

Preparing University Graduates for the Fourth Industry Revolution – A Case Study from Bahrain

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Higher Education in the Era of the Fourth & Future Industrial Revolutions: Challenges and Opportunities

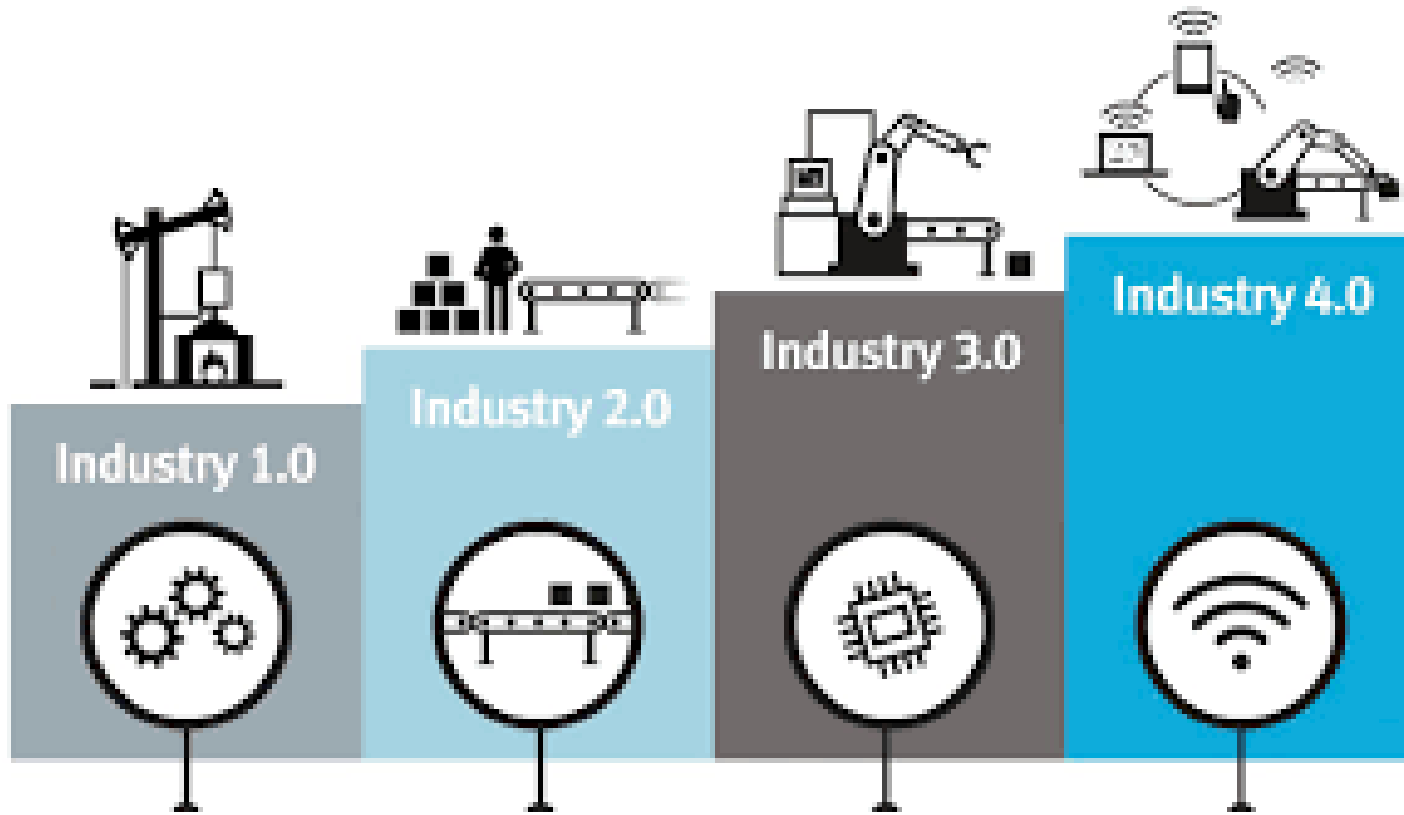
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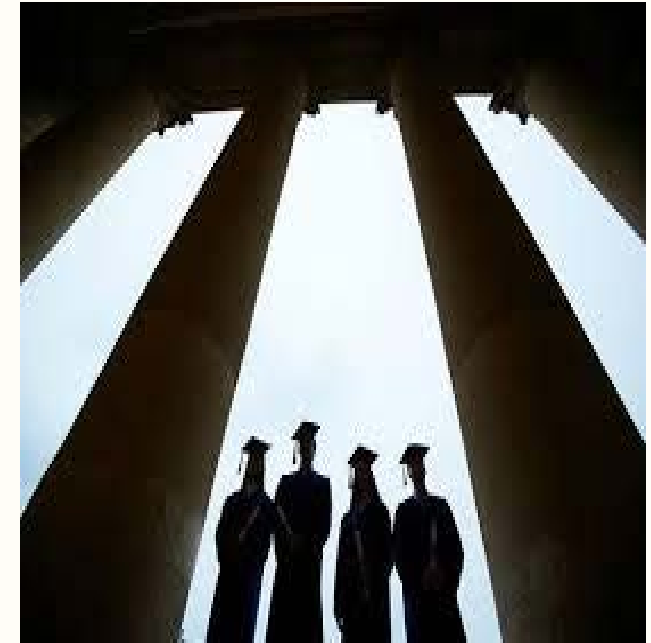


