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The Best Practices in Organizing and Implementing Applied Studies with the Emphasis on the Technology and Maritime Sectors

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Basic Parts of the presentation

- Applied sciences in maritime study programmes: what it all means?
- Inclusive and flexible practices across different sectors: energy, ICT, maritime, etc.

Inclusive and flexible practices in Applied Science. Why?

- An inclusive approach:

… necessitates a shift away from supporting specific student groups through a discrete set of policies or time-bound interventions, towards equity considerations being embedded within all functions of the institution and treated as an ongoing process of quality enhancement. Making a shift of such magnitude requires cultural and systemic change at both the policy and practice levels.

(May and Bridger, 2010, p.6)

- Inclusive teaching is an important component for Social Inclusion.
- Universities should be committed to providing socially inclusive teaching practices so that all students have access to and engagement with learning regardless of social, cultural, economic or physical barriers.

Inclusive approach. What this is / what it means?

- Inclusive approach does not focus on specific target groups or dimensions of diversity, but rather strives towards proactively making higher education accessible, relevant and engaging to all students.

- This is informed by the simple but challenging maxim that "*students don't want to stand out as different yet want to be recognised as individuals" (Hockings, 2010a)*.

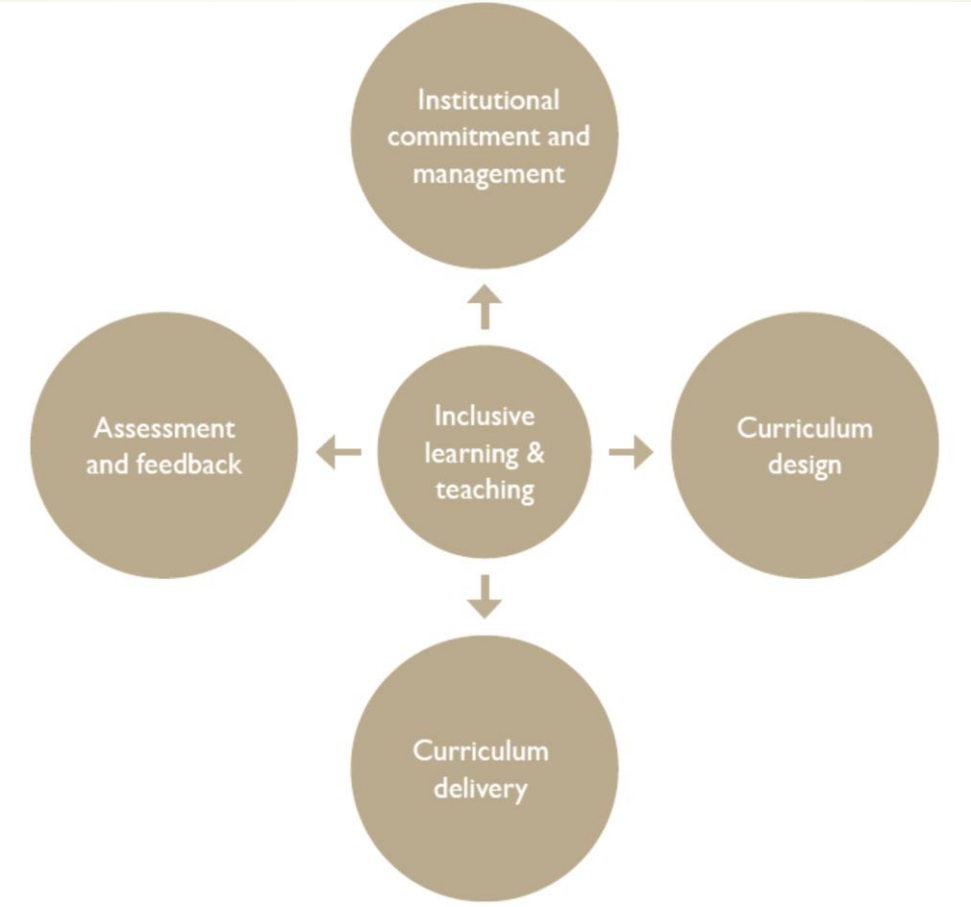
- Students are different. Student present diversities that sometimes lead them outside the educational system.

Student diversity. What this is?

Diversity dimensions	Examples
Educational	Level/type of entry qualifications; skills; ability; knowledge; educational experience; life and work experience; learning approaches.
Dispositional	Identity; self-esteem; confidence; motivation; aspirations; expectations; preferences; attitudes; assumptions; beliefs; emotional intelligence; maturity; learning styles; perspectives; interests; self-awareness; gender; sexuality.
Circumstantial	Age; disability; paid/voluntary employment; caring responsibilities; geographical location; access to IT and transport services; flexibility; time available; entitlements; financial background and means; marital status.
Cultural	Language; values; cultural capital; religion and belief; country of origin/residence; ethnicity/race; social background.

