Learning Collective Competences and intelligence for sustainable development

Miguel Chacon
Why competences for Sustainable development?
Poverty + Climate Change in Latin America

• Latin America contributes 6% of emissions of greenhouse gases related with climate change.
• 226 million people in poverty (almost half of total population). 77 million with no access to water.
• Climate Change will affect 34% of plants, 37% of reptiles, 43% of birds, 30% of corals.
• Lost of 4.4% territory of Brazil, 12% of area in Central America, Chile and Colombia.
• Growth and expansion of pandemic diseases due to CC.
• Economic Impact of Climate change is between 2% to 56% of GDP, not including destruction of ecosystems, health, and catastrophic events.
• Inform STERN 2006
• 5% to 10% loss of GDP due to climate change impact.
• World Bank borrows money for mitigation.
• World bank may focus on clean energy and incentives for reforestation, reduce soil degradation and biodiversity conservation.

According to World Bank
What competences for Sustainable development?

How should we learn competences for sustainable development?

Definitions

Competence (individual for SD) COMPLEXITY approach THEORY

• COMPLEX PROCESSES FOR CERTAIN CONTEXTS AND INTEGRATES SEVERAL KNOWLEDGES TO BE, TO DO TO KNOW AND TO LIVE TOGETHER.
  – (TOBON, 2007)

Collective competence

• Cooperatively enterprises
  • Social capital and networking with synergy
    • Socio organizational field

Collective competence for SD

• COMMUNITY oriented intelligences, SKILLS, VALUES, ABILITIES, collective knowledge INTEGRATING KNOWLEDGES FOR designing and implementing PROCESSES TOWARD SUSTAINABLE DEVELOPMENT.
• INCLUDING THE CLIMATE CHANGE IMPACT AND GLOBALIZATION ISSUES
## Methods for defining competence

**Productivity approach**

1. Identify competencies to perform work by functional analysis in relation to objectives.
2. Generalization of valid reference to a group of workers.
3. Assessment performance
4. Recognition of competence performed by worker

**Education approach**

- Competence based education: curriculum development for work identifying competences to improve performance for real work
- Human resource management

### What is a Sustainability approach?

More than Cognitive competences to increase productivity
Types of competences

• Basics: social learning and life learning

• Generic: common to all fields

• Specifics: each field

• **Instrumentals:**
  – analysis-synthesis, organization-planning, cultural knowledge, field knowledge, oral-written communication, second language, information technology, information management, problem resolution, decision making.

• **Interpersonal:**
  – critic, auto critic, team work, communication skills, multicultural skills, ethical commitment

• **Systemic:**
  – Knowledge implementation, research skills, adaptation to new situation and change, leadership, new ideas, independent work, project design and management, quality, motivation

Collective competences

- Know how to establish common problems and common goals
- Know how to communicate with common language
- Know how to develop and use and exchange collective base knowledge
- Know how to Cooperative in a network with different norms, cultures, resources and cognitive procedures
- Interdependency
- Resilience
Individual intelligences

- Rational
- Logical
- Lateral
- Natural (part of multiple)
- Multiple
- Emotional
- Spiritual
- Social

- Human plus not-Human intelligences
  - Artificial (computer)
  - Environmental (automatic built environment)
Collective Intelligences

- Traditional intelligence
  - Shared knowledge, information, abilities, believes & values learnt/transfered generation by generation in community-action processes, such as customary law
  - Ethnology & Anthropology & Popular Education
- Community Intelligence (co-intelligence)
  - COLLECTIVE INTELLIGENCE
  - Communities of practice
  - Cooperatives
  - Civil society organizations
  - Cyber-information society and cyber-community
  - Social-environmental networks
- Collective Action
  - Collective action versus Tragedy of the commons
Identifying Competences in Higher Education

by Consulting and surveys to groups: alumni, faculty, students
Competence: employment & education

Goal

• DEFINING THE RELATIONSHIP BETWEEN EMPLOYMENT AND EDUCATION TO ESTABLISH A FLEXIBLE PROFESSIONAL WHO ADAPTS WITH NEW KNOWLEDGE TO NEW TASKS.

• Questions about: knowledge and understanding, innovation, time management, organization and communication.

• Study will include in Latin America

STUDIES

• REFLEX: 39,000 GRADUATED European from 13 countries answered survey 5 years after they graduated in 1999-2000.

• CHEERS: 37 graduated European from 9 countries answered surveys after they graduated between 1994-95.
Reference Points (tuning)

• **TUNING: Consultation process in Europe (175 HEI) and Latin America (182 HEI in 18 countries)** including employers, graduates, academic staff, faculty to identify the most important competences in degree programs.

