

Entrepreneurship in Engineering Education

Ideation - Action - Education

USTM – Morocco - 2013



d.confestival

DESIGN THINKING THE FUTURE

Sept 20-22 2012, Potsdam / Germany

Sportsman → Sportsmanship

Citizen → Citizenship

Leader → Leadership

Designer → Designership

Entrepreneur → Entrepreneurship

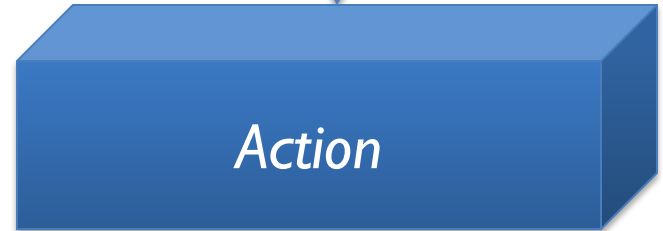
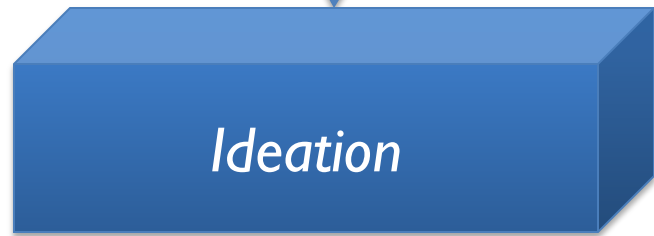
Entrepreneurship

