

*Proceedings*  
*Enhancement of the Global Perspective for*  
*Engineering Students by Providing an*  
*International Experience*

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Engineering Conferences International

Year 2003

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Need for Global Perspective: An  
Industrial View

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Enhancement of the Global Perspective for Engineering Students by Providing an International Experience

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# Need for Global Perspective An Industrial View

Tomar, April 7, 2003

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## Siemens

### Some facts and figures (2002)

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- Employees:
  - world-wide 460 000 (100 %)
  - in Germany 160 000 (35 %)
- University graduates: 150 000 (33 %)
- Engineers: 120 000 (26 %)
- Global presence in: 195 countries
- Sales: 85 billion €

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## Driving factors

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### **Globalization**

- Economy
- Society
- Education

### **Change**

- Technology
- Organization

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## International orientation

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Engineers see themselves as an integral part of a global society

They are also embedded in their local environment

The slogan "think global, act local" is part of their philosophy of life

They have the will – and ability – to work across all political, cultural, and ethnic boundaries

## International orientation

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They are aware of the cultural differences between different regions of the world

They are flexible and eager to learn

They master foreign languages

They adapt to their international partners and avoid misunderstandings that can arise due to cultural differences

They practice real and virtual mobility on a global scale

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## Characteristics of an excellent Engineer

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An excellent engineer has/shows evidence of:

- Providing leadership and vision
- Focus on business / clients
- Focus on international opportunities
- Focus on required roles / results
- Commitment to ethical and social responsibilities
- Team-working: multidisciplinary / cultural
- Management of projects / events
- Management / motivation of people
- Management of knowledge / IT

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## Characteristics of an excellent Engineer

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An excellent engineer has/shows evidence of:

- Management of self / time
- Communicating, verbal and written
- Learning, developing and improving
- Flexibility in adapting to change
- Technical knowledge / expertise
- Commercial / financial knowledge / expertise
- Application of relevant knowledge / expertise
- Systematic and logical approach



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## Europe - a continent of great diversity

### Some facts and figures

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- ~ 40 independent countries
- ~ 32 different languages
- 15 countries in European Union
- simultaneous translation in at least 3 - 4 languages in every official EU / EC meeting
- all official documents of the EU must be translated into 11 languages in order to be understood in every Member Country

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## Variety of educational systems

### Secondary level

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According to the national needs and attitudes the major differences begin already in school education at secondary level.

From country to country there are different

- types of schools
- different emphasis on certain content
- different pedagogical approaches and
- different standards and lengths of education

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Variety of educational systems  
Tertiary level

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Similar differences we can find in university education a tertiary level too:

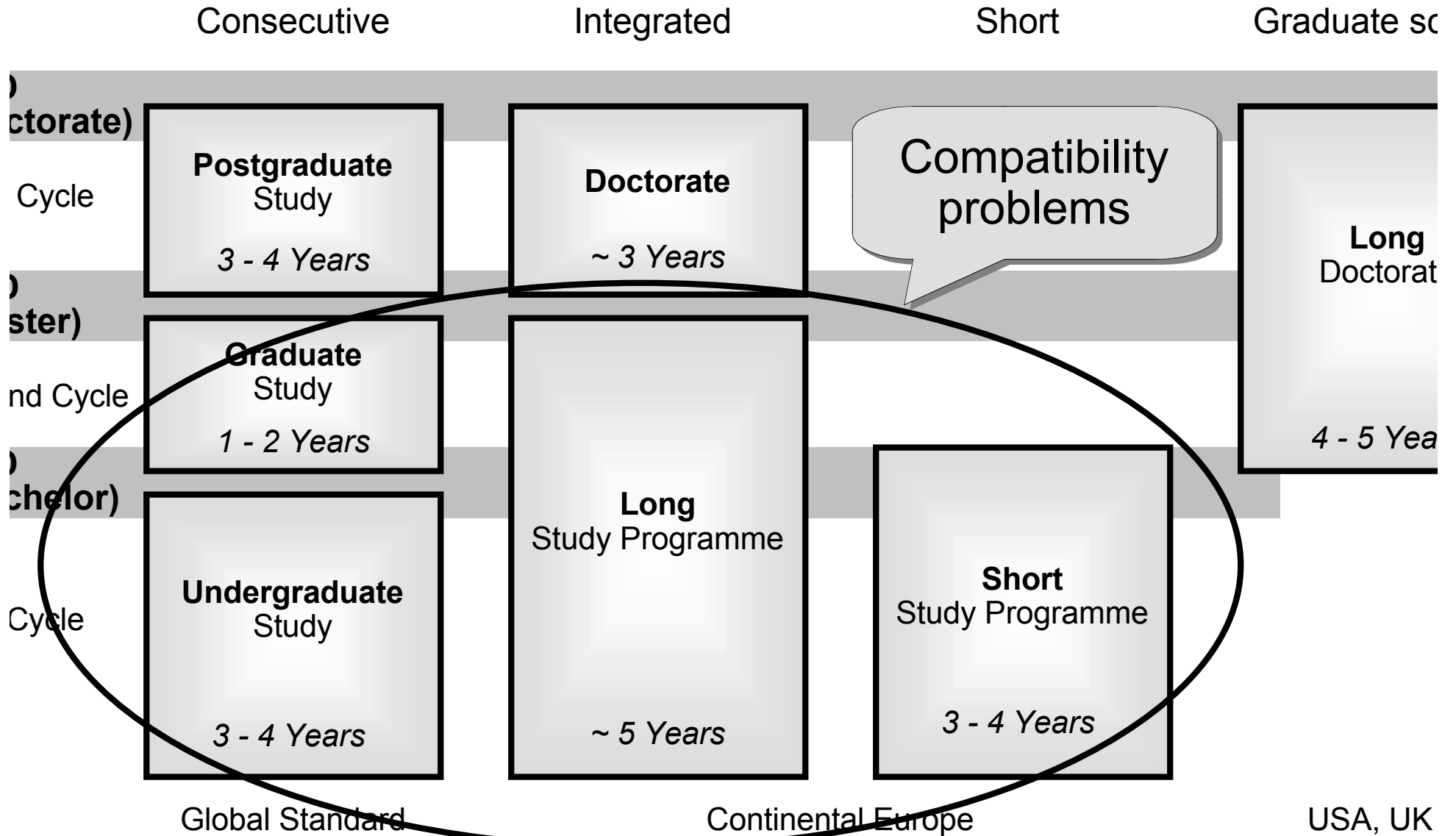
- different types of universities with their own **educational profiles**
- different **levels** of theory and practice in education
- different academic **values of degrees**
- different **titles** and again
- different **lengths of study**

