Learning for now and the future

Dr. Rosemary Hipkins

Presentation at IB Schools Conference, The Hague, Saturday 31 October, 2015
Theme 1: Who do we want our young people to be?
The International Baccalaureate® aims to develop inquiring, knowledgeable and caring young people who help to create a better and more peaceful world through intercultural understanding and respect.
UNESCO’s idea was “four pillars of learning” (but one of them is missing here....)
Most of us would say we want our young people to be engaged and productive citizens.

In science students explore how both the natural and physical world and science itself work so that they can participate as critical, informed, responsible citizens in a society in which science plays a significant role.

In technology, students learn to be innovative developers of products and systems and discerning consumers who will make a difference in the world.
The Greenhouse Effect

The Enhanced Greenhouse Effect

Steve Burgess Graphics
<table>
<thead>
<tr>
<th>Symbol and how interpreted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larger circles (earth) read as representing the sun</td>
</tr>
<tr>
<td>“... the tired and exhausted sweaty sun..”</td>
</tr>
<tr>
<td>Arrows (energy flow) read as movement of gases</td>
</tr>
<tr>
<td>“... more gases will be entering and exiting the atmosphere..”</td>
</tr>
<tr>
<td>Colour intensification (temperature increase) read as visual pollution</td>
</tr>
<tr>
<td>“... if we have a dirty environment the earth will get hotter and hotter.”</td>
</tr>
</tbody>
</table>

Image and quotes from Assessment Resource Banks (ARBs) www.arbs.nzcer.org.nz
We live at the bottom of a thin layer of gases called our atmosphere.

This layer keeps us alive, protects us from the harsh conditions of space.

It is fragile and we need to look after it better than we do.
Measures of Variation: The Sample Standard Deviation

- Most commonly used measure of variation
- Shows variation about the mean
- Is the square root of the variance
- Has the same units as the original data

\[ S = \sqrt{\frac{\sum_{i=1}^{n} (X_i - \bar{X})^2}{n - 1}} \]
Whenever I see …

I remember …

Mine could even be like this …

Or even this …

I must take this uncertainty about where it really is into account when I make comparisons!
Looking carefully/pattern recognition

Distinguishing observation from inference

Building awareness that what we already know influences what we observe

Asking curious questions/ finding ways to check our inferences

http://www.outreach.canterbury.ac.nz/chatham/resources/resources_5.shtml
Charlatan Ring merits contempt
Ring's tip sends families fleeing
(NZ Herald headlines)

What knowledge, skills and dispositions are needed to think like this?
Can we teach them?

Theme 2: Key competencies can add ‘something more’ to the learning that we plan for students
In the NZ curriculum key competencies are defined in an interesting way.

But many NZ teachers and school leaders can't tell me what the words in the circle say.

KCs are .....capabilities for living and lifelong learning.
<table>
<thead>
<tr>
<th>OECD key competencies to underpin PISA assessment frameworks</th>
<th><strong>New Zealand introduced its own version in to our national curriculum framework (NZC)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thinking (cross-cutting)</strong></td>
<td></td>
</tr>
<tr>
<td>Acting autonomously</td>
<td>Managing self</td>
</tr>
</tbody>
</table>
| Functioning in socially heterogenous groups | Relating to others  
Participating and contributing |
| Using tools interactively | Using language, symbols and texts |
|  | Thinking (not identified as cross-cutting) |
Two possible pathways for implementation

1990s – “Essential Skills” for economic productivity

OECD DeSeCo project

New and better essential skills

Social justice/democratic participation
Transforming learning for the 21st century

After Reid, 2006
Learning to recognise and use discipline-specific (normative) ways of thinking

An explicit focus on acts of thinking

Thinking about thinking

Recognising how texts structure thinking

Asking questions about meaning-making

Using strategies such as De Bono’s six hats

Strengthening existing thinking skills

Fostering agency and the disposition to be a critical thinker
A ‘both/and’ way of thinking …

There are reciprocal relationships between the learning areas and the key competencies.

When these relationships are purposefully exploited both the learning areas and the key competencies are strengthened.

Opportunities to develop key competencies can play out as opportunities to develop learning areas and vice versa.
Sione knows the way to school.
He knows that he has to walk straight to school
and then straight home at three o’clock.