Source : Inclusive learning and teaching in higher education.
Available in http://www.heacademy.ac.uk

Elements of inclusive learning and teaching



Source : Inclusive learning and teaching in higher education. Available in http://www.heacademy.ac.uk

Inclusive and flexible practices across different sectors

- A distinctive approach should generate a re-imagined future for teaching staff, where responding to human diversity is recognized as the point of education.
- A new way of thinking. every person is a unique individual with multiple overlapping identities.
- Learning is a social activity, interconnected with others, where lecturers can act to enhance participation and achievement.

Ways of enhancement

- develop and appropriately apply knowledge, skills and attitudes relevant to inclusive education.
- reflect critically on the relationships between theory and practice and explore issues in the implementation of educational and social principles and ideals.
- influence policy issues and the practice of professionals in relation to developing and sustaining inclusive education.

Flexible learning -Flexible pedagogies

- It is about empowering students by offering them choices in how, what, when and where they learn: the pace, place and mode of delivery.
- The need to develop new ways of learning has become a big issue, largely linked with the demand for increased flexibility of pace, place and mode of delivery.
- Flexible learning requires a balance of power between institutions and students, and seeks to find ways in which choice can be provided that is economically viable and appropriately manageable for institutions and students alike.
- Forms of flexibility are leading to an enhancement in students' experience of higher education and to an impoverishment in that experience; and it is by no means clear as to how, in general, matters might proceed from here. This, therefore, is an especially timely moment for systematic reflection and concerted action by all concerned

Thinking from across the disciplines and sectors

Different disciples and sectors require common knowledge and use common tools provided by other disciplines.

Facilitated through a dynamic and collaborative process of knowledge exchange and enhancement in the form of:

- discussion forums
- webinars
- face-to-face meetings and events
- distance assignments and projects
- use of video streaming and other distance learning tools

Institutional Flexibility

The institutions' pedagogical flexibility and their capacities in this domain may be evident in numerous directions. In the first place, it will be apparent in their capacities to vary their curricula and pedagogical arrangements in response to changing markets and to the increasing heterogeneity in student cohorts.

<u>Flexibility happens in Two Forms</u>

- an ability on the part of an institution quickly to adapt through time to a changing environment
- an ability to vary the educational offer at any one moment in time across its students.

These two forms of institutional flexibility – across time and across students – may run into each other: for instance, institutions are being challenged by students' pedagogical wishes themselves changing through time. An individual student may start as a full-time student but wish to transfer to a part-time programme during the course of the programme of studies).

Examples of an institution's pedagogical flexibility includes enabling its students to:

- to receive credit of some kind for their prior learning and/or experience (so requiring flexibility in the making of admissions' judgements);
- during the course of their studies, to vary and even to switch the disciplines and/or professional fields of their studies;
- to have some optionality over the pattern of their studies (some students may wish to have physical access to the library during the night; others may wish to have digital access to the pedagogical resources associated with their programme of study);

Examples of an institution's pedagogical flexibility includes enabling its students to:

- to have a degree of choice over the modalities in which they present their assignment (in combinations of text, sound and vision, in three-dimensionality, in performance);
- to have some epistemological control over their programme of studies (some students prefer to study theoretical aspects of phenomena; others prefer to study practical aspects);
- to adopt a learning strategy best suited to their own learning style (whether, for instance, starting with concrete instances or discrete facts warranting a surface-level approach but broadening into a deep and synoptic understanding or starting with a deep grasp of general principles and filling in the interstices over time);

Examples of an institution's pedagogical flexibility includes enabling its students to:

- to have choice as to the level of interactivity of their own approach to their studies (some students thrive on interaction with others; other students much prefer, at least initially, to work things out in their own way);
- to change the mode of their registration – as between full-time and part-time;
- to interrupt their studies;
- to acquire credits and be able to leave mid-way with a portfolio of credits;
- to provide for students to choose or to influence the way – and potentially time and frequency – in which they will be assessed;
- to allow students to alter the contents of their programme so as to heighten their professional or personal relevance (which might even allow students room to switch their main subject of study completely).

Expanding an institution's flexibility profile

This calls not just for systems investment but calls attention also to an institution's values, ethos and priorities.

(Especially but not only in research-intensive institutions), managerial attention will need to be paid to pedagogical reward structures such that academics are encouraged to invest of themselves in the development and redesign of curricula and pedagogies.

… necessitates a shift away from supporting specific student groups through a discrete set of policies or time-bound interventions, towards equity considerations being embedded within all functions of the institution and treated as an ongoing process of quality enhancement. Making a shift of such magnitude requires cultural and systemic change at both the policy and practice levels.