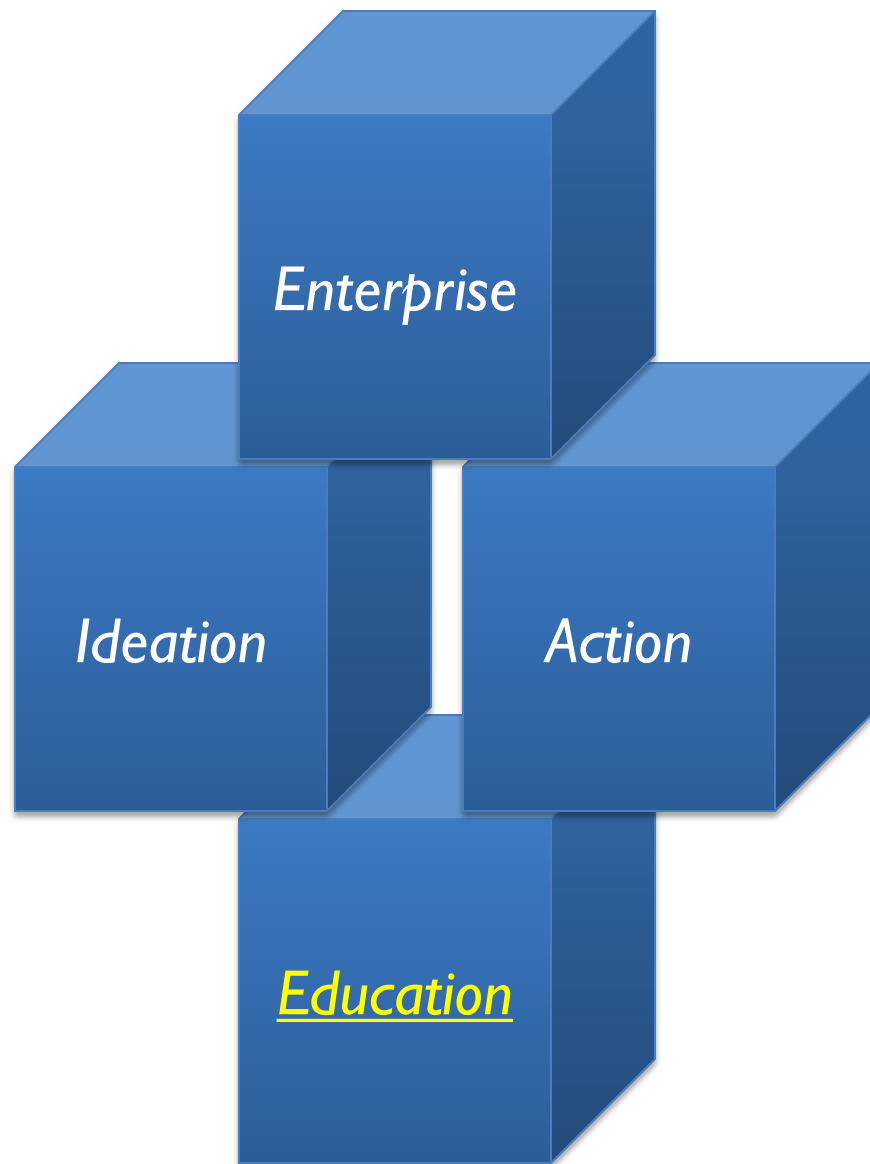
Seeing

Imagining

Action

Ideation





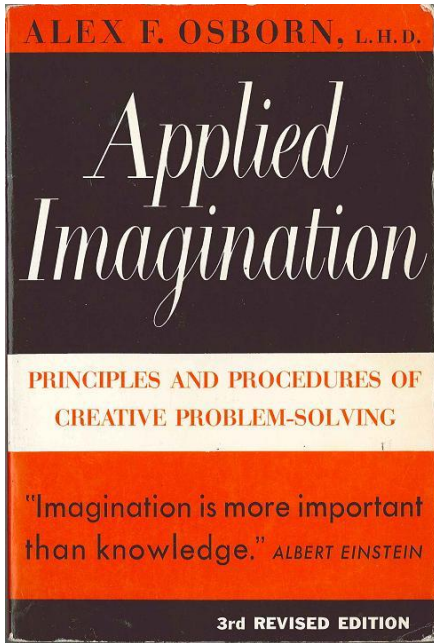
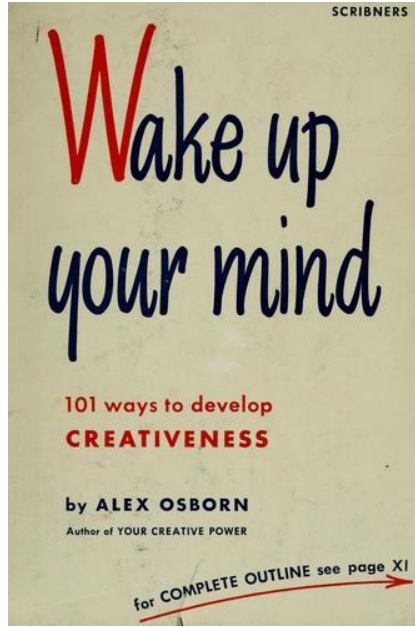
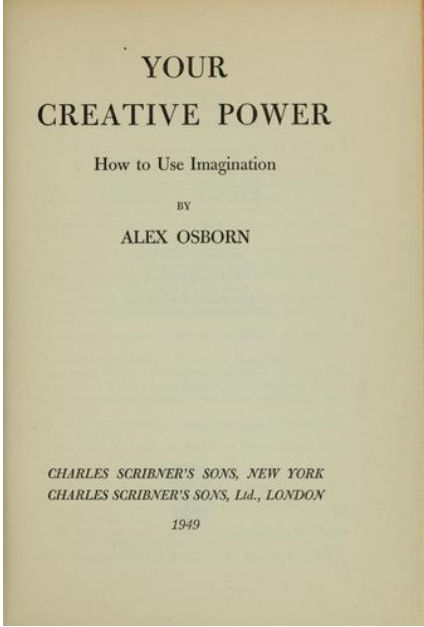
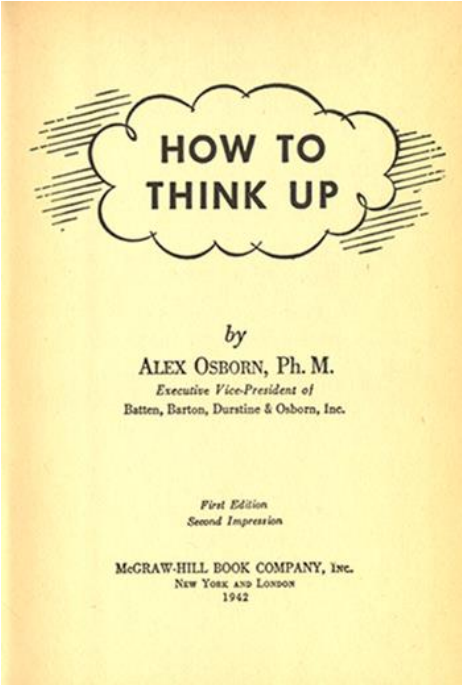
If technology enterprise arises from ideation and action, then engineering education should support their development.



