A stylized, light-colored illustration of a plant with several leaves and a cluster of small, round fruits or berries, positioned on the right side of the slide.

9 February 2018
NSF Science of Learning



LEARNING VERSUS EDUCATION

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NSF Science of Learning
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My beliefs

Ultimate aim of Education:

To prepare the younger generation for the future!

WHY?

Core business of education

Learning!

How?

However,

Learning is a Human Instinct,
but education is not.

Education is system of learning
we design for our younger generation
and ourselves.



The question is:

Is our system (and policies)
conducive to learning?

Typical career path, industrial era

- John
 - BScEng (1971)
 - Graduated in Electrical Engineering
 - Appointed to the Department of Electrical Engineering
 - Promoted to a very senior position
 - Stayed in the Department until 55
 - Enjoying early retirement



- One credential
- One job
- One occupation
- One organization

That belongs to the past!!!

To date,

Education is basically about
definitive contents, processes, targets, ...
hence assessments for definitive expectations.

Assuming, after all,
individuals would learn as we design.
Those who do not are failures.

This is not a problem in a typical industrial society

Categorical division of labor

Lifelong employment

Predictable career paths

Lifelong occupation

Education for Credentials

That promise smooth sailing

A conceptual diagram with two large, irregular, hand-drawn shapes. The left shape is yellow and contains the text 'Society (Human Resources)'. The right shape is green and contains the text 'Human Beings'. A small, brown, rectangular label with the word 'Education' is positioned between the two shapes, overlapping both. The background is a light gray with a faint, stylized plant illustration in the upper right corner.

Society
(Human Resources)

Education

Human Beings

Society has changed ...



Production for Needs >>

Creation of Desire

Mass Production >>

“Less of More”

Large Pyramidal Bureaucracy >>

Small, flat, loose, fragile One-stop units

Organizational Commitment >>

Individual Endeavors

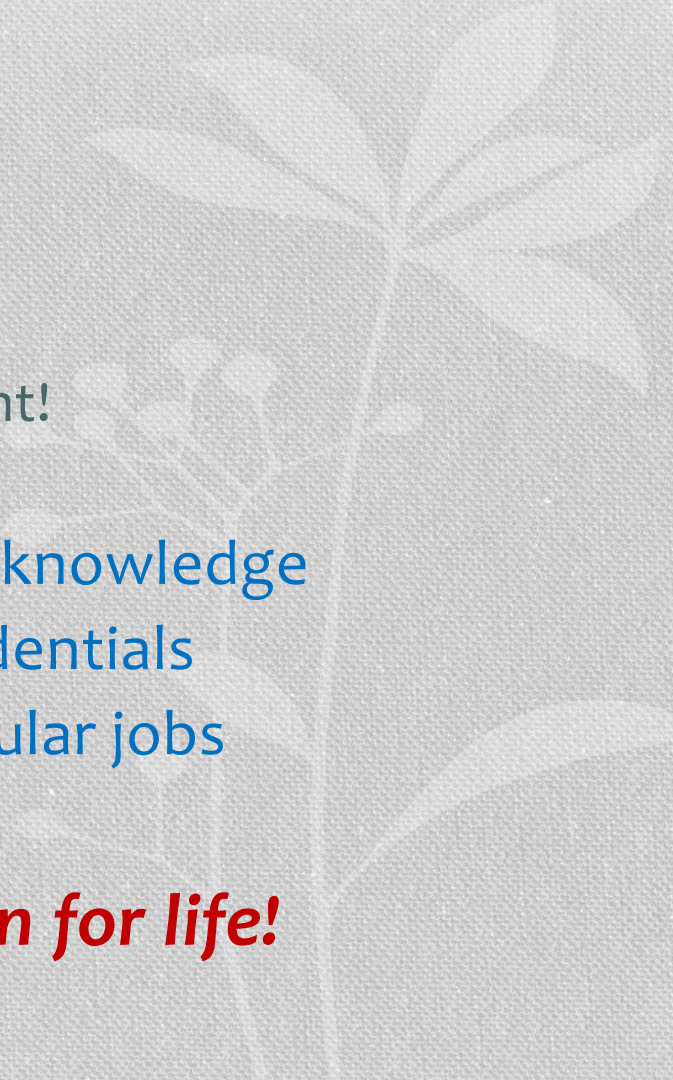
Now, we are moving away from the typical industrial society ...

Volatile
Uncertain
Complex
Ambiguous

It's VUCA Society

Individual face diverse careers paths:

Study-work Mismatch
Frequent change of jobs
Frequent change of occupations
Non-employees
Intermittent Employments
Start-ups
Free-lancers
Multiple Portfolios
Unintended Unemployment
Voluntary Unemployment
Early Retirement



