New skills for a new world: The INTEC experience

Global ICT Capacity Building Symposium (CBS 2018)
Developing Skills for the Digital Economy and Society

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Instituto Tecnológico de Santo Domingo, (INTEC)
Innovation in historical perspective

Throughout three centuries, prominent thinkers have highlighted the innovation capacity as a distinctive feature of our economic system.

- **s. XVIII**
  - **Adam Smith**
  - Innovation in processes as a basis for increasing productivity.

- **s. XIX**
  - **Karl Marx**
  - The entrepreneurial attitude and the constant search for new markets as a basis for the expansion of capitalism.

- **s. XX**
  - **Joseph Schumpeter**
  - The process of "creative destruction" as a source for investment and economic growth.
The role of higher education institutions

Since the mid-twentieth century, the analysis of innovation has established some principles:

1. The capacity for innovation depends not only on individual creativity, but also on the existence of a whole system.

2. Universities are essential actors in national innovation systems, as incubators of new discoveries and capacity building.

3. To fulfill this mission, universities must transform their educational and operational model based on three key questions:

   Why to teach? What to teach? How to teach?

This presentation describes the experience of INTEC (a small university in the Dominican Republic) in the search for answers to these challenges.
Development challenges for the DR

In the Dominican context, universities are called to contribute to the achievement of four great aspirations established by society ...

**Social**
"A Society with Equal Rights and Opportunities"

**Institutions**
"A Democratic Social State ruled by Law"

**Economy**
"A Sustainable, Integrated and Competitive Economy"

**Environment**
"A Society with Production and Consumption Patterns which are Environmentally Sustainable and which Adapts to Climate Change"

* Based on National Development Strategy (END) 2010-2030
Development challenges for the DR

... which translate into specific social needs.

Latin America and Caribbean (25 countries): Lexicometric analysis of key concepts in National Development Plans
The technological environment for XXI century

### NMC Horizon Report > 2017 Higher Education Edition at a Glance

**Key Trends Accelerating Higher Education Technology Adoption**

<table>
<thead>
<tr>
<th>Short-Term</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
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<tbody>
<tr>
<td>Blended Learning Designs</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
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<tr>
<td>Collaborative Learning</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
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<table>
<thead>
<tr>
<th>Mid-Term</th>
<th>2017</th>
<th>2018</th>
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<th>2021</th>
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<tbody>
<tr>
<td>Growing Focus on Measuring Learning</td>
<td>YES</td>
<td>YES</td>
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<tr>
<td>Redesigning Learning Spaces</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
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<table>
<thead>
<tr>
<th>Long-Term</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
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<tbody>
<tr>
<td>Advancing Cultures of Innovation</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
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<tr>
<td>Deeper Learning Approaches</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
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### Significant Challenges Impeding Higher Education Technology Adoption

- **Solvable**
  - Those that we understand and know how to solve
  - Improving Digital Literacy
  - Integrating Formal and Informal Learning

- **Difficult**
  - Those that we understand but for which solutions are elusive
  - Achievement Gap
  - Advancing Digital Equity

- **Wicked**
  - Those that are complex to even define, much less address
  - Managing Knowledge Obsolescence
  - Rethinking the Roles of Educators

### Important Developments in Technology for Higher Education

<table>
<thead>
<tr>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
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</thead>
<tbody>
<tr>
<td>Time-to-Adoption Horizon: One Year or Less</td>
<td>Adaptive Learning Technologies</td>
<td>Mobile Learning</td>
<td>The Internet of Things</td>
<td>Next-Generation LMS</td>
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<tr>
<td>Time-to-Adoption Horizon: Two to Three Years</td>
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<tr>
<td>Time-to-Adoption Horizon: Four to Five Years</td>
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INTEC strategic approach

**MISIÓN**
Somos una comunidad universitaria plural e innovadora, que forma ciudadanos y profesionales éticos, emprendedores y competitivos a nivel internacional, y genera conocimiento en beneficio de la sociedad.

**VISIÓN**
Ser un espacio que inspire creación de conocimiento, innovación y excelencia, para contribuir al desarrollo sostenible de la sociedad.