*How has education supported ideation development
(creativity)?*

*“Why is there so little apparent
correlation between education
and creative productiveness?”*

J. P. Guilford
Presidential address to the
American Psychological Association (APA)
1950



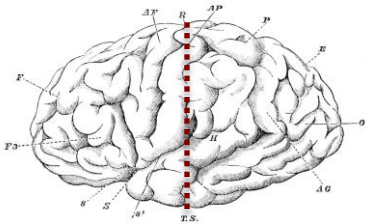
“Ordinary” Creativity

Alex Osborn

(1942, 1949, 1952, 1953)

Tactics: “Idea Book” - “Brainstorm” - “Aladdin's Lamp” – “Process”

Judicious Mind



Creative Mind

Scientific literature from this time period: Creativity = “Great Man”; “Trait”
Creative process of “Great Men”

Lack of creativity = f(Motivation)

Provide incentives and receive less creativity

McGregor - 1966

The Human side of Enterprise

Kruglanski & Chand - 1971

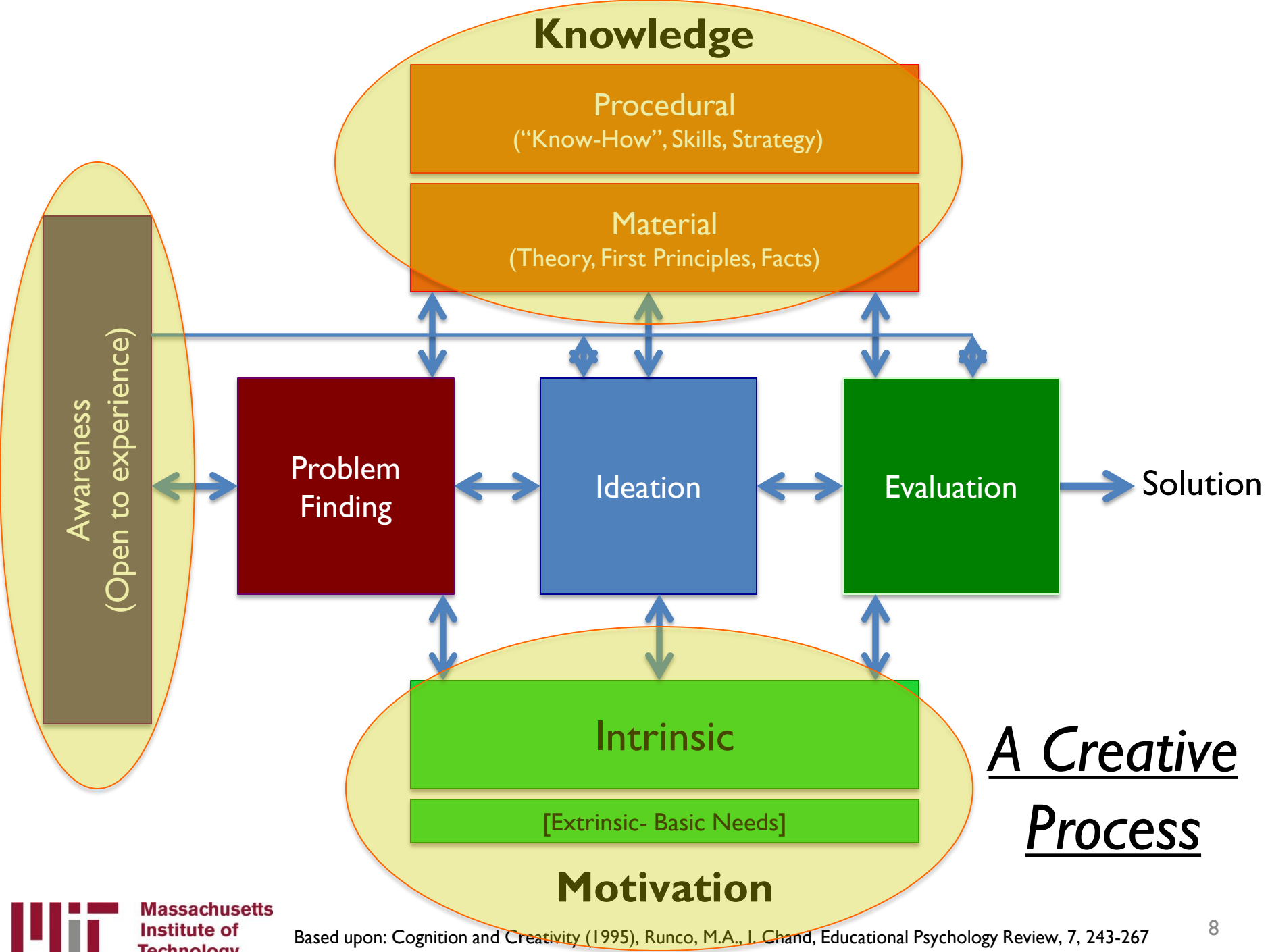
The effects of extrinsic incentive on some qualitative aspects of task performance