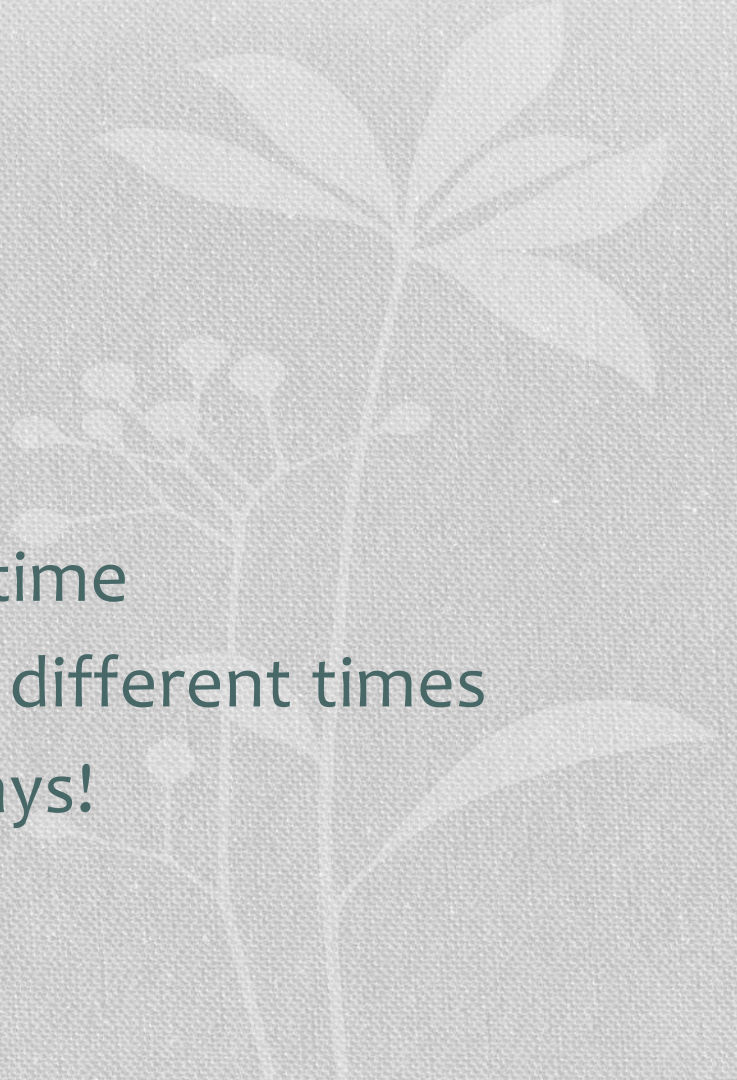
Education
has to be different!

No longer about feeding knowledge
No longer about credentials
No longer to fit particular jobs

It's about preparation for life!

To face the future, ...

They have
to learn all the time
to learn different things at different times
in different ways!



That is ...

They have to learn how to learn!

Hence

Learning to Learn

(Title for Curriculum Reform Hong Kong 2002)

Therefore

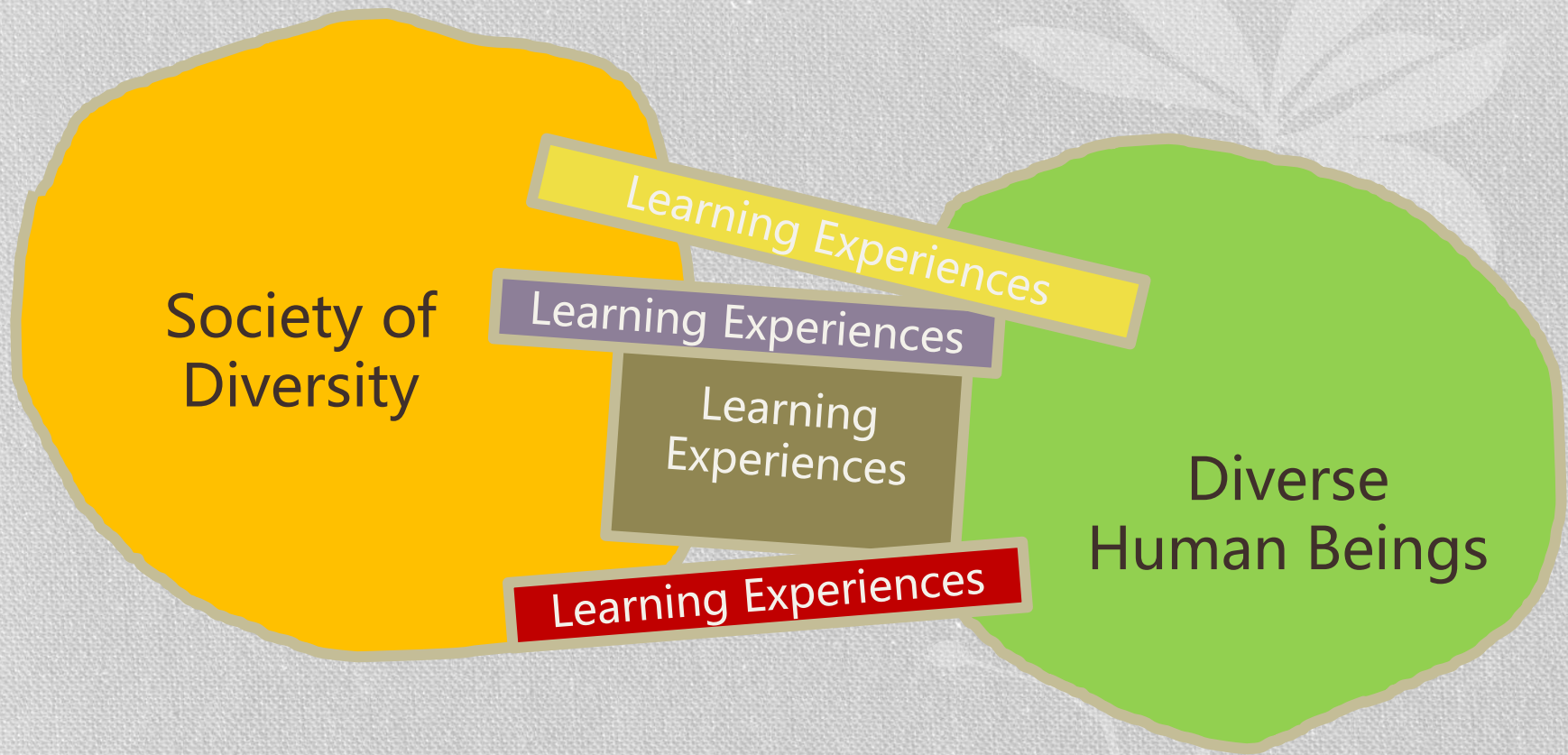
Science of Learning



To start with ...