Industry 4.0 and Bahrain's Economic Vision 2030

Bahrain's Economic Vision 2030 envisages moving the economy from being oil-based to a knowledge-based, with education and training being key in providing the needed knowledge, skills and competencies for this transformation

Higher Education in the Era of Industry 4.0

- What is expected from university graduates is changing continuously
- Academics are facing the dilemma of preparing graduates for jobs that are yet to exist.
- The purpose of higher education institutions has expanded to include the responsibility for providing the market with knowledgeable, adaptive, agile and creative workforce.



- A number of scholars have attempted to draw a landscape of the academic programs needed and the characteristics of higher education institutions that can deliver them.
- These studies emphasize the vagueness of the future jobs and hence, the ability to predict what programs and graduates are needed.

Higher Education in the Era of Industry 4.0

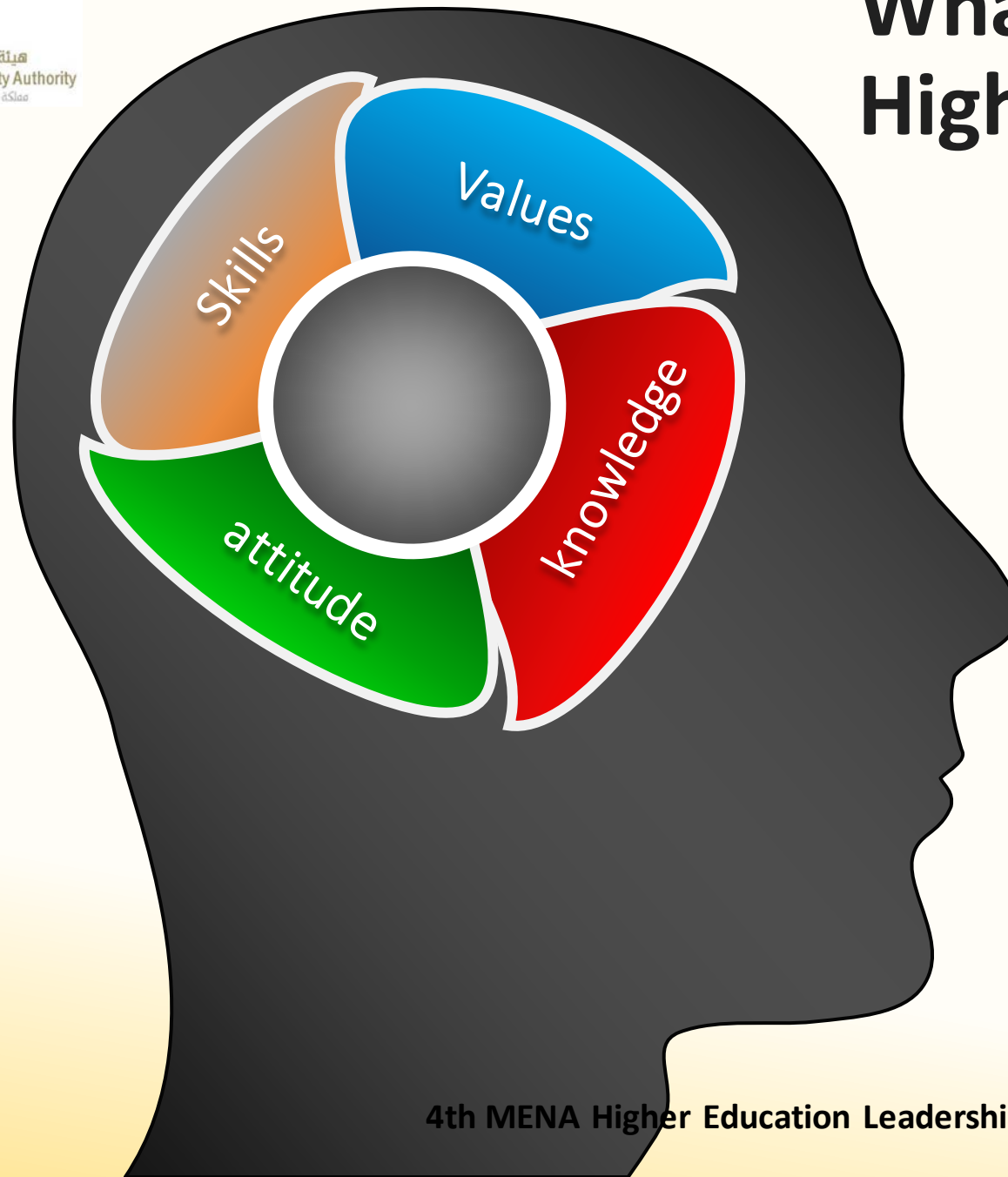
- The term 'Education 4.0' suggests what is expected from higher education institutions to align the way they operate with the needs of Industry 4.0
- There are different models suggested; however, Scholars agree on a number of key principles expected to be adopted by the higher education sector, mainly:
 - (i) Graduate Attributes
 - (ii) Teaching and learning pedagogies
 - (iii) The learning environment
 - (iv) Flexible learning