Deci - 1972

The effects of Contingent and Noncontingent Rewards and Controls on Intrinsic Motivation

Amabile - 1998

How to Kill Creativity (HBR)





Innovative Enterprise Development Engineering Entrepreneurship

Action

Action = f(Personality)

(e.g. The Achieving Society, McClelland, 1961)

Action = f(Education)

(e.g. 21st Century entrepreneurship education programs)



How does education correlate with action
(i.e. intention to start business)?

“There is no correlation between entrepreneurship education and the intention or desire to start a business.”

Impact of Entrepreneurship Education in Denmark - 2011

2000 students born in 1996

(Page 27)



FONDEN FOR ENTREPRENØRSKAB
YOUNG ENTERPRISE DANMARK



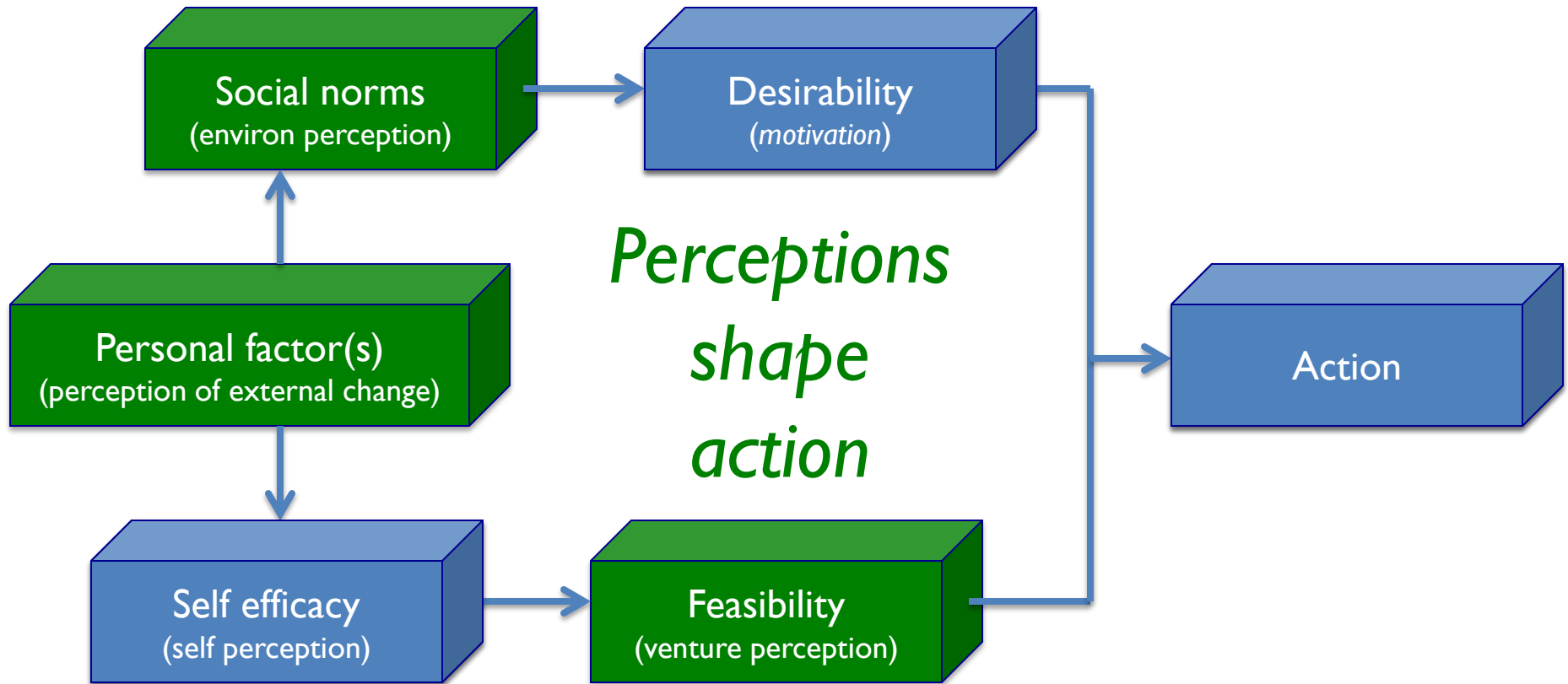
Effect and Counter-Effect of Entrepreneurship Education and Social Context on Students Intentions