Learning is meaning-making.
Learning is knowledge construction.

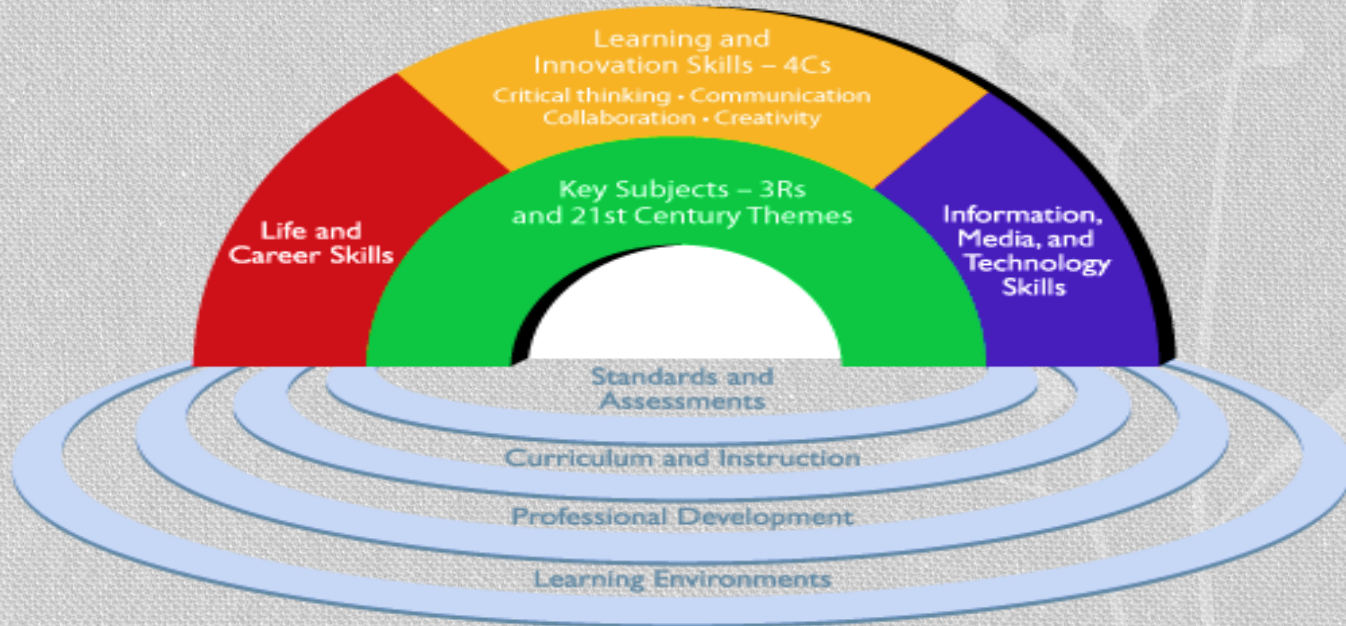
Therefore,
Learning is not pouring “knowledge” from external sources.
Learning happens in individual brains.
Learning depends on individuals’ respective experiences.
Even with the same experience, individuals learn differently.



21 Century Skills (US)

P21 Framework for 21st Century Learning

21st Century Student Outcomes and Support Systems





However,

Is skills adequate?

Is there a place
for social and emotional development?
for personal development?

The Spectrum



- Spirituality
- Global citizenship
- Cultural identity
- National identity
- Citizenship
- Community harmony
- Human relations beyond job
- Human relations on job
- Work related attributes