Example:

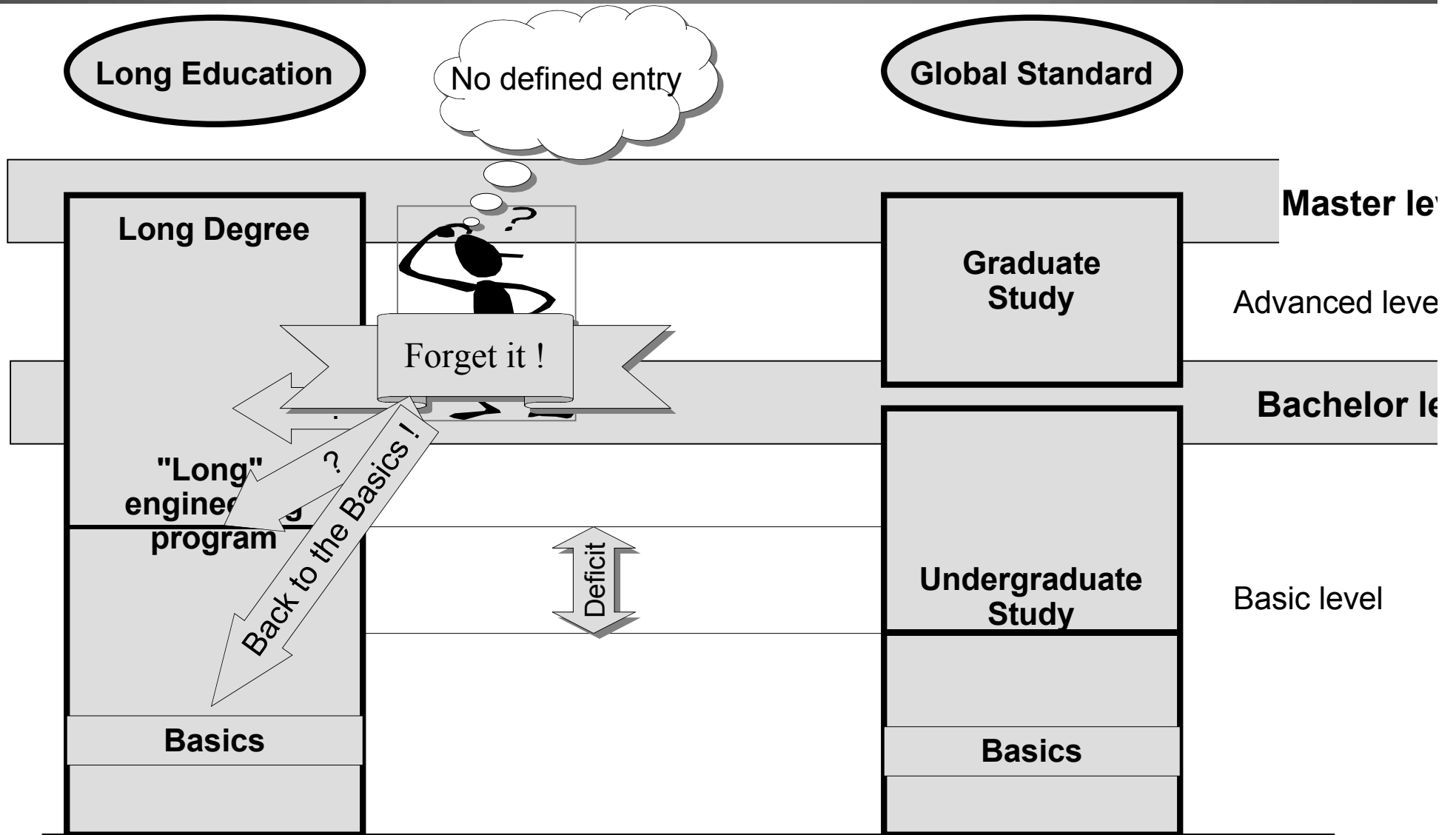
Variety of academic engineering titles in Europe

