Leadership in out-of-class Teaching and Learning

Zhiwu Xu
Harbin Institute of Technology
April 12, 2018
**Background**

- **World**
  - Worldwide scientific and technological revolution and industrial transformation is accelerating; the competition of comprehensive national power is increasingly intense.

- **China**
  - Major development strategies undertaken in China: Innovation-driven development; the Belt and Road; Made in China 2025; Internet plus initiative.

- **Student**
  - Talents to be cultivated: Stronger sense of responsibility, Practical ability, Innovation ability, International competitiveness.
Talents cultivation system of HIT

Target

- Innovation system
- Curriculum system
- Comprehensive ability system

Quality assurance and promotion system

All-in education system

To cultivate innovative talents with:

- Persistent belief
- Leading future development
- International vision
- Excellent skill
- Good morality
- Rich knowledge
Knowledge delivery is just the base of education, higher order cognitive skills are needed.

Higher order cognitive skills:

- Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create

- Recognizing and recalling facts
- Understanding what the facts mean
- Applying the facts, rules, concepts, and ideas
- Breaking down information into component parts
- Judging the value of information or ideas
- Combining parts to make a new whole
Outline

Professional education

In-class

Out-of-class

• Scientific and technological innovation training
• Innovation and entrepreneurship practice

General education

In-class

Out-of-class

• Activities for integrated ability development
# Diagram of organization and management of out-of-class teaching and learning

<table>
<thead>
<tr>
<th>Top-level design</th>
<th>Organization</th>
<th>Implementation</th>
<th>Functions</th>
<th>Target of service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vice Presidents in charge of teaching and students' affairs</td>
<td>Undergraduate College Office of Global Affairs</td>
<td>Youth League Committee</td>
<td>19 Schools</td>
<td>Guidance of Specific Innovation and Entrepreneurship Practical Project</td>
</tr>
<tr>
<td></td>
<td>Innovation and Entrepreneurship Education Office</td>
<td>Innovation and Entrepreneurship base</td>
<td>Curriculum Teachers and Instructors</td>
<td>Practice of Annual Innovation Project Project Hatching</td>
</tr>
<tr>
<td></td>
<td>Student Innovation Community &amp; Club</td>
<td>Building Cultural Atmosphere</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All students</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Professional education

Scientific and Technological Innovation training
&
Innovation and Entrepreneurship Practice
Innovation practice and training runs through four years

- **Freshmen**
  - Professional introduction and seminar

- **Sophomore**
  - Course Exercise

- **Junior**
  - Integrated Design

- **Senior**
  - Diploma project

- **In class**
  - Innovative Design

- **Out of class**
  - Innovative experiments
  - Discipline Competition
  - Annual project plan
Strong scientific researches provide solid base for talents cultivation

Satellite Laser Communication won the First Prize of National Technology Invention in 2014

- National Key Disciplines: 9
- State Key Lab: 8 SKL and 1 collaborative innovation centers
- National teaching and demonstration center: 7
- Academic Ranking
  - Top 6, Best Global Universities for Engineering, 2018, USNEWS
  - 9 among top 1%
- ESI Papers
  - 1 among top 1‰
  - 1 among top 1%
Adequate professional advisors

- High level teachers undertake teaching and practical instruction.
- A large number of international outstanding teachers are invited to join the team during the summer term.
- Excellent advisors are rewarded regularly.
Diverse scientific and technological competitions and activities

- Annually supports more than 700 innovation projects for the freshmen, and 1,000 innovation and entrepreneurship projects for high grade students.
- Annually organizes an innovation and entrepreneurship carnival and the Zuguang Cup innovation and entrepreneurship competition.
- The outstanding works will be selected to participate in the national and international competition.
**Incubation space for college students**

- **Maker Space**: 500 m²
- **Incubation space**: 4000 m²
- **Coffee Space**: 200 m²
- **Advisor Office**: 24 m²/
- **VC fund Office**: 22 m²/
- **Service Office**: 35.5 m²
- **Processing Platform**: 64.5 m²

- 6 functional regions
- Totals 5000 m²
- Free service
### Typical achievements of scientific and technological innovation training