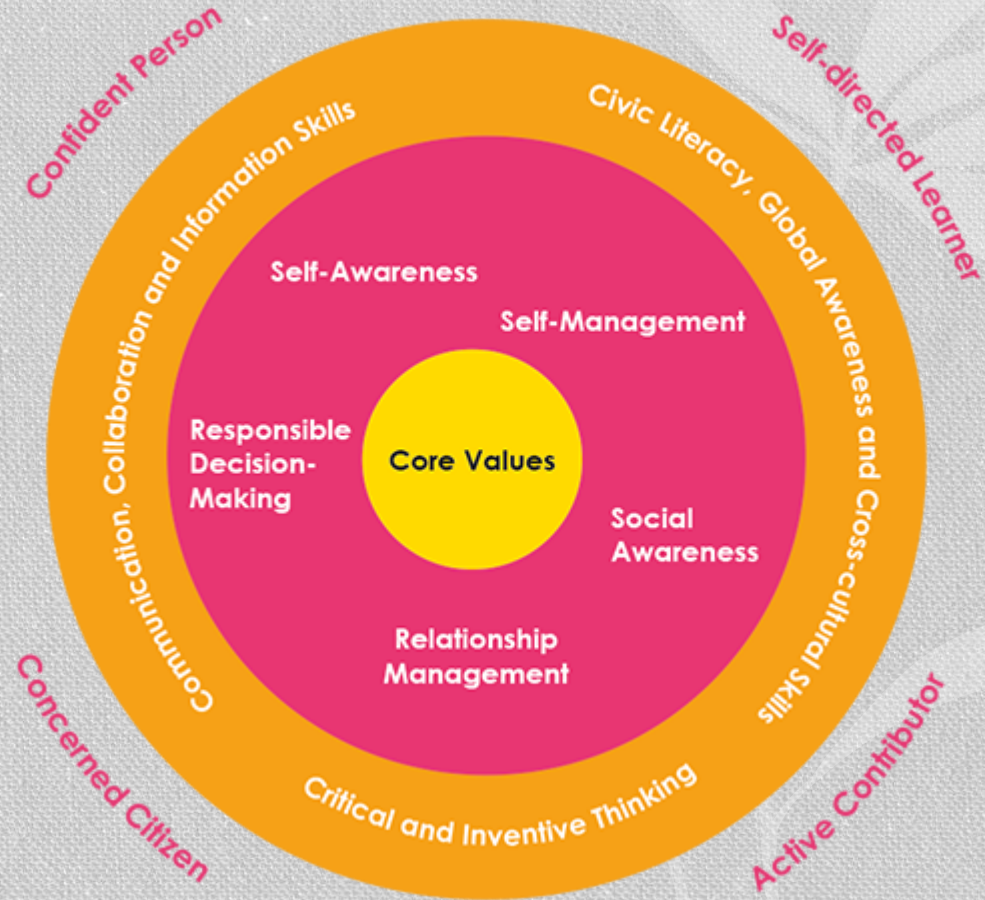
Attempting a Framework

	Economic Discourse	Social Discourse	Humanity Discourse
Global Perspective	Competitiveness	Understanding/ Peace	Global Citizenship
National Perspective	GDP	HDI	Citizenship/ Patriotism
Individual Perspective	Employability	Community Harmony	Moral/ Character

Starting from **the person**, ...

examples from East Asia.