Fatolle et al (2006), Estudios de Economia Aplicada, 24(2), 509-523

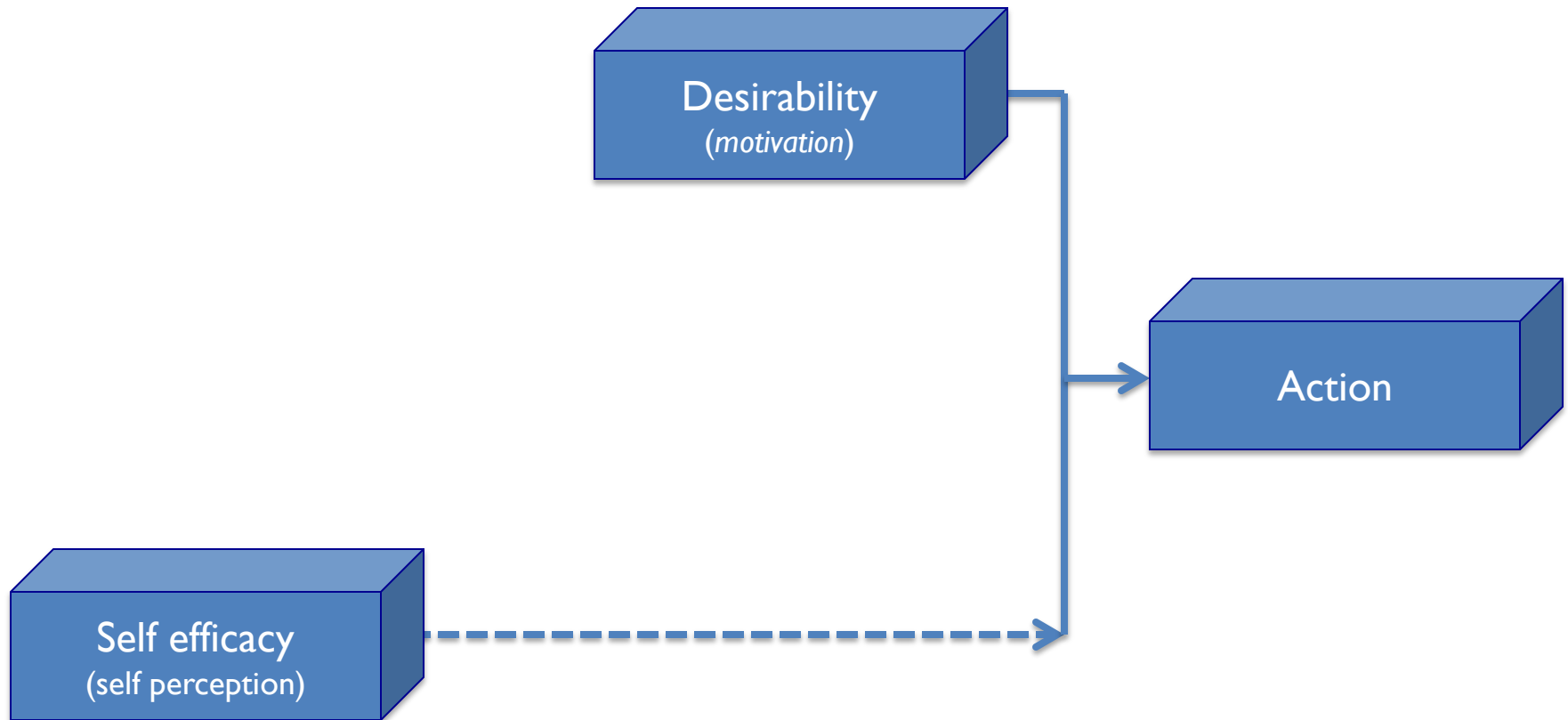
“Entrepreneurship Teaching Programmes (**ETP**) **could have some strong positive influences** for some students depending on their background and initial perspectives on entrepreneurial intention.”