demiingeniør	Engenheiro	In_enyr
helor of Arts	Europa-Ingenieur	In_inier
helor of Engineering	Ingenieur (grad.)	In_ynier
helor of Science	Ingeniør	Magister In_ynier
lingenior	Inginer	Master of Arts
lingenjör	Insinööri	Master of Engineering
om-Ingenieur	Ingeniero Químico	Master of Science
om-Ingenieur ETH	Ingeniero Superior	Okleveles mérnök
om-Ingenieur (FH)	Ingeniero Técnico	Okleveles üzemmérnök
omi-Insinöör	Ingénieur civil	Sivilingeniør
omirani In_enir	Ingénieur diplômé	Teknikfræ_ingur
tor-Ingenieur	Ingénieur industriel	Teknikumingeniør
ore in Ingegneria	Ingénieur technicien	Verkfræ ingur

# Higher Education Systems Different models

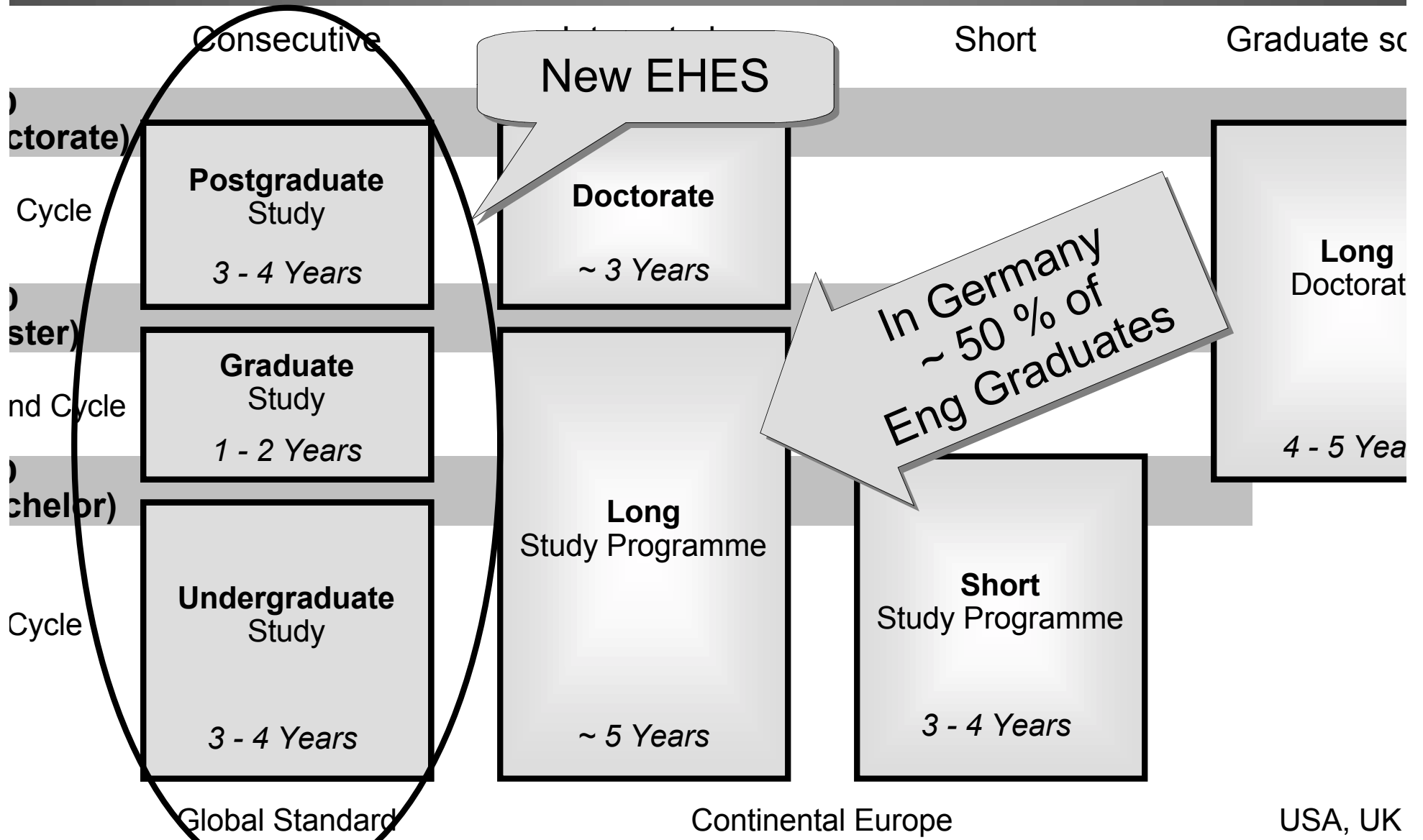


# Compatibility problems



# New European Higher Education System (EHES)

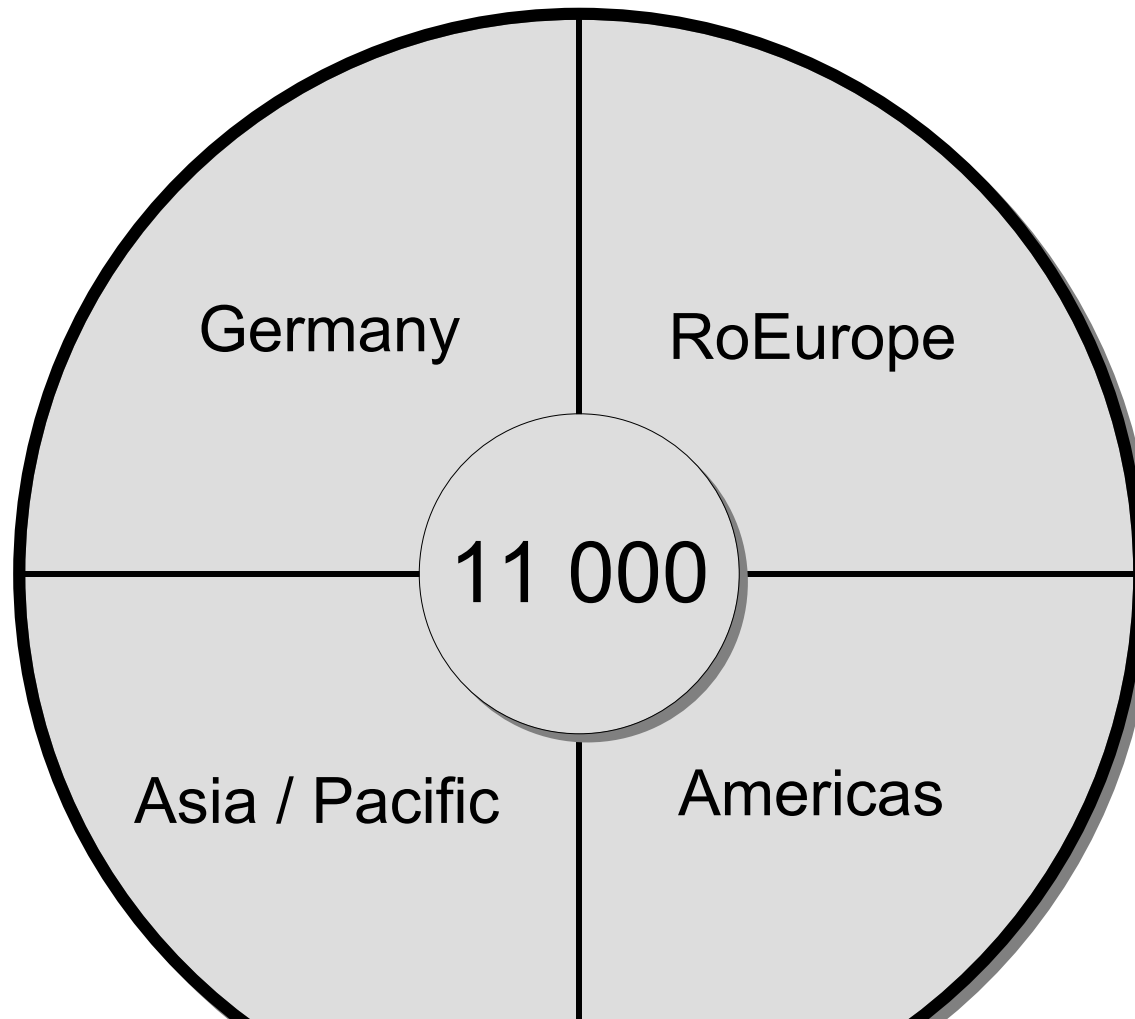
## Bologna declaration (1999) & Bologna process until 2010