Singapore 21st Century Competency Framework



Korea

An independent person

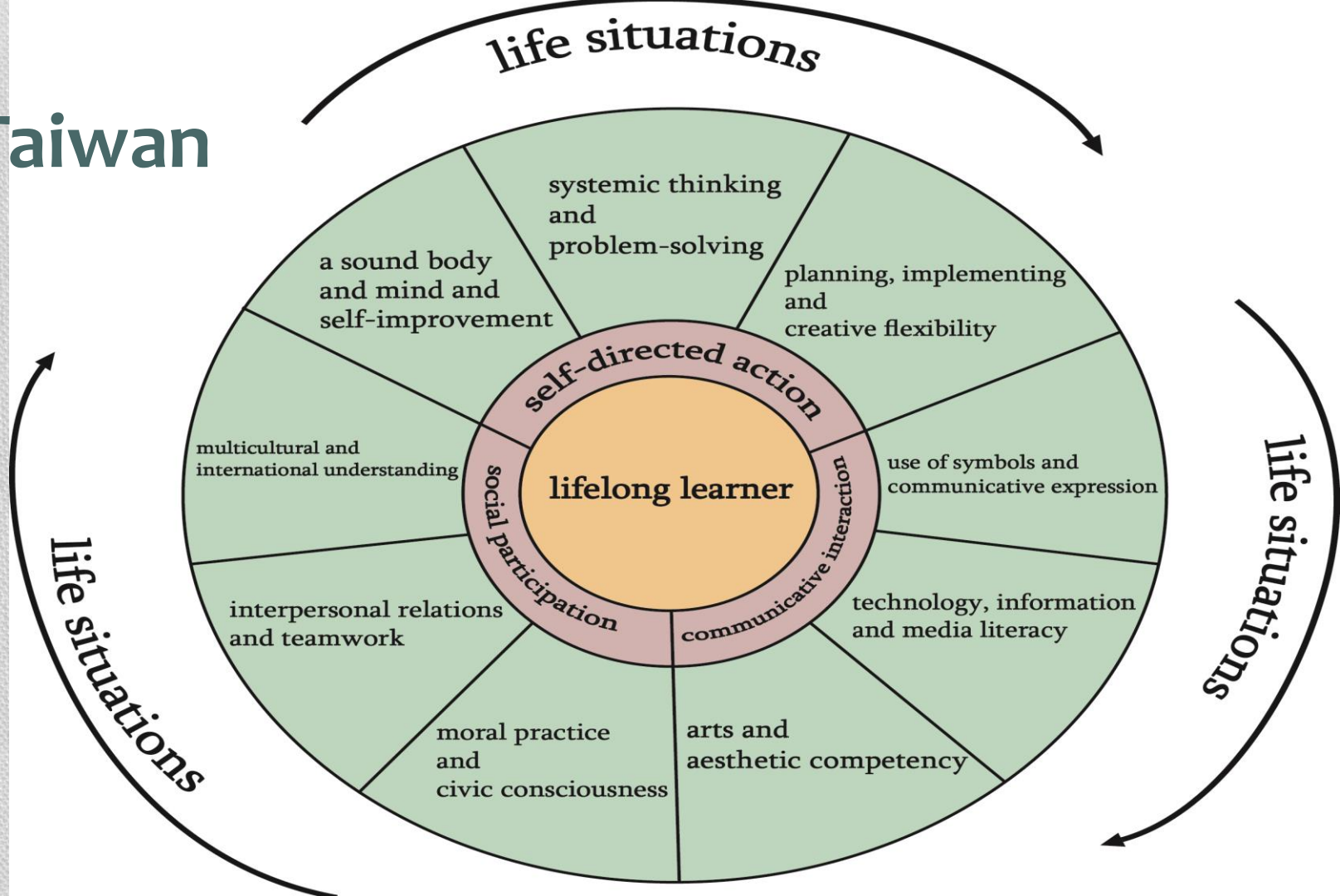
An ingenious person

A refined person

A democratic citizen



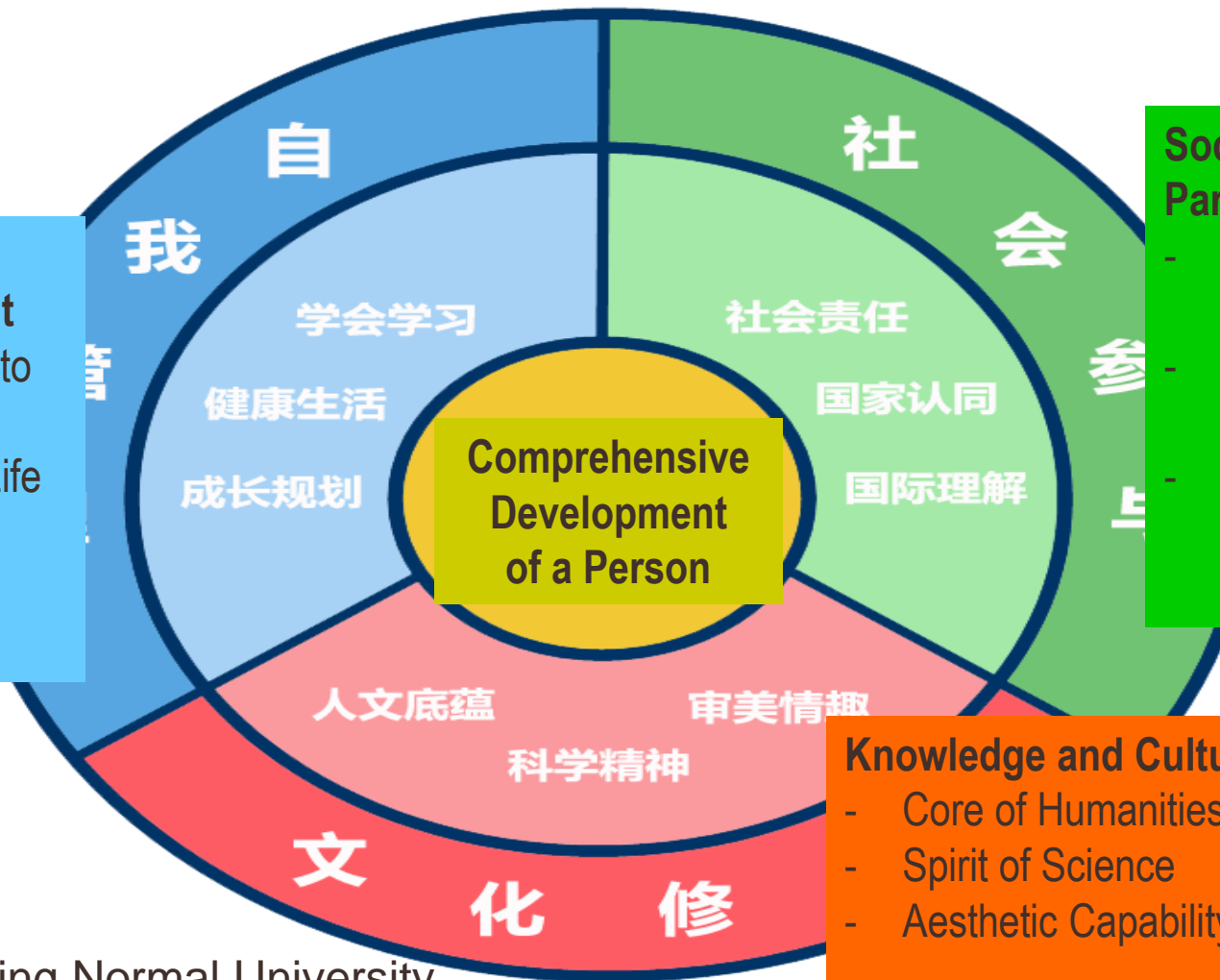
Taiwan



China

Self Management

- Learning to Learn
- Healthy Life
- Growth Planning



Social Participation:

- Social Responsibility
- National Identity
- International Awareness

Knowledge and Culture:

- Core of Humanities
- Spirit of Science
- Aesthetic Capability

Hong Kong (Hong Kong Education 2.1)

People Quality

Capability

*language, mathematics, computational thinking, science and technology literacies,
global, national and civic literacies*

Attributes

*creativity, teamwork, leadership, resilience, self-discipline, aspiration and
motivation, rights and responsibility, sensitivity to ethnicity, religions and cultures,
inclusiveness, ...*

Values

*love and care, integrity, justice, peace, righteousness, charity, environmental
stewardship, national and cultural identity, spirituality, ...*

Diverse modes of Learning Experiences

(Hong Kong Education 2.1)

People Quality

Capability

language, mathematics, computational thinking, science and technology literacies, global, national and civic literacies

Attributes

creativity, teamwork, leadership, resilience, self-discipline, innovation and motivation, rights and responsibilities, sensitivity to ethnicity, religions and cultures, ...

Values

love and integrity, justice, peace, righteousness, compassion, environmental stewardship, national and cultural identity, spirituality, ...

Mitigated by
the Media

Curriculum

Experience

Enculturation

Learning-based reform in Hong Kong (2002-16)

Learning to Learn

Chart the learning experiences students deserve.

Compress the traditional “subjects”.

Create new learning experiences.

Free up space for diverse/autonomous learning.