#### 2013-2017年全国普通高校学科竞赛评估结果(本科)

<table>
<thead>
<tr>
<th>排名</th>
<th>学校名称</th>
<th>获奖次数</th>
<th>总分</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>上海交通大学</td>
<td>270</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>浙江大学</td>
<td>259</td>
<td>99.56</td>
</tr>
<tr>
<td>3</td>
<td>电子科技大学</td>
<td>273</td>
<td>99.38</td>
</tr>
<tr>
<td>4</td>
<td>哈尔滨工业大学</td>
<td>356</td>
<td>97.94</td>
</tr>
<tr>
<td>5</td>
<td>清华大学</td>
<td>223</td>
<td>97.03</td>
</tr>
<tr>
<td>6</td>
<td>武汉大学</td>
<td>284</td>
<td>97.02</td>
</tr>
<tr>
<td>7</td>
<td>华中科技大学</td>
<td>247</td>
<td>96.45</td>
</tr>
<tr>
<td>8</td>
<td>山东大学</td>
<td>339</td>
<td>96.22</td>
</tr>
<tr>
<td>9</td>
<td>东南大学</td>
<td>247</td>
<td>94.52</td>
</tr>
<tr>
<td>10</td>
<td>北京航空航天大学</td>
<td>231</td>
<td>93.45</td>
</tr>
</tbody>
</table>

#### 2012-2017年全国高校教师教学竞赛状态数据

<table>
<thead>
<tr>
<th>排名</th>
<th>学校名称</th>
<th>获奖次数</th>
<th>总分</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>武汉大学</td>
<td>44</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>大连理工大学</td>
<td>57</td>
<td>97.66</td>
</tr>
<tr>
<td>3</td>
<td>哈尔滨工业大学</td>
<td>45</td>
<td>96.33</td>
</tr>
<tr>
<td>4</td>
<td>吉林大学</td>
<td>52</td>
<td>93.6</td>
</tr>
<tr>
<td>5</td>
<td>浙江大学</td>
<td>26</td>
<td>93.53</td>
</tr>
<tr>
<td>6</td>
<td>山东大学</td>
<td>58</td>
<td>90.9</td>
</tr>
<tr>
<td>7</td>
<td>上海交通大学</td>
<td>24</td>
<td>89.34</td>
</tr>
<tr>
<td>8</td>
<td>西南石油大学</td>
<td>42</td>
<td>88.47</td>
</tr>
<tr>
<td>9</td>
<td>河海大学</td>
<td>24</td>
<td>86.94</td>
</tr>
<tr>
<td>10</td>
<td>中国矿业大学</td>
<td>18</td>
<td>86.73</td>
</tr>
</tbody>
</table>
Typical achievements of innovation and entrepreneurship practice

Leng Xiaokun

Wei Mingchuan

AELOS Robotic Group

Student Lilac Nano-Satellite Group
General education

Activities for integrated ability development
Diversified, healthy and elegant campus cultures

- Evening Party
- Dance Performance
- Symphonic Festival
Diversified, healthy and elegant campus cultures

- Ice & Culture Festival
- Mini Marathon
- Reading Activities
- Chinese Excellent Traditional Culture Month
Social practice and voluntary services

- Over 15,000 registered youth volunteers.
- Over 720,000 hours of volunteer service each year.
- The model deeds of graduate student teaching group in serving the West are reported in the front page of Guangming Daily.
- Won “National excellent project of teacher support” .
HIT International Communication Association

Main Activities
GIFTS / HITMUN / Chatting Café

Model United Nations
HITMUN
MUN is an educational simulation and/or academic competition in which students can learn about diplomacy, international relations, and the United Nations. HICA has successfully held MUN 8 times until now.

English Corner
Chatting Café
Chatting Café, with a slogan of "making your good speaking class", is aiming at giving participants a cosy, zero-stressed environment to practice their spoken English forwardly with a proven pattern.

Global Innovators
Forum on Technology and Society-GIFTS
A interdisciplinary and intercultural academic forum for international undergraduates.
THANKS