• As a result Develops REFERENCE POINTS for curriculum design and evaluation.

• **Learning outcomes:**
  • Statement of what a learner is expected to know, understand and demonstrate after completion of learning experience in a course unit or period of studies.

• **Competences**
  • Combination of cognitive and meta-cognitive skills, knowledge, understanding, skills, (interpersonal, intellectual and practical skills), abilities and ethical values.
  • Competences are develop in all course units.
Academic, Employer and graduated disagreed with importance of competences

<table>
<thead>
<tr>
<th>Academic</th>
<th>Employer</th>
<th>Graduated</th>
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</thead>
<tbody>
<tr>
<td>Ethical commitment</td>
<td>Decision Making</td>
<td>Basic general knowledge</td>
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<tr>
<td>Ability to work in interdisciplinary team</td>
<td>Problem solving</td>
<td>Analysis synthesis capacity</td>
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<tr>
<td>Initiative</td>
<td>Ability to work autonomously</td>
<td>Capacity to learn</td>
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<tr>
<td>Teamwork</td>
<td>Information management skills</td>
<td>Generating new ideas</td>
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<tr>
<td>Information management skills</td>
<td>Teamwork</td>
<td>Applying knowledge in practice</td>
</tr>
<tr>
<td>Ability work autonomously</td>
<td>Initiative</td>
<td>Last: appreciation of diversity for employer graduate and academics</td>
</tr>
<tr>
<td>Problem solving</td>
<td>Ability to work in interdisciplinary team</td>
<td>Academics seek knowledge</td>
</tr>
<tr>
<td>Decision making</td>
<td>Ethical commitment</td>
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</tbody>
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Employer: seek collective Intelligence
Graduated: seek individual intelligence

Miguel Chacon -HE, Collective intelligences & Competences for SD-
## Generic competences in LA among students, alumni, academics, employers

| 1. Capacity of abstraction and synthesis |
| 2. Applied knowledge in practice |
| 3. Time organization |
| 4. Knowledge of discipline |
| 5. Social responsibility and citizenship |
| 6. Oral and written communication |
| 7. Second language |
| 8. Information technology |
| 9. Research capacity |
| 10. Learning and updating |

**11th to 27th competences**

| 11. Seek, processing and analysis information |
| 12. Critic and auto critic |
| 13. Action in new situations |
| 14. Creativity |
| 15. Identify and solve problems |
| 16. Decision making |
| 17. Team work |
| 18. Interpersonal abilities |
| 19. Motivation to common goals |
| 20. Environmental preservation commitment. |
| 21. Socio cultural context commitment. |
| 22. Appreciation and respect for diversity and multiculturalism |
| 23. Ability to work in international context |
| 24. Ability to work independently |
| 25. Project Formulation and management |
| 26. Ethical commitment |
| 27. Quality commitment |

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**1st ten generic competences**

Professional occupation. 
(5,496 respondents)
Graduate Degree Programs in Development

Study by International Commission on Education for sustainable Development Practice. Earth Institute of Colombia

- **Africa**: 1 university per country: South Africa, Tanzania, Ghana, Nairobi, African economic resource consortium.
- **Australia**: 2 universities
- **East Asia**: 2 Thailand, 1 Japan, 1 Singapore
- **Europe**: 8 in UK, 1 Finland.
- **USA**: 7 (Harvard, Columbia, etc)
- **Canada**: 2.
- **Latin America**: 4 universities
  - Argentina: FLACAM (distance learning)
  - Chile: University of Chile
  - Mexico: UNAM, IT Monterrey
- **South Asia**: 2 Bangladesh, 1 India, 2 Sri Lanka.

Core courses, Economic: low, high, medium
Electives Policy & Policy science oriented in environmental, agriculture, health.
Sustainable Development practitioner

• Diagnosis
  – demand for “generalist” development practitioner,
  – Demand for a new educational system
    • Graduate level degree programs
    • Lack appropriate training programs for life-long learning

• Recommendation
  – Core competences of sustainable development practitioner
  – Build a global “master’s in Development practice (MDP) degree
    • MDP core curriculum
    • Case studies and practical exercises
    • Global learning resources
    • MDP Network
    • Field Training

  – PROVIDE ONGOING PROFESSIONAL DEVELOPMENT FOR PRACTITIONERS
    • IN ACADEMIC INSTITUTIONS
    • Organization-based initiatives
SDP Proposal of Competency Areas