Immediate measures:

Reduce public assessment
From THREE (Grades 6, 11, 13)
To ONE (Grade 12)

Visible impacts:

More lively school lives

More active learning

Diverse learning experiences

Engaging community resources

(9.8 partnership programs/school)

Example

Learning Chinese



Example

Learning Chinese



Grade 3 students are
given a large piece of
blank paper and a theme.

E.g. Spring

春天

Grade 3 students are expected to find relevant vocabulary on their own.

春天

Requirements

- Minimum 6
- No upper limit
- 3 marks for each
- No deduction for mistakes

菊花 玫瑰 蒲公英 洋紫~~蘭~~ 種子~~夏天~~ 秋天
冬天 雨天 晴天 蝴蝶 草花 樹~~初~~ 綠油油 青蔥
蜜蜂~~夏天~~ 熱 冷 郊 野 郊遊 木棉樹~~牡丹~~
嬌媚 柔弱 淡淡的 春天 花香 味 花 柳 葉子
夏季 天空 太陽 陽光 森林 世界各地的天氣
天文台 閃電 打雷~~春風~~ 登山 遠足 旅行
撲鼻 芬芳 奪目 彩 開~~花~~ 花地 耀眼 色彩
~~種花~~ 郊外 暖和~~種植~~ 種植 來臨

Minimum six

No limit

蝴蝶 玫瑰 蒲公英 洋紫荊 種子 夏天 秋天
冬天 雨天 晴天 蝴蝶 草花 樹 縫油 油 青蔥
蜜蜂 熱 冷 郊野 郊遊 木棉樹 牡丹
嬌媚 柔弱 淡淡的 春天 花香 味 花 柳 葉子
夏季 天空 太陽 陽光 森林 世界各地的天氣
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撲鼻 芬芳 奪目 彩 開花 花地 耀眼 色彩
種植 郊外 暖和 樹 植 來臨

3 /word

No deduction
for mistakes

三、心理詞彙

看到「春天」這個詞語，你會想到甚麼？請把你想到的詞語寫下來，寫得越多越好，但最少要寫下 6 個。（每個正確詞語得 3 分）

Mental Lexicon

Vocabulary Building

Active Learning

Diversity

春天 種子 夏天 秋天
冬天 晴天 蝴蝶 草 花 樹 綠油油 青蔥
蜜蜂 蝴蝶 春天 遊木棉樹 牡丹
花香 味 花 柳 葉子
夏季 天空 太陽 陽光 森林 世界各地的天氣
天文台 閃電 是旅行
撲鼻 芬芳 奪目 色彩 開花 花地 耀眼色彩
種植 郊外 睡蓮 種植 來臨

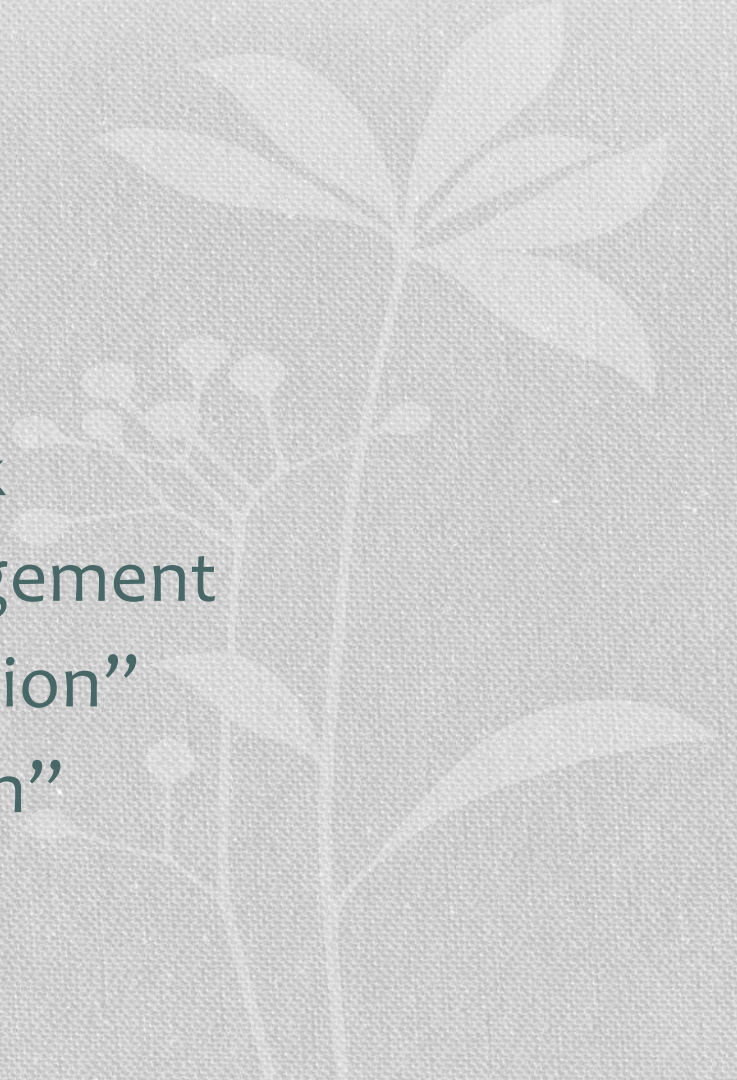
Teachers innovations

Group work

Whole class engagement

“Recommendation”

“Classification”



PIRLS Progress in International Reading Literacy Study

Hong Kong results:

- PIRLS 2001: 14th
- PIRLS 2006: 2nd
- PIRLS 2011: 1st



Efforts to scale

Numerous workshops for teachers

Experiment in Pilot Schools

Forums for Parents



Challenges



Challenge 1

Assessment reforms

From
What do they know?
To
What can they do?