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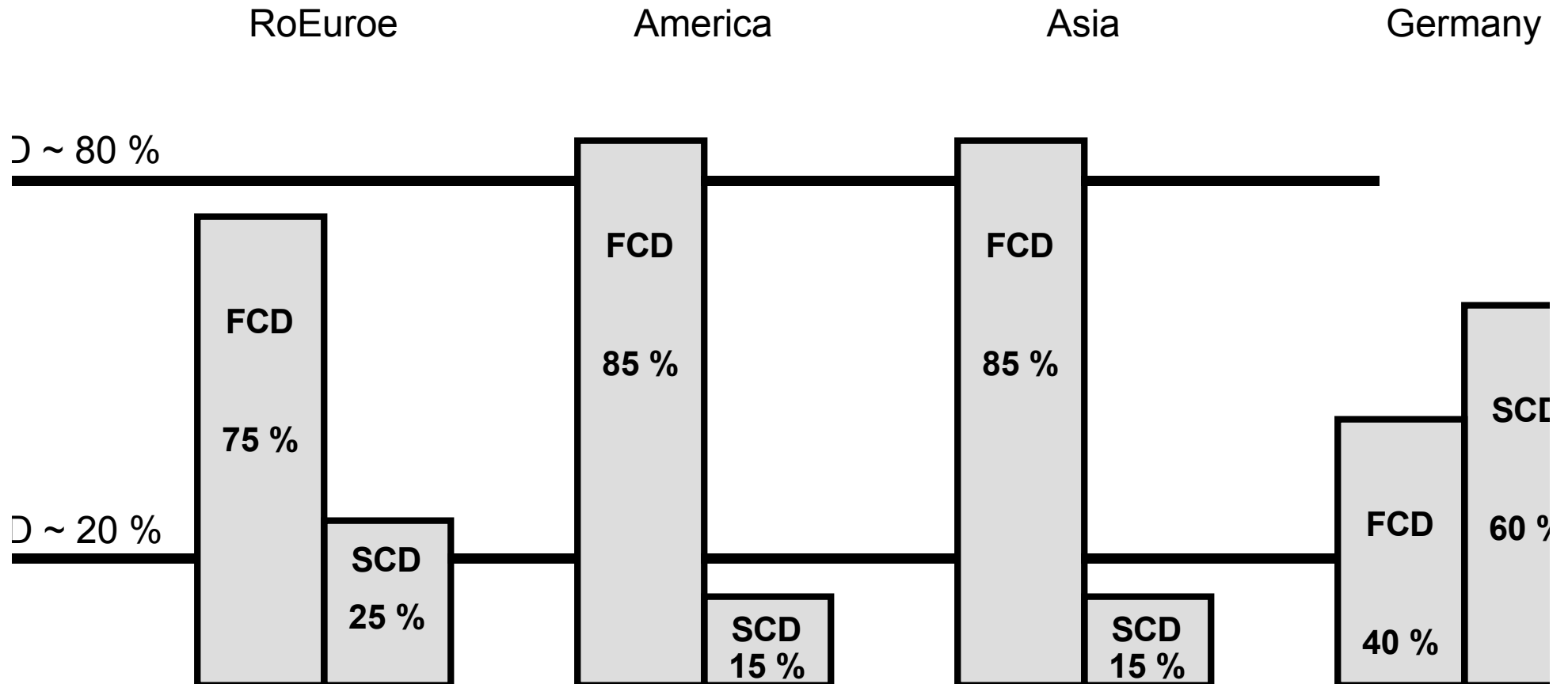
## Recruiting of Graduates with University Degree (2002)

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## Recruiting of Graduates with First and Second Cycle Degree



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## Students' mobility models

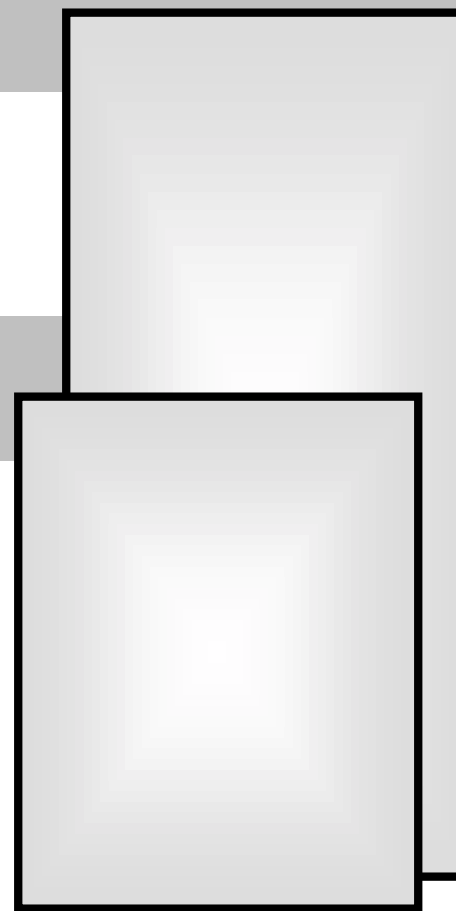
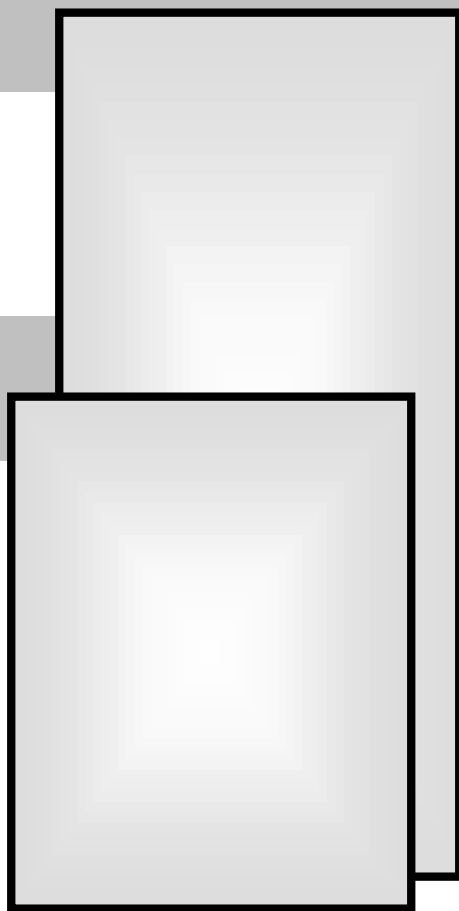
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One country