“At the same time, the **ETP could also actually decrease the level of entrepreneurial intention** (counter effects) for other students who have been yet exposed to entrepreneurship.”

How does education correlate with action
(i.e. intention to start business)?



Entrepreneurship Intention Model (EIM)



How can education support self efficacy and motivation?



Action

MIT Sloan School of Management



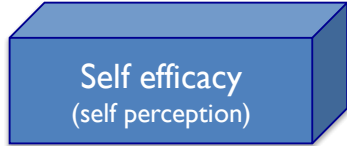
MIT Sloan Working Paper 4489-04
May 2004



Contents lists available at ScienceDirect

Technovation

journal homepage: www.elsevier.com/locate/technovation



Self efficacy
(self perception)

Enhancing self-efficacy to enable entrepreneurship: The case of CMI's Connections

Industry placement, authentic experience and the development of venturing and technology self-efficacy

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^d Lancaster University Management School, University of Lancaster, Lancaster LA1 4YX, England, UK

William A. Lucas and Sarah Y. Cooper

Self Efficacy (Bandura, 1977)

Demystifying the entrepreneurial process, building self-belief.

Students work on company-based projects and learn by working.

Authenticity is a dominant predictor of self-efficacy.

Pedagogy for creativity, innovation and venture creation.



MIT Sloan School of Management



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Self Efficacy (Bandura, 1977)

Demystify

build self-belief

learn by working

Authenticity

creativity, innovation and venture creation.

(McGregor, 1966)

Enterprise Management - Motivation

Men are tied to limited **jobs** which do not utilize their capabilities

Responsibility is discouraged

Passivity is encouraged

Meaning has been eliminated from **work**

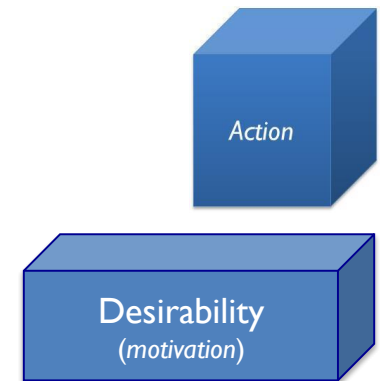
Change will be slow

Change requires modification of **management** and **workers** alike

People are accustomed to being directed, manipulated, controlled

People find satisfaction away from **the job**

This is true of **management** and **workers**



(Based upon McGregor, 1966)

Enterprise Education - Motivation

Students are tied to limited **studies** which do not utilize their capabilities

Responsibility is discouraged

Passivity is encouraged

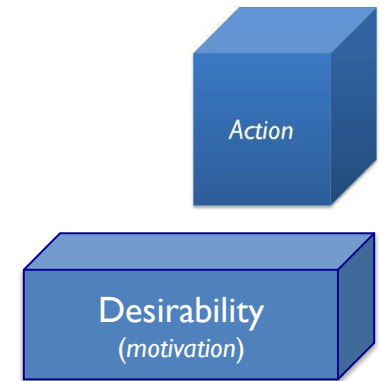
Meaning has been eliminated from **learning**

Change will be slow

Change requires modification of **Professors** and **students**

Students are accustomed to being directed, manipulated, controlled

Students and **Professors** find satisfaction away from **the classroom**



(Based upon McGregor, 1966)