- **Health**
  - Nutrition,
  - health and epidemiology
  - Population science

- **Natural Sciences**
  - Agriculture, forestry, fisheries
  - Energy
  - Engineering, urban-rural planning
  - Environment, water, climate science

- **Social Sciences**
  - Delivery science
  - Economics
  - Education
  - Politics, anthropology, social sciences
  - Statistics

- **Management**
  - Budget planning, financial management
  - Communications and negotiations
  - Geographic information systems
  - Institutional human resources management
  - Information Systems Design and Management
  - Project Design and management

For Health, Natural and Social Sciences, they seek as learning outcomes core knowledge, policy and management. For management they look for core knowledge and skills.
<table>
<thead>
<tr>
<th>Cognitive domain</th>
<th>Key word</th>
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<tbody>
<tr>
<td>Knowledge and understanding</td>
<td>World current situation</td>
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<td>Causes of unsustainability</td>
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<td>Sustainability fundamentals</td>
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<td>Science, technology and society</td>
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<td>Instruments for sustainable technologies</td>
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<td>Skills and abilities</td>
<td>Self-learning</td>
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<td>Cooperation and transdisciplinarity</td>
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<td>SD Problem solving</td>
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<td>Systemic thinking</td>
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<td>Critical thinking</td>
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<td>Social participation</td>
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<td>Attitudes</td>
<td>Responsibility</td>
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<td></td>
<td>Commitment</td>
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<td>SD challenge acknowledgement</td>
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<td></td>
<td>Respect</td>
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<td></td>
<td>Ethical sense</td>
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<td></td>
<td>Peace culture</td>
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<td></td>
<td>Concern</td>
</tr>
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<td>Risk awareness</td>
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Sustainable development competences in engineering

Table 1. SD key competence words for Bachelor degree at CUT, DUT and UPC. D. Ferrer-Balas, J. Segalas, K.F. Mulder.
Case analysis: Master Programs

- Applied Development Science & studies
  - Agriculture
  - Tourism
  - Interventionist projects
  - Community & Economic development
- Applied environmental Science
  - Environmental Education
  - Environmental planning
- Trans disciplinary and international studies
  - Sustainable development and management
Master programs

• **Rural sustainable Development**
  – Social environmental sciences
    • Agronomy School USAC Guatemala.
    • Wageningen University
    • Geography Department. Utrecht University

• **Local Economic Development. Started 2008.**
  • Technologic Institute & FLACSO Costa Rica.
  • Poverty reduction.
    – Improving local capacities for employment
    – GLOBALIZATION and State transformation.
    – Flacso offers CA-Master and doctoral degrees in Social Sciences. Swedish cooperation agency

• **Community Development Management. Start april 2009. 2 years.**
  • Universidad autonoma de nicaragua. Esteli.
Master program sample: Argentina

• Master sustainable Development. University Lanus. Argentina. (4 tetra-mester)
  – Seminar nivelation
  – Environmental issues,
  – Project process,
  – territorial sustainable development
  – Urban sustainable development
  – Environmental project

  • Project seminar
  • Management and social contract,
  • Environmental project
  • Project seminar
  • Impact Evaluation and environmental behavior
  • Education participation and environmental communication
  • Thesis seminar I, II, III,, IV
  • Environmental legislation
Master program sample: Nicaragua

Universidad Nacional autónoma de Nicaragua, Leon

  - Territory, ecosystems and resources
  - Social and science Research Methods
  - Politic, legislation and territorial administration of local development
  - Cultural dimension of local development
  - Construction of development. Social dimension.

Universidad Nacional El Salvador.

- Creating economic value
- Ethics and good governance in local development
- Formulation, management and evaluation of development project
- Evaluation and monitoring of local development
- Production systems.
Sustainable Development.
Universidad Costa Rica.
Environment, economy, ecology. Society.
Conservation of biological Resources.

MASTER & PH D PROGRAM IN SUSTAINABLE DEVELOPMENT. VENEZUELA, CHILE, MEXICO

These programs has a curriculum design based on theories of development. They are research + project oriented at local level. In other cases they have a profile of development management in government.
How collective and individual learning process for Sustainable Development should be?

PEDAGOGIC PRINCIPLES AND COMPETENCIES FOR SUSTAINABLE DEVELOPMENT
Higher education

• 153 million higher education students in 2007,
• Much of this growth in Asia,
• More tertiary students in low and middle income countries.