Another country

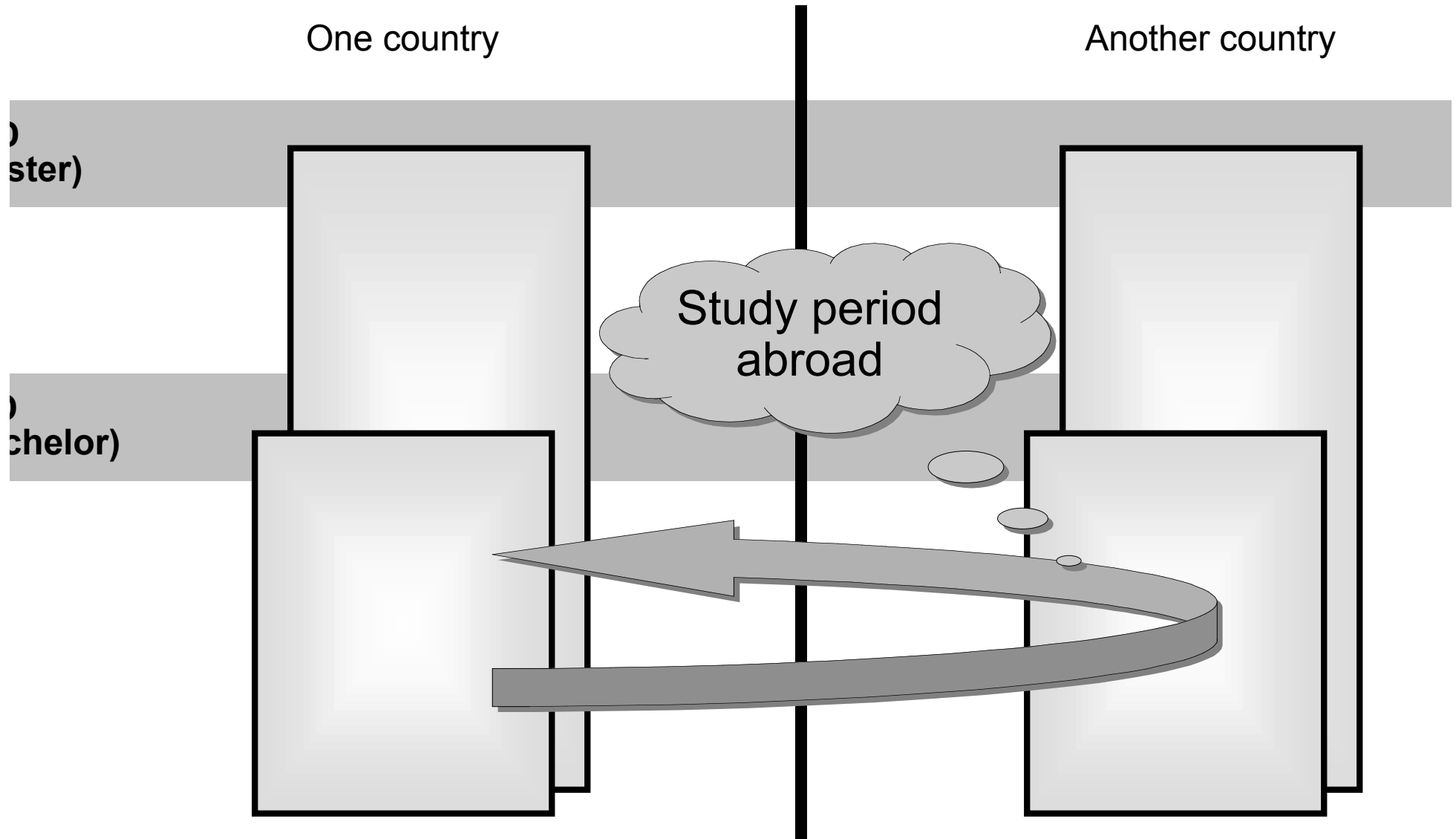
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