500
⋮		
40	Greece	470
	International Average	
41	Malta	461
⋮		
51	Thailand	425
⋮		
52	**MALAYSIA**	**422**
⋮		
66	Indonesia	383

[1] the percentage of top performers (Level 5 or 6)

Eleven shifts to transform the system

EMPOWER JPNs, PPDs, AND SCHOOLS TO CUSTOMISE SOLUTIONS BASED ON NEED

- Accelerate school improvement through systematic, district-led programmes in all states by 2014
- Allow greater school-based management and autonomy, including greater operational flexibility over budget allocation and curriculum implementation, starting with the best performing and most improved schools
- Ensure 100% of schools meet basic infrastructure requirements by 2015, starting with Sabah and Sarawak

LEVERAGE ICT TO SCALE UP QUALITY LEARNING ACROSS MALAYSIA

- Provide internet access and virtual learning environment via 1Bestarinet for all 10,000 schools by 2013
- Augment online best practices content starting with a video library of best teachers delivering lessons in critical subjects in 2013
- Maximise use of ICT for distance and self-paced learning to expand capacity and allow for more customised learning

TRANSFORM MINISTRY DELIVERY CAPABILITIES AND CAPACITY

- Empower JPNs and PPDs through greater decision making power over budget and personnel while also holding them accountable for common KPIs from 2013
- Deploy almost 2,500 more personnel from Head Office and JPNs to PPDs to better support schools by 2014
- Strengthen leadership capabilities in pivotal 150-200 leadership roles from 2013
- Strengthen key central functions and rationalise structure of Ministry from 2016

PARTNER WITH PARENTS, COMMUNITY, AND PRIVATE SECTOR AT SCALE

- Equip every parent to support their child's learning via a parent engagement toolkit and online access to their child's in-school progress (SAPS system)
- Invite every PIBG to provide input on contextualisation of curriculum and teacher quality from 2016
- Expand Trust School model to 500 schools by 2025 by including alumni groups and NGOs as potential sponsors

MAXIMISE STUDENT OUTCOMES FOR EVERY RINGGIT

- Link every programme to clear student outcomes and annually rationalise programmes that have low impact; align to government's overall shift towards outcome-based budgeting
- Capture efficiency opportunities, with funding reallocated to the most critical areas such as teacher training and upskilling

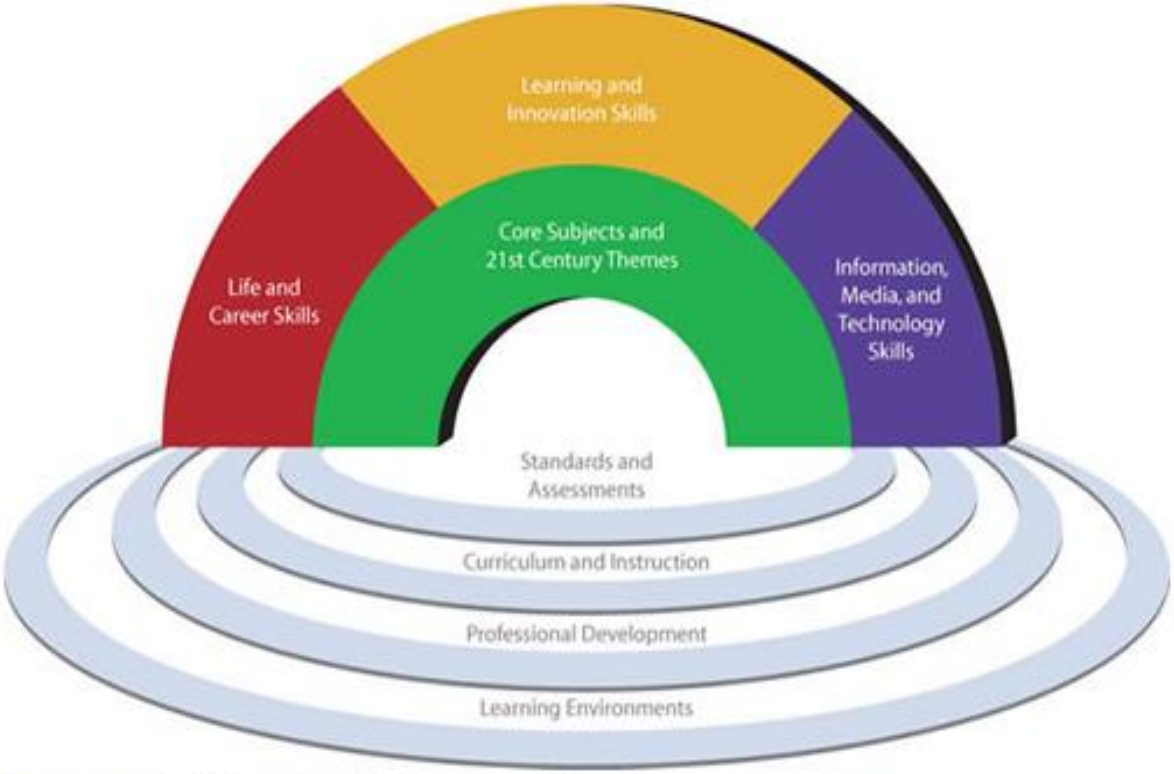
INCREASE TRANS-PARENCY FOR DIRECT PUBLIC ACCOUNT-ABILITY

- Publish an annual public report on progress against Blueprint targets and initiatives, starting for the year 2013
- Conduct comprehensive stock-takes in 2015, 2020 and 2025 to ensure Blueprint remains relevant by incorporating stakeholder feedback and accounting for an ever-evolving external environment

8 9 10 11

Conclusion

21st century students should be equipped with *essential skills for sustainable living*.



Resources (wiki by Sheryl Nussbaum-Beach)
Route 21: Building 21st Century Skills by p21.org

These include *thinking, living* and *technology skills* that are also emphaized in SEAMEO '*Borderless School*' (BS), i.e. '***a school that prepares students to become global players who are enterprising, creative, innovative, equipped with 21st century skills, and lifelong learners.***'

It is high time BS was identified as one of the 10 focus areas in Golden SEAMEO for the next decade.

It is thus our duty as educators to be part of the team to facilitate these groups of global players towards achieving the aspiration of the nation!

Nan dhri

Terima kasih

Thank you

Merci

谢谢您

ありがとうございました

Xie xie ning

Arigatogozaimatsu