• How and what should they learn?
  – science, sustainability, rational knowledge, community knowledge. Cognitive, techniques for productivity.
  – New learning and alternative teaching
Knowledge Systems, learning theories

Which pedagogy is suitable for each discipline?
Which pedagogy is suitable for sustainable development competences?
Indigenous communities and forest conservation

- During colonization, some indigenous communities moved to high lands and other to low lands. They inhabit remaining forested areas.
- Land use and forest conservation skills. Totonicapan.
- Land values with spiritual meaning (nahual, pacha-mama)
- Local traditional concepts (satoyama, etc)
- Taxonomic knowledge of ecologic resources
Education approaches

• Competence based education
  – Know to know, know to do, know to be.
  – Curriculum design and evaluation of quality performance and pertinence of education.
  – Student centred (learning for student future role in society) it is output oriented
  – Staff centred (Institutions) is input oriented
  – Labor market-oriented (learning for future employment opportunities) of human resource development

• Traditional Pedagogy
  • Knowledge centered Professor approach

• Developmentalist Learning
  • Knowledge multiple source learning approach
Learning theories

• Behaviorism:
  – stimulus & response
• Cognitivism
  – Manage information & instructional
• Constructivism & Social constructivism
  – Meaning and understanding
  – Cultural background affects meaning and knowledge
  – SOCIAL DEVELOPMENT THEORY; COMUNITIES OF PRACTICE
  – Social background of groups, indigenous
• Humanism
  – Person self development
• Structuralism
• De-constructivism
• Critical Emancipatory:
  – Action for liberation from suppression through education
LA ESD approaches and pedagogy

- **Curriculum**
  - Essential
  - Instrumental
  - Complementary
  - Articulator

- **SD PILARS**
  - Economic
  - Environmental
  - Social
  - Cultural

**Environmental Education**
- Ethics
- Biology
- Ecology
- Pedagogy

**Eco-Pedagogy**
- Transformative
  - Sociology & Ecology & Political science
- Adaptive:
  - Ecology & Biology & Economics
- Holistic Education
  - Integrative approach: mind, spirit, culture, environment, economics, society

Other education for sustainability:
- Environmental economics, environmental engineering
- Environmental-Business,
- Environmental Law,
Conclusions

• Transformative education in master programs is related to ESD but in the level of individual competences. Few implementation cases.

• Critical Education in master programs is related to SD and is applied in the level of Individual competences. Few implementation cases.

• Holistic education is implemented in the Environmental programs, but not evidence of ESD in master programs.

• Collective learning and Community intelligence are related with constructive pedagogy, critical pedagogy and social learning. Many implementation cases with NGOs programs and non-formal education, they are not very related to universities in master programs.
University Contribution

• Advices to orient those designing new master programs related with SD or ESD
  – Beyond individual intelligences
  – Beyond individual competences
  – Beyond market labor demand (for individuals)
• Seek collective competences & collective intelligences
  – Engage with traditional and community intelligence
  – Embrace traditional collective learning
  – Research about transformative pedagogies, and community intelligences, collective learning
• Pedagogic Model can help reorient university program to ensure academic pertinence to sustainable development
Pedagogy and curriculum for sustainability

- Value based education
- Developmentalist education
- Transformative education
- Competence based education
- Environmental education
- Critical pedagogy
- Ethno pedagogy
- ESD

- Critical Curriculum
- Constructive
- Deconstructivist pedagogy

Field + SD competences need different pedagogies
HE PRINCIPLES

• Collective
  – Collective learning
  – Collective competences
  – Collective intelligences

• Individual learning
  – Not only market oriented

• Envision a community learning
  – Connecting university at local scale
  – With local reality and community

• New curriculum design and implementation
  – Research for new programs and pedagogy
  – Accreditation grading for those who embrace community knowledge and community learning
Teaching competences

• Methodology
  – Pedagogical (teaching)
  – Research (learning and discovering)
  – Social learning
  – Self learning
  – Team oriented work

• Conceptual
  – Epistemological of science and development
  – Logic and Ethical
  – Development
  – Ways of knowing, Knowledges and wisdom
  – Collective intelligence
  – Emotional intelligence

• Strategic
  – Micro-planning
  – Short term task operation
  – Long term task operation

• Scientific for specific science

• Scientific FOR Sust. Development
  – Historical
  – Climate change
  – Social development
  – Environmental
  – Economical
  – Political
  – Ethnical

• Project management
  – Organization and administration of collective resources
  – Communication skills
  – Team group abilities
  – Leadership
  – Mobilization
  – Problem solving
  – Programming skills
“Let them all rise together. Let no one be left behind”