Creation, Application, Integration, Collaboration

Challenge 2

Active Learners

Motivation

Choice

Autonomy



Challenge 3

University admissions

Liberal Studies

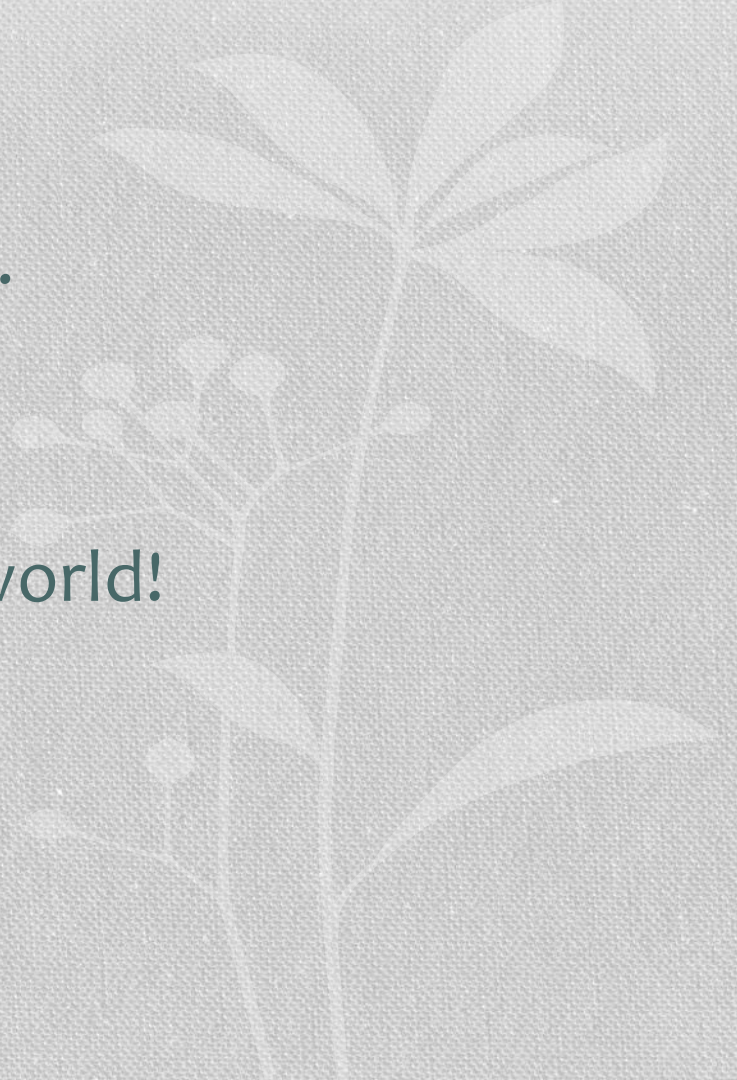
Other Learning Experiences

Students' Learning Portfolios

Largely ignored.

However, the largest challenge ...

It's a turbulent world!











97.22					
34.79					
63.71	-1.22	▼	-3.34	82.11	
4.35	-0.83	▼	-8.74	27.82	-1.04
1.83	-0.77	▼	-6.61	34.34	1.84
	-9.43	▼			

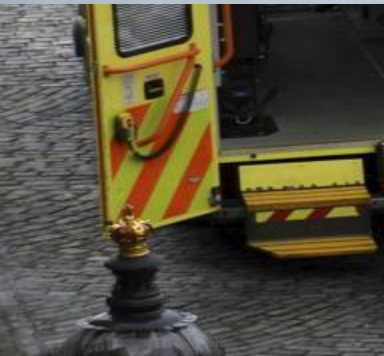


















It is a world of turbulence ...