Graduate Attributes



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What is expected from Higher Education

HE has a vital role in preparing citizens who can contribute to a sustainable growth in the country's economy and social development.

Graduates Fit for Industry 4.0

HEIs are expected to declare what type of 'generic attributes' its graduates will have.

GAs are defined as the set of 'skills, knowledge and abilities of university graduates, beyond disciplinary content knowledge, which are applicable in a range of contexts'. *Barrie (2006:217)*

Industry 4.0 requires attributes that range from simple technical skills to complex intellectual abilities and personal and ethical values.

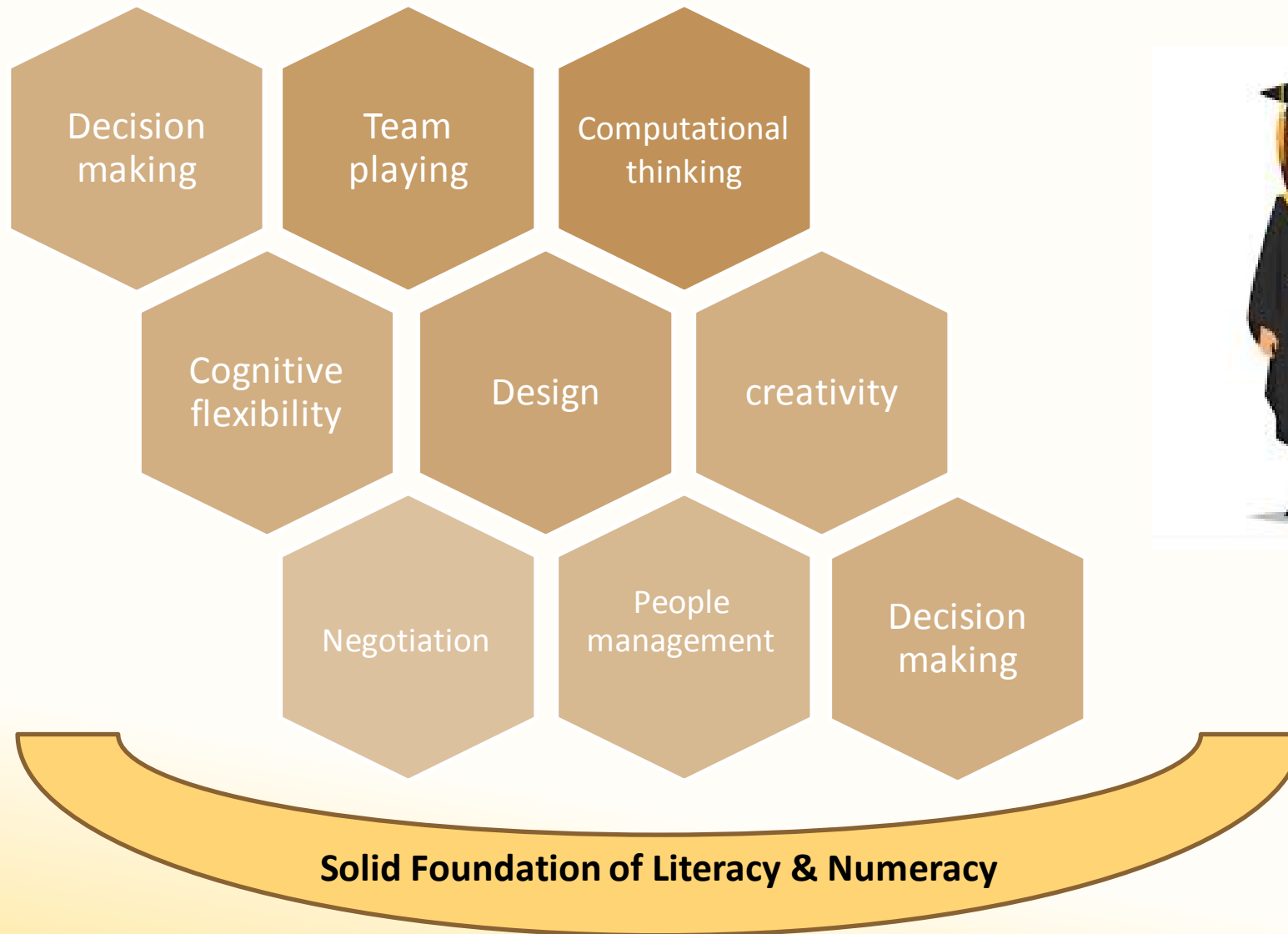
Graduates Fit for Industry 4.0

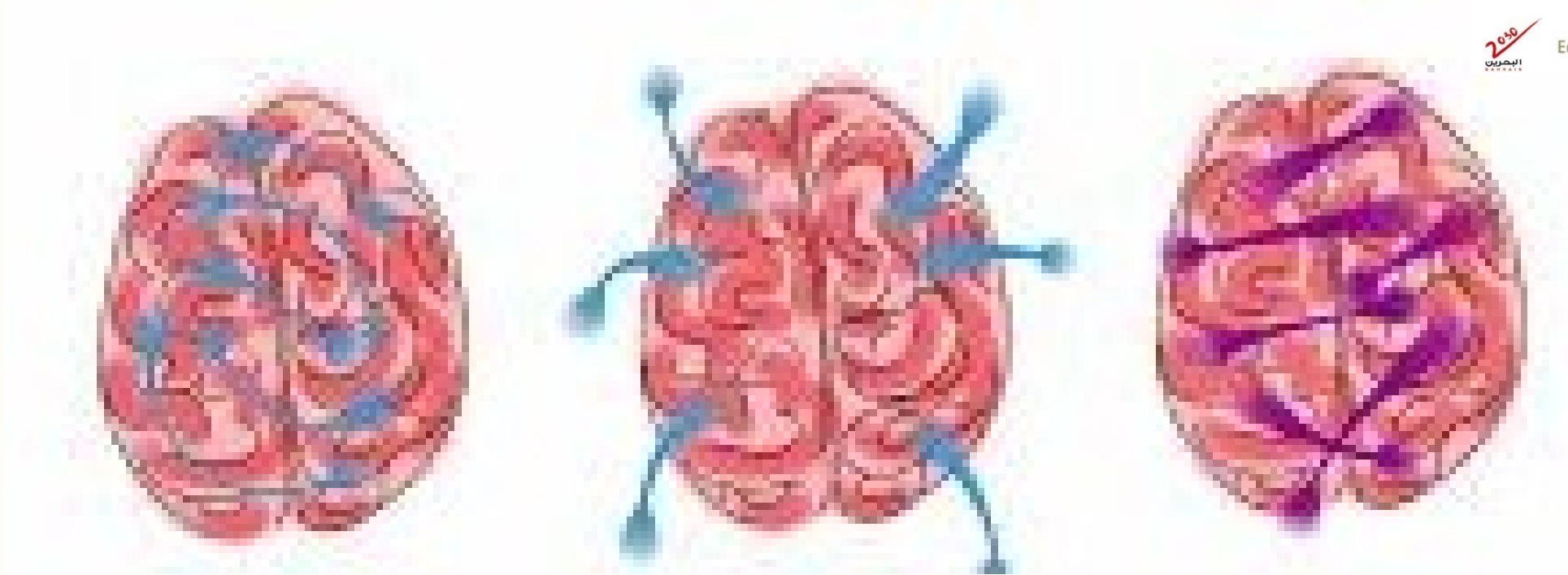


2030
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'the illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn.'

