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Doctoral education as part of sustainable development

SSRU
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Conclusion

“3. Development involves a progressive transformation of economy and society....But physical sustainability cannot be secured unless development policies pay attention to such considerations as changes in access to resources and in the distribution of costs and benefits. Even the narrow notion of physical sustainability implies a concern for social equity between generations, a concern that must logically be extended to equity within each generation”.

(United Nations, 1985)
“41. Economic and social development can and should be mutually reinforcing. Money spent on education and health can raise human productivity. Economic developments can accelerate social development by providing opportunities for underprivileged groups or by spreading education more rapidly”.

(United Nations, 1985)
2016 United Nations 17 goals to transform the world.

4. Quality education

8. Decent work and economic growth

(United Nations, 2016)
Figure 3
World wealth levels 2012

Source: James Davies, Rodrigo Lluberas and Anthony Shorrocks, Credit Suisse Global Wealth Databook 2012

Wealth per adult (USD)
- Under USD 5,000
- USD 5,000 to 25,000
- USD 25,000 to 100,000
- Over USD 100,000
- No data
Number of people with HDR attainment
Top 5 countries for international students

<table>
<thead>
<tr>
<th>Destination country</th>
<th>Total number of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  US</td>
<td>740482</td>
</tr>
<tr>
<td>2  UK</td>
<td>427686</td>
</tr>
<tr>
<td>3  France</td>
<td>271399</td>
</tr>
<tr>
<td>4  Australia</td>
<td>249588</td>
</tr>
<tr>
<td>5  Germany</td>
<td>206986</td>
</tr>
</tbody>
</table>

Source: UNESCO Institute for Statistics, July 2014
This pattern does not serve sustainable development goals.
Development of PhD

1880
Germany

1861
USA

1900
Canada

1917
UK

1948
Australia

1950
Thailand*

*Chronicle of Thailand: Headline News Since 1946
Using one-on-one supervision model
Rapid expansion

Worldwide PhDs Granted Annually

- TOTAL
- China PhDs
- India PhDs
- US PhDs
- UK PhDs
- Australia PhDs
The rise of generic training skills
Critical Thinking
- Imagination and Creativity
- Logic and Reasoning
- Conceptual Thinking
- Reflection and Feedback

Problem Solving
- Imagination and Creativity
- Logic and Reasoning
- Data Collection
- Conceptual Thinking
- Reflection and Feedback
- Scientific Experimentation

Research Skills

Analysis
- Data Collection
- Data Analysis
- Reflection and Feedback
- Scientific Experimentation

Dissemination
- Imagination and Creativity
- Logic and Reasoning
- Conceptual Thinking
- Reflection and Feedback
Demanding quality

• Massification within university environments has implications for pedagogical contexts in general, including HDR programs.

• This is commonly perceived to be a result of national and state government priorities that focus on growing the number of skilled people to meet the demands of innovation. These priorities are common throughout the industrialised world and there is a general emphasis on the need for higher education to meet future demands.
The rise of quality Assurance

Examples:

• Australia
  – TESQA (level 10)
  – ACOLA (Recommendation 10: evaluation of supervisory competence)

• EU
  – Seven principles for professional research supervision.
But this is minimum

• Quality assurance should be welcome by all universities- but should we merely aim for the minimum?

• What might better practice look like?
• What assumptions underpin the notion that all supervisor can and should do all things?
What is missing
Scaffolded Learning

• Jerome Bruner, a cognitive psychologist developed the notion of Scaffolded learning in the 1950s in regard to children learning to read by listening and watching adults read bedtime stories.

Scaffolding is basically changing the level of support to suit the cognitive potential of the learner
Underpinnings

• Vygotsky’s zones of proximal development.
• Schön’s indeterminate zones of professional practice
• Lave and Wenger’s Legitimate Peripheral Participation and communities of practice
Zones of Proximal Development

Learner Cannot do

Learner can do with Guidance

Learner can do unaided

Legitimate Peripheral Participation

Community of Practice

• Often explicitly or implicitly used to endorse cognitive theory, to describe workplace teams, to define groups brought together by shared interests or common problems.

• But here we are talking about Situated Learning
Within communities of practice, roles of various members at various stages of their activities and progress may be systematically supported, with good theory to underpin the communities’ endeavours.
Learning by doing research

A shift from teaching to engagement in practice. Taking into account the learner's perspective.

Central to this is Research Practice and Research Community
Known outcome

• Originally a master and apprentice model but now layered with deliberate learning objectives.

• Knowing what is to be learned means we can access that it has been learned.
Risk

• Reducing all knowledge practice to the language of the community runs the risk of ignoring what to make of the hard facts of science, technology, politics ....
Panel-cohort supervision
Improved completions

- 2004: 17%
- 2008: 75%
- 2012: 83%
Reduced time taken to complete
Not enough

Candidates should become doctoral
Collect and add

Research Skills

Critical thinking

Writing

International

Networked with industry

collegial
PLUS

• impact and outputs
• funding and grants
• managing well at work (whether in academia or government, business, industry etc)
• research collaborations
• personal and social competencies
• career planning
A person who is doctoral should be a skilled person who is capable of playing a maximum part in drawing their country to an influential position in knowledge societies and economics.
Stakeholders in doctoral programs

- Government
- University
- Staff
- Candidates
- The Discipline
- Industry
Factors for Universities/Faculties

• Workloads
• Resistance
• Prestige factors
• Undergraduate teaching
• Budgets
Lao, Rattana (2015) looks at implementing international standards in a way that safeguards “Thai-ness.”

Thai “socio-logic” – a term coined by Schriewer and Martinez (2004), which refers to the unique history, politics, and culture of a nation that influence the policy borrowing process.

forces of globalisation,
regional pressures from the Association of South East Asian Nations (ASEAN), and internal quality assurance goals and measures have ultimately led to “reform fatigue.”

Next iteration

To create an international experience for PhD students

and

To create Communities of Practice that move beyond the PhD
Swinburne/Tongji joint PhD

- Masters from both Universities
- Early career researchers from both universities
- Doctoral students from both universities
‘Made in China 2025’ seeks to upgrade and internationalise Chinese industry. Drafted by the Ministry of Industry and Information Technology with major input from the China Academy of Engineering, its focus is on technology innovation and its main application in major industries such as aeronautical, maritime, rail, and road transport. The goal is to transition China into an advanced economy.
For any country to achieve advanced economy status it also needs to address the ‘soft’ and psychological side of products and the consumers who use them.
Preferred model

The masters change depending on the expertise needed

Early Career researchers who graduate from the program

International network of students
Learning to tell a story through song
The Community of Practice

- Younger children
- Older children
- Teachers
- Researchers
- Indigenous elders
Use of progressive classroom
the expert as mentor within a framework of pedagogy

Without that framework we are left with happenstance. The learning opportunities are left to a Wheel of Fortune and depend on how lucky or unlucky the learner is.
And ability for the massification of doctoral training
Traditional model
New model
Growth

CCP1

CCP2

CCP3
Back to pedagogy

Emphasising the social and organizational context for project work has a number of educational advantages.

- enables us to relate the learning which takes place within projects to other sources of learning in organisations or social group.
These include:

- the individual learning
- the group learning of the project team,
- the learning of wider CoPs,
- and ultimately the organisational or social learning through which new practices and routines become part of the mainstream.
Conclusion

• The current model of PhD is not the best pedagogical approach.
• The proposed quality measures should be understood as a minimum requirement.
• The PhD is not sufficient in itself to support Early Career Researchers
• Internationalisation can be achieved hand in hand with research training.
  – More economically
  – more rapidly