Ever worsening climates and natural disasters

Frequent man-made accidents

Unpredictable economic crises

Spontaneous political unrest

Recurrence & emergence of epidemics

Irresponsible politicking

Increasing potentials of war

Organized and unorganized terrorist activities

Widespread serious corruption

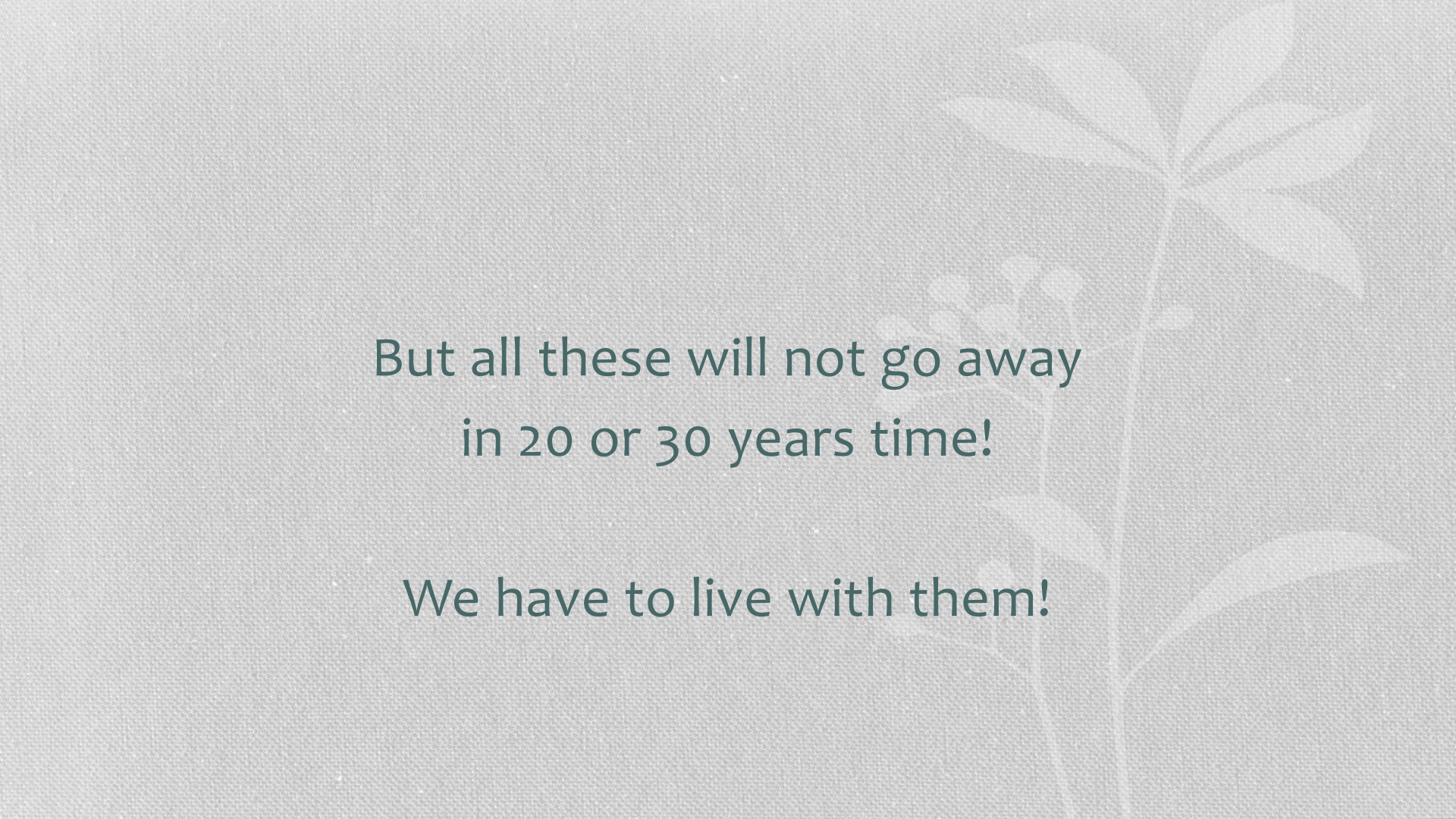
Unstoppable waves of refugees

Shameless cheating and faking

Emotions of independence

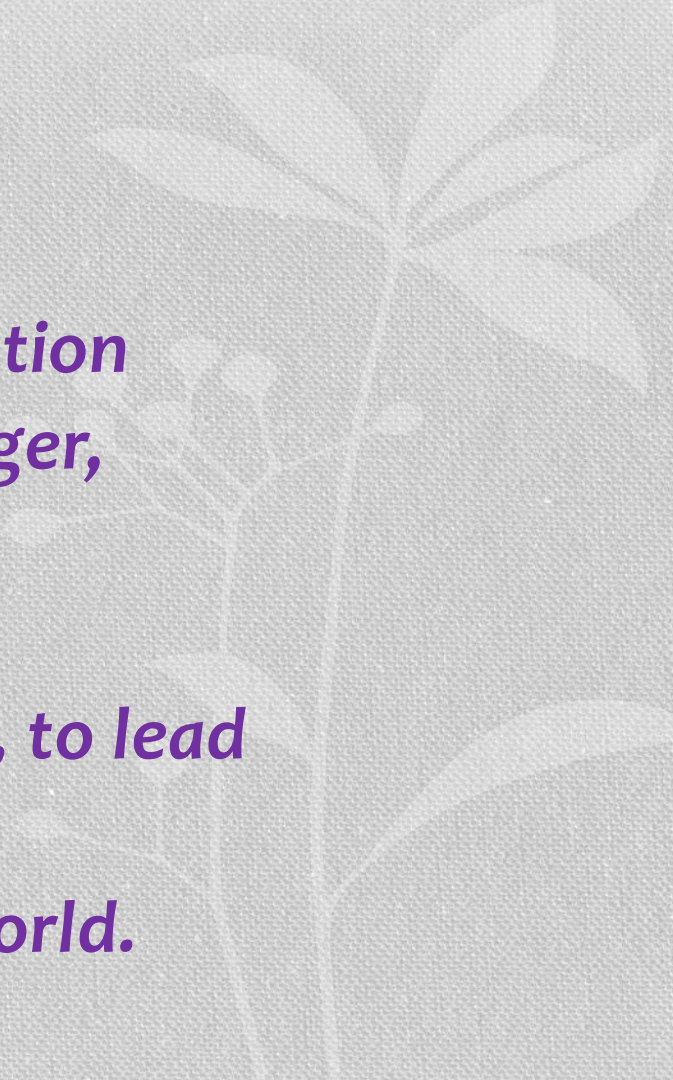
Unwanted results of democratic processes

... ..



But all these will not go away
in 20 or 30 years time!

We have to live with them!

A stylized, light green illustration of a plant with several leaves and small buds, positioned on the right side of the slide.

**Our next generation
has to be stronger,
in order**

**to survive, to thrive, to lead
&
to change the world.**

Education as it is now

Higher Education
Career Readiness

Secondary School
College Readiness

Kindergarten
School Readiness

These are apparently
taken for granted!

But are they indeed justifiably
the aims of education?

Thank you!

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