First, Sione thinks about the walk to school.
Muamua, e māfaufau Sione e uiga ‘i le sāvaliga
‘i le ā’oga.

‘Ua iloa lelei e Sione
le ‘aula aaga ‘i le ā’oga.
‘Ua ia iloaina fo‘i e tatau
ona alu sa‘o ‘i le ā’oga
ma toe fo‘i mai ‘i lona ‘āiga
pe‘ā tū‘ua ‘i le tolu ‘i le aouli.

http://education.nzta.govt.nz/resources
ANALYSING WHAT'S ACCEPTABLE

YEAR 12 ENGLISH CLASSES ARE ANALYSING ROAD SAFETY AD CAMPAIGNS FOR NCEA, DRAWING ON THEIR PRIOR KNOWLEDGE OF HOW YOUNG PEOPLE BEHAVE ON OR NEAR OUR ROADS.

http://education.nzta.govt.nz/resources/secondary/english#
Key competency/subject combinations contribute to contextually specific sets of capabilities

Specific subject-based learning challenges

KC
KC
KC
KC
KC

Capabilities for now

Capabilities for the future

Contexts of action
Theme 3: Students need to build capabilities for futures we cannot predict
Learner Development

<table>
<thead>
<tr>
<th>No risk</th>
<th>High risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional content</td>
<td>Knowledge building</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learner Transformation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic skills</td>
</tr>
</tbody>
</table>

Learning for an unknown future

After Barnett, 2004
What sorts of capabilities will today’s young people need to thrive in futures we cannot predict?
Social Messes
Representing Wicked, Ill-Structured Problems

No unique "correct" view of the problem

Ideological constraints

Many possible intervention points

Political constraints

Often a-logical or illogical or multi-valued

1 + 2 = 7

Great Resistance to change

Copyright 2007 Robert E. Horn

When knowledge claims conflict..

Climate change as the wicked problem

Exploring matters of truth, belief and evidence

Building discipline-specific ways of thinking

Developing a critical radar for truth claims and fostering the disposition to use it
Introducing five science capabilities

Five basic capabilities in the science learning area have been identified from our Nature of Science (NOS) research. We asked what capabilities could contribute to a functional knowledge of science. We also thought about what these capabilities would look like for students at different ages and what we might expect to see them do and say.

Within each capability you will find over ten resources to explore and use in the classroom. Explore the capabilities and resources below. These capabilities are a guide for adapting teaching and learning and are not an exhaustive list. The boundaries between the capabilities are blurry. Any learning activity could provide opportunities to strengthen more than one of them, but for planning, teaching and assessment purposes, it is useful to foreground one specific capability.

Teachers often ask why they were called 'capabilities'. Dr Rosemary Hipkins of NZCER explains why the capabilities were developed (what they are supposed to "do" in terms of teaching and learning), why they were called that, and how they fit in with our curriculum’s key competencies. Read her article "Unlocking the idea of capabilities in science".
Fostering systems thinking

Food security as the wicked problem

Looking for connections between seemingly disparate events and actions

Fostering dispositions to consider wider impacts of our own decisions

Looking at ways social systems create relative advantage and disadvantage

Practicing ‘it depends’ thinking
Students in one school were challenged to weigh up conflicting interests in relation to the culling of the wild horses of the ecologically fragile Kaimanawa Plateau.
• What are our young people capable of now?
• What do they hope to be and become capable of?

However we answer these questions, we can’t leave capability-building to chance. We need to be clear about purposes for learning that are more expansive than gaining content and skills for their own sake.

Strategically weaving key competencies and content together can create powerful learning for now and for the future
Barnett’s dispositions for an unknown future

- Carefulness
- Thoughtfulness
- Humility
- Criticality
- Receptiveness
- Resilience
- Courage
- Stillness
Selected references to our work


Other references


Other resources

Building students' inferential reasoning: Statistics curriculum Levels 5 and 6 (The TLRI research project)

Examples of teaching for reciprocal relationships between key competencies and learning areas (subjects)
http://nzcurriculum.tki.org.nz/Key-competencies/Key-competencies-and-effective-pedagogy