Alvin Toffler (1970)

What is expected from Higher Education



- A paradigm shift has been introduced in higher education, with more emphasis on learning (outcomes focused) rather than teaching (input focused).
- There is a need for a language through which different stakeholders would have a common understanding to what a program graduate can do and a mean through which the actual learners' achievements can be evaluated and measured and hence provide a '*genuine measure of the value of education*' (Maher, 2004: 47).

Outcome Based Learning



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Intended Learning Outcomes

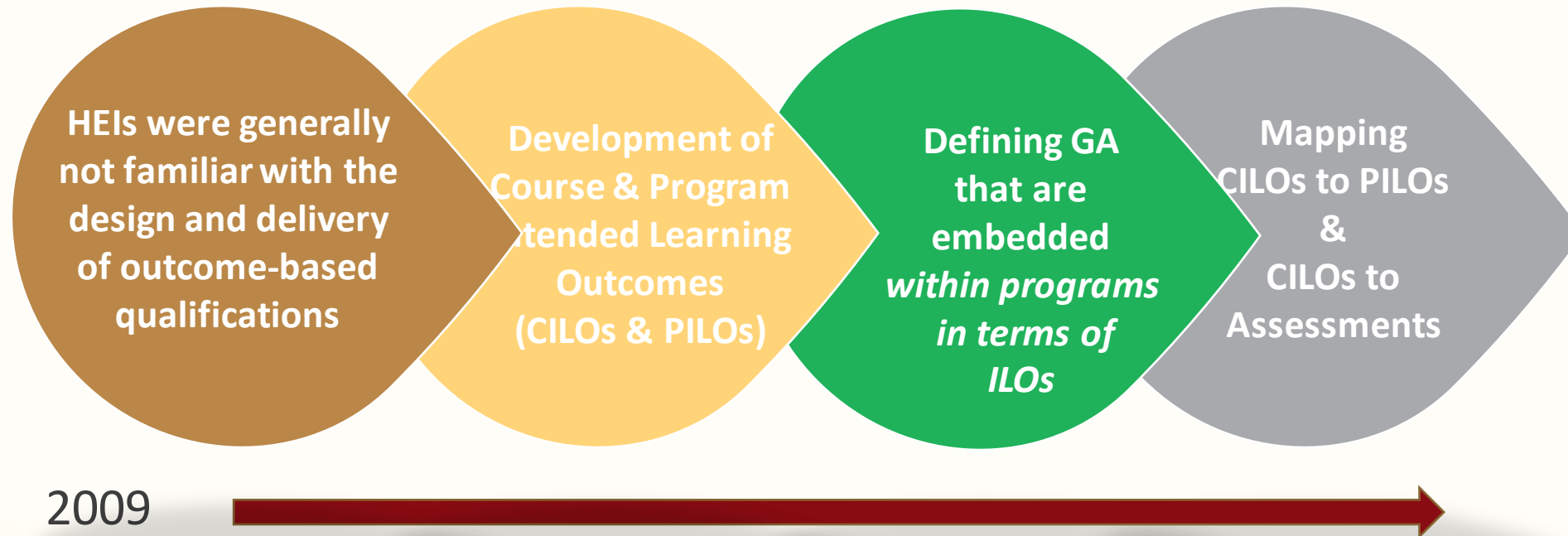
- Program Intended Learning Outcomes (PILOs)
- Course/Units Intended Learning Outcomes (CILOs)
- map CILOs to PILOs

Achieved Learning Outcomes

- map assessment to CILOs
- use marks achieved to assess achievement of CILOs
- Use CILOs to PILOs map to assess PILOs achievement

Graduate attributes are imbedded within the Intended Learning Outcomes

Outcome Based Learning – HEIs in Bahrain



Challenges