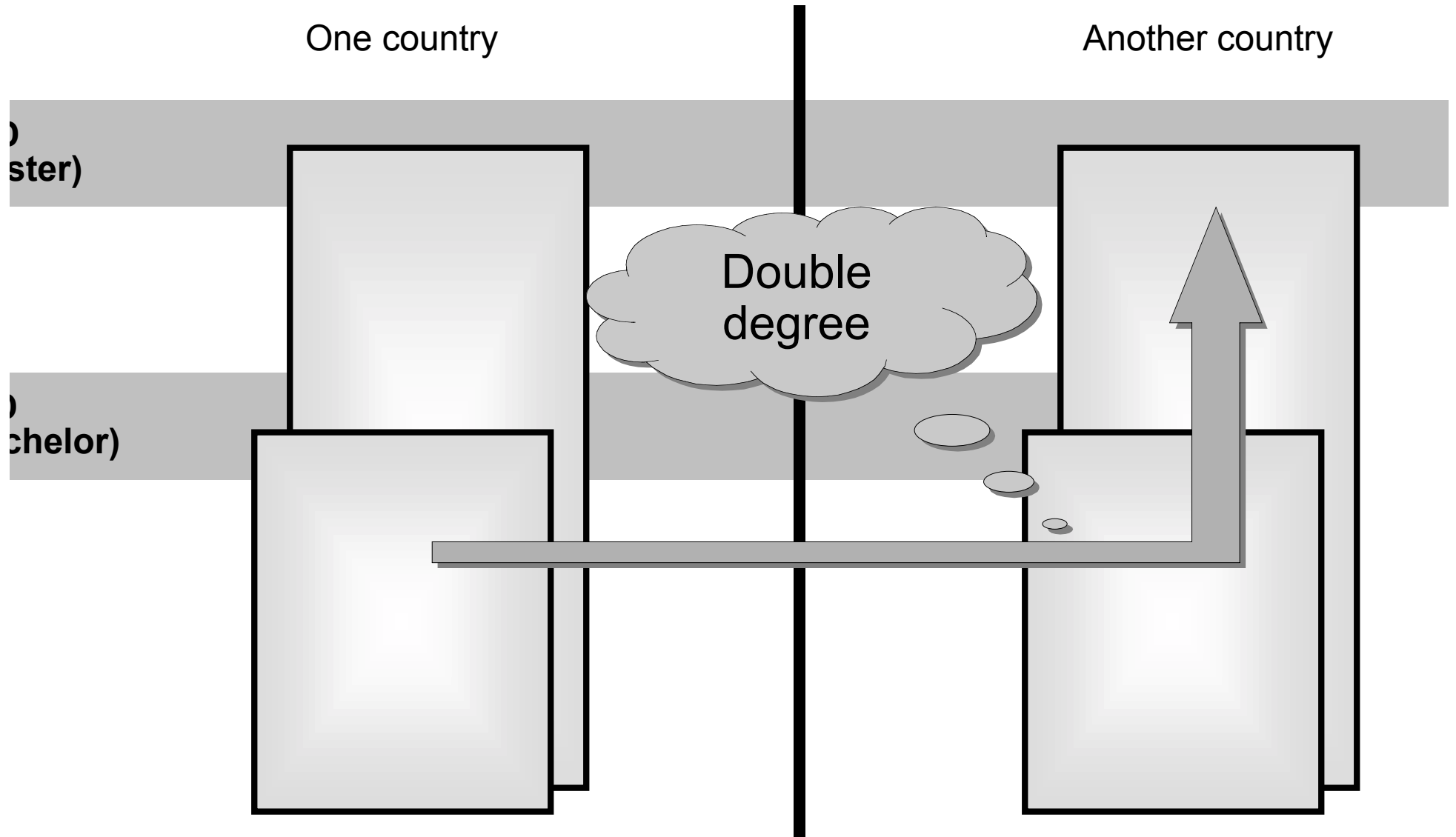
# Students' mobility models