(May and Bridger, 2010, p.6)

Standards and quality

- Both standards and quality have to come into play in any efforts to inject flexibility into the higher education system;

Standards' here refers to the criteria and general considerations (held to constitute a valid student experience and set of attainments) that might come into play in any flexible environment.

Standards and quality play against each other in intricate ways. On the one hand, we have identified situations in which quality and standards may run a risk of being jeopardized.

Taking advantage of new technologies so that higher education becomes readily – and even freely – available to huge numbers of potential students may herald a limited higher education experience; and it may be evident in high – and even very high – non-completion rates.

Quality

- Quality' here refers to the likelihood that those criteria – those standards – are actually in practice going to be met and, thereby, to the institutional processes and arrangements deployed to that end in particular settings.
- Quality is here impugned but not unreasonably, it may be felt: the gain of wider access warrants a more limited student experience and so loss in quality of that experience; and in that case, different – and even a lowering of – standards would be coming into play.
- In short, there may be a tendency in any drive towards flexibility to permit an altering of standards.
- Matters of standards and quality are key to the development of more flexible provision but yet it is doubtful if they are receiving their due attention.

Information and Communication Technologies

ICT technologies is of paramount importance in higher education of all sectors.

Provides tools for educational purposes but it is also a significant part or a discrete discipline it shelf.

- **Educational ICT** tools can be divided into 3 categories
  - input source
  - output source
  - others.

ICT

- It is now impossible to ignore the potential of Information and Communication Technologies (ICT), and especially that of the Internet.
- We are witnesses to the appearance of the Information Society and its expansion through the development of computer networks, which allow citizens to access enormous sources of information, communicating at a speed never seen before, connecting to any point on the globe and asserting themselves not only as consumers of information and knowledge but also as the creators and sources of that very information and knowledge itself.
- This technological revolution obviously constitutes an essential element in the understanding of our modernity, inasmuch as it creates new forms of socialization and, even, new definitions of individual and collective identity

ICT as a didactic tool

- Using the Web as a didactic resource for schooling activities—due to its potential for communication and distribution—means that it is not only necessary to transpose study material onto the Network but that it is important above all to conceive and develop environments that will support methodologies and strategies allowing for significant learning.

- The conception, development, implementation and evaluation of educational and training devices for the Web necessarily require profound reflection and discussion, not only concerning the computer software and communication aspects of operation of the devices themselves, but also, and above all, regarding the pedagogical, didactic and curricular purposes and intentions that support them.

ICT in higher education teaching

- It is worth emphasizing that ICT activity may cause radical change in the teacher's activity as well as in that of the student.
- The real evolution lies in the change of educational culture: a culture of collaborative learning, seeking to overcome the individualistic matrix through social action, whether it be from the perspective of interaction or representation.
- In this field, there is still much to be done within the culture of the universities.
- Web tools for teaching such as E-calss, Moodle, youtube, are some of the strong tools that the academic staff can use to improve and enhance teaching far beyond the typical white board and presentations.
- Advance teaching tools included in well established e-learning platforms are key elements
- In the next years the augmented reality will also add strong teaching potential especially in Applied Science and engineering.

Energy

- The effects of energy use are global. All sectors of society have important roles to play in ensuring that energy is managed more efficiently.
- The topics renewable sources and sustainable energy generation become more significant every day.
- The energy flow monitoring is based on ICT technologies.
- Development of material and concepts for a systematic approach to energy education in computing education
- Development of competence in didactics and methodology for energy education

Maritime

- Maritime is the key to global commerce as it transports fuels and goods all around the world.
- Maritime is also key to connect islands with mainland for people moving, also in wellbeing where it is offering yachting and cruising to the people.
- Commercial interests have been the primary cause for the dramatic improvement in and rapid growth of the capabilities of information systems in maritime, and this trend is expected to continue.
- Information and information technologies will profoundly influence future maritime sector that the pursuit of *information superiority* will become a paramount goal in education and training, amongst others.

Interdisciplinary Approaches or common aspects between energy, ICT and maritime?

- Energy, ICT and maritime are totally different or present common topics? This is an interest question.

Facts for energy:

- Energy should be produced, transmit and distributed to the people and companies with high availability and reliability.
- 24/7 measuring, monitoring and analyzing data are key issues for achieving this goal. Thus sensors, distributed sensors systems, measuring and data analytics are key elements to do so. But this is basically ICT. This is the 1st step to IOT in Energy.
- Energy goods are extracted also and distributed using offshore infrastructures, port infrastructures and shipping. This is maritime.

All these energy facts proves beyond any doubt that energy, ICT and maritime are interconnected.