Enterprise Education - Motivation

Allow students greater freedom with studies to better utilize their capabilities

Encourage (demand) responsibility

Discourage (forbid) passivity

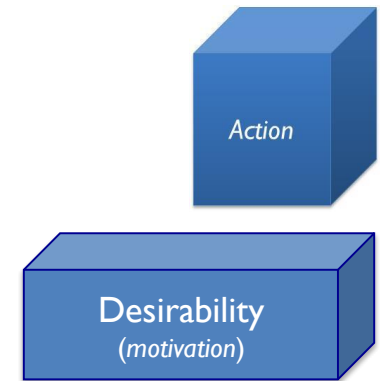
Inject meaning in learning

Be patient

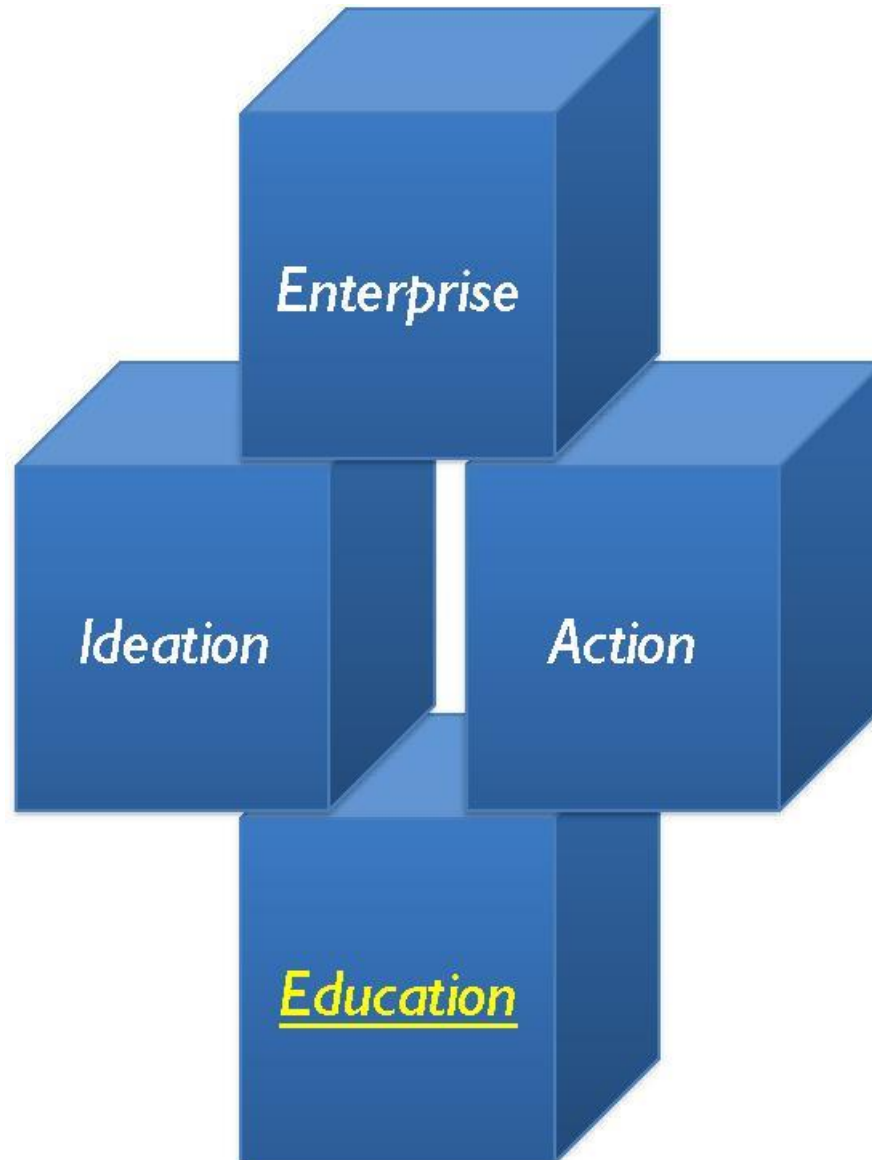
Professors and students should be partners in change

Students should not require direction, manipulation, and control

Students and Professors should find satisfaction in the classroom



Innovative engineering enterprise development (i.e. engineering entrepreneurship) can be supported by education



*But that education must be meaningful and substantive,
leverage intrinsic motivation, and build confidence*



<http://shemeanwellbut.blogspot.com/2012/09/how-to-change-life-teachers-that-make.html>

Questions?