## Organized mobility



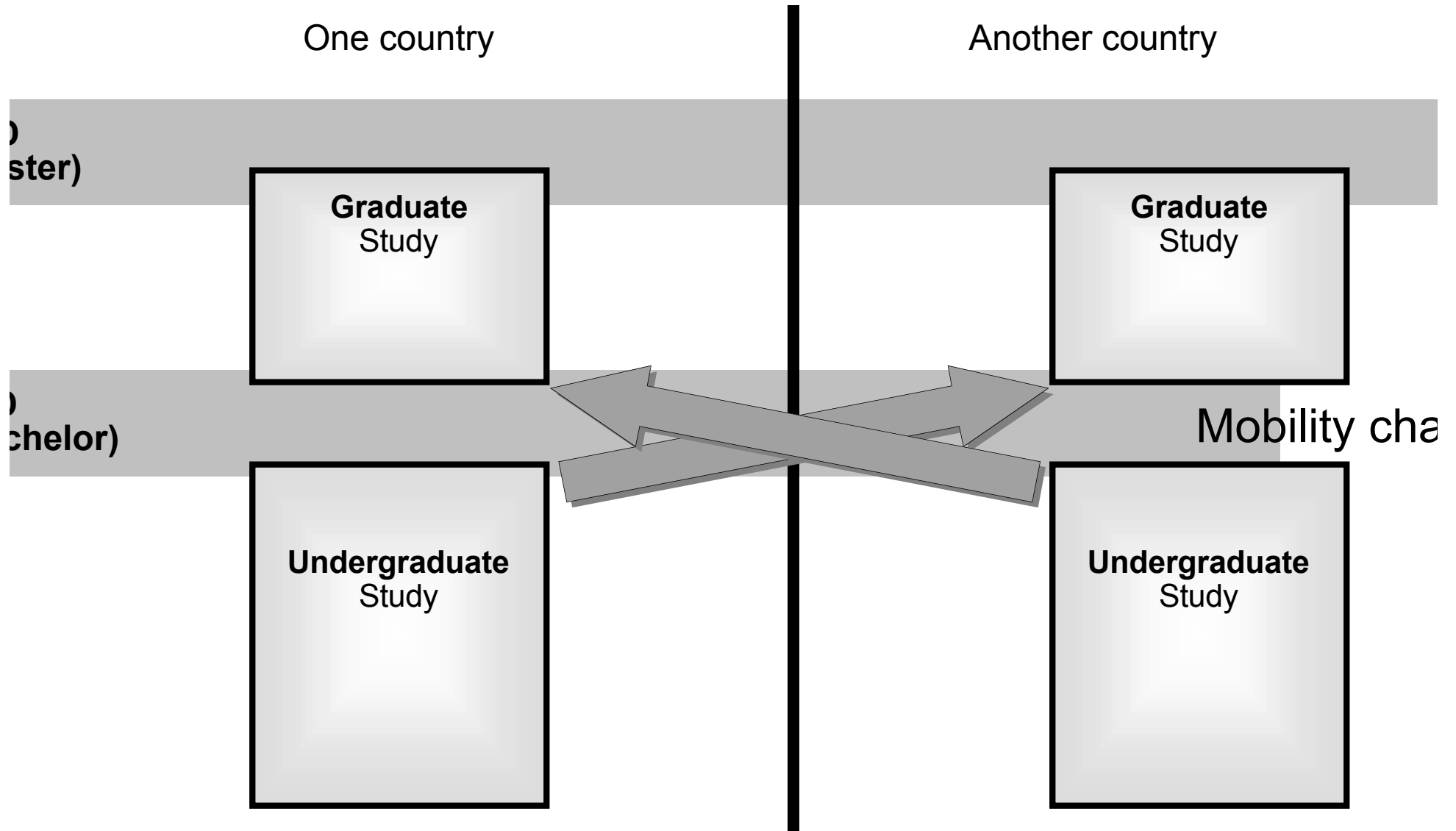
# Students' mobility models

## Organized mobility



# Students' mobility models

## Free mobility



## Recommendations

### Declaration

from Siemens International Symposium on  
Engineering Education in a Global Society

held in Berlin in 1998

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## Siemens International Symposium on EE in a Global Society Declaration 1998

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A global society and the profession requires engineers with different competencies.

These engineers must be highly qualified whether research oriented or application oriented.

This implies an understanding and appreciation of basic science, engineering, and different cultures including foreign languages.

Engineers must also possess interpersonal skills such as communication and teamwork.

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## Siemens International Symposium on Engineering Education in a Global Society - Berlin 1998

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Engineering education must recognize, promote, and reward the global mobility of students and professors in the spirit of mutual recognition of the various approaches to engineering education.

This mobility includes courses, research, practical experiences, and degrees.

The de facto international standard based on bachelor's, master's, and Ph.D. degrees appears to be a suitable model for engineering education in the global society.



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Siemens International Symposium on Engineering Education in a  
Global Society - Berlin 1998

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Engineering must promote an understanding that  
technology is an integral part of society ...

... in order that young people, their teachers, and parents  
appreciate the fundamental role of engineering and  
technology in their everyday lives and work.

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## Siemens International Symposium on Engineering Education in a Global Society - Berlin 1998

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There is a need for quality assurance systems which are transparent and are based on mutual recognized minimum standards.

These should be responsive to changing technology and world conditions.

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## Siemens International Symposium on Engineering Education in a Global Society - Berlin 1998

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There is a need for global networks of universities cooperating at the professional level in order to integrate an understanding of other cultures and differing approaches to engineering education.

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Siemens International Symposium on Engineering Education in a Global Society - Berlin 1998

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Engineering education must introduce global marketing strategies and structures to attract students from other countries and cultures to participate in programs in initial and continuing engineering education.

This may involve the delivery of education in foreign languages and may utilize modern technology such as quality assured distance learning.

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## Conclusion

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European Industry welcomes the European Higher Education System based on Bologna Declaration.

Expectations on authorities and universities:

- adapt national legislation
- implement new courses in Universities
- integrate the traditional system into EHES scheme
- learn from experience and best practice of other countries

as soon as possible

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End

**Ladies and Gentlemen.  
Thank you for your attention ...**

**... questions and discussion  
are appreciated**

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Senior Director, Education Policy