**VALORES**
EXCELENCIA - PENSAMIENTO CRÍTICO Y CREATIVO - INNOVACIÓN - INCLUSIÓN - INTEGRIDAD - RESPONSABILIDAD SOCIAL

**DIRECTRICES ESTRATÉGICAS**

- **Aprendizaje Transformador**
  Desarrollamos un sistema de aprendizaje sustentado en un diseño curricular flexible, metodologías innovadoras y estudios transversales de búsqueda activa de resultados socialmente relevantes.

- **Conocimiento, Innovación y Emprendimiento**
  Somos referente en innovación y búsqueda continua de oportunidades de mejoramiento, mediante la gestión productiva del conocimiento, basada en actividades de curiosidad, hábitos de indagación y prácticas de experimentación, para la transformación de la sociedad.

- **Vinculación e Impacto Social**
  Actuamos como agentes de cambio e innovación, mediante alianzas estratégicas con sectores clave, incidencia en políticas públicas y aplicación de ciencia y tecnología a problemas relevantes de la sociedad.

- **Sostenibilidad y Expansión**
  Construimos una universidad que crece de manera sostenible, financieramente diversificada y ambientalmente responsable.

- **Capacidades Organizacionales**
  Desarrollamos un entorno que propicia el desarrollo continuo del talento y que fomenta una cultura orientada al servicio de calidad con transparencia y rendición de cuentas.

**EJES TRANSVERSALES**
CALIDAD - VIRTUALIZACIÓN - INTERNACIONALIZACIÓN
The pillars of the strategy

Continuous curricular reform
Mechanism to detect and satisfy relevant needs on continual basis

Special bonding with industry, government and society
Strengthening spaces for dialogue and mutual enrichment

Research and innovation
Development of research and innovation capacities

Structural (Re)adaptation
Rethinking structure, processes and incentives
The implementation of the strategy:

**Curriculum**

- **Curricular reform based on skills and humanist fundamentals**
- **New degrees, related to science and digital skills**
- **Search for flexibility**
- **Virtuality as a learning tool**
- **New paradigms for learning evaluation**
Indicators of employability of INTEC graduates (circa 2016)

Currently having a job: 93.5%

Employer 6.9%
- Micro 22.3%
- Small 22.8%
- Medium 26.8%

Employee 77.9%
- High level 26.1%
- Med level 56.7%
- Low level 17.3%

Self employed 8.7%

Distribution of INTEC graduates by labor condition at the time of graduation

With a job: 68%
Without job: 32%
The implementation of the strategy: Research and innovation

- Creation of Research Vice-Rectory
- New Research Policy and Creation of Research Groups
- Attraction of new researchers with doctoral degree
- Creation of Entrepreneurship and Innovation Center
- Intellectual Property Regulation
- Attraction of new researchers with doctoral degree
Automatic heating catalyst
It reduces the pollution of the gases emitted by the vehicles in a shorter time compared to those existing in the state of the art. Bases entirely its operation on the catalysis achieved through three precious metals: palladium, rhodium and platinum

Automated wheelchair
Automated wheelchairs with omnidirectional movement and erection mechanisms. It includes an operating system with Internet access, being able to communicate with any device, and allowing linking the chair to a home automation system implemented in the home or workplace.

Amphibious Vehicle for people with reduced mobility
It allows people with reduced mobility to bathe while sitting on the vehicle in the sea, pool or lake, without any type of impediment and without the help of a third party. It works by means of a motorized or mechanical system that allows the movement through the sand and water, where the user has control of the mobility of the vehicle.
The implementation of the strategy: Institutional networks

- Multi-party Thematic Centers
- Creation of Coordination Committees
- University/business development projects and alliances, courses and joint certifications
- Creation of new programs on demand from business sectors
- Programs in situ
The implementation of the strategy: Structure, process and incentives

- Promotion of new forms of leadership
- Promotion of the culture of innovation and intrapreneurship / Reasonable risk taking attitudes
- New incentive structure
- Adoption of business practices to university management and decision process
"Universities have been a historical synonym of the generation of knowledge, as well as essential and irreplaceable pillars of scientific progress. However, the way of doing research has changed and universities should adapt to it.

It is fundamental to self-reflection, the constant search for good practices and new ideas, and a willingness to adapt and change.

It is a priority that leaders education not only know but lead this revolution, anticipating paradigm changes based on new realities".

Salamanca Declaration (2018)

(*) Reproduced from El Trabajo en un Mundo Inteligente. Fundacion Telefónica. 2015.