Interdisciplinary Approaches or common aspects between energy, ICT and maritime?

Facts for ICT:

- 24/7 energy availability in huge quantities high extreme availability is the key to operate the ICT infrastructure globally.
- Block-chain applications consume tremendous amounts of electricity. Are expected to become among the highest climate change dangers in the next years.
- The biggest players of internet (Google, Facebook, Apple, Twitter, etc.) are going from fossil fuels to renewables. And invest BIG in renewable energy.
- The biggest challenge of the next decade in computing is the energy efficient programming and data analytics.
- ICT plays a very important role in operations in maritime

All these ICT facts proves beyond any doubt that energy, ICT and maritime are interconnected.

Interdisciplinary Approaches or common aspects between energy, ICT and maritime?

Facts for Maritime:

- 24/7 monitoring of ships fleet and positioning as well as remotely condition of vessels.
- 24/7 ICT technologies for organizing and delivering, goods, energy products and passengers globally.
- 24/7 Advance monitoring of the ships operation to reduce the energy consumption and cut costs in shipping.
- 24/7 communications in global seas for the ships.
- New advance rules with strong remote monitoring systems to reduce the climate change impact from the operation of the ships, with new fuels and new concept designs.

All these maritime facts proves beyond any doubt that energy, ICT and maritime are interconnected.

Applied sciences in maritime study programmes: what it all means? (1/2)

The study programme sets out to cover maritime operations, with ship technology and management as supporting framework. Maritime operations cover different aspects related to different maritime operations.

- Regulations
- Technical aspects
- Organizational and managerial aspect

In the maritime industry of today the technological, operational and managerial aspects are entwined and technology and management.

Applied sciences in maritime study programmes: what it all means? (2/2)

The purpose of such a combination of applied sciences is to cover maritime operations in depth and educate students able to contributing to improve and develop such operations.

Teaching and learning methods are varied and aim to make the students to participate actively and build up independent thinking by lectures, solving exercises in groups, and problem-based learning being the most common.

Also internships in the maritime sector is a key for a successful implementation of the program that will give the required skills for the students.

But the definition of modern maritime will “show” what, why and how.

Modern Maritime : what it all means?

- Ships and vessels design, building, testing, maintaining and operating.
- Ships operation which includes economics, catering, fueling, communications, insurance, brokerage, taxing, law, legislation.
- Yachting, which presents the similar needs as above.
- Cruising, which also present the similar needs as above.
- Shipyards (small for yachts or big for vessels) and shipyards operation.
- Marines for yachting and marine operation.
- Ports both for goods and for passengers.
- Offshore installations – platforms for natural gas or oil extraction.
- Offshore renewables like wind or floating photovoltaics.
- Offshore and underwater pipelines up to shore
- Offshore fuel storages, etc.

SO YOU NEED Engineers for strong Curricula in Technology and Maritime
In addition you needs expertise in law, economics and logistics

YOU NEED ENGINEERS and SCIENTISTS FROM UNIVERSITIES OF APPLIED SCIENCES

Designing Successful Applied Curriculum in Technology and Maritime Sectors

1. *Focus on the market needs for scientists in the medium-long term.*
2. *Focus on applied science development and new knowledge.*
3. *Strong scientific background : the key in solving real world problems fast is the strong basic background knowledge.*
4. *Dynamic approach in curriculum creation.*
5. *Applied Sciences required applied skills and knowledge, thus many "hands on training" (laboratory) hours.*
6. *Strong quality assurance approach with measuring results in the market acceptance.*
7. *Always remember that the people with applied science degrees should have adequate knowledge and skill to enter the job market immediately.*

Designing Successful Applied Curriculum Examples for engineering sector (1/2)

1. *Strong background on applied mathematics, applied physics and chemistry.*
2. *Strong background in measuring technics and methods in general.*
3. *Skills and knowledge in measuring quantities in the specific sector, eg. Electric power, mechanical strength, energy, efficiency, etc.*
4. *Focus on the design of products and/or systems in the core of the studies, eg. electrical installation, electronic device, mechanical part, program, concrete foundation, a boat' hall, software, etc, using design tools.*
5. *Solving small real world problems during courses.*

Designing Successful Applied Curriculum Examples for engineering sector (2/2)

6. *Dynamic approach in core areas such as renewables, smart grids, cloud computing, new vessels design, LNG facilities, embedded systems, IOT, offshore, communications, big data analytics, etc.*
7. *Many hours in laboratory work and strong emphasis on executing real world experiments.*
8. *Strong role of the final thesis related to engineering issues.*
9. *At least 3 months internships in the fields of their studies with supervision in companies.*
10. *Basic economics and cash flow knowledge*
11. *Basic technical law and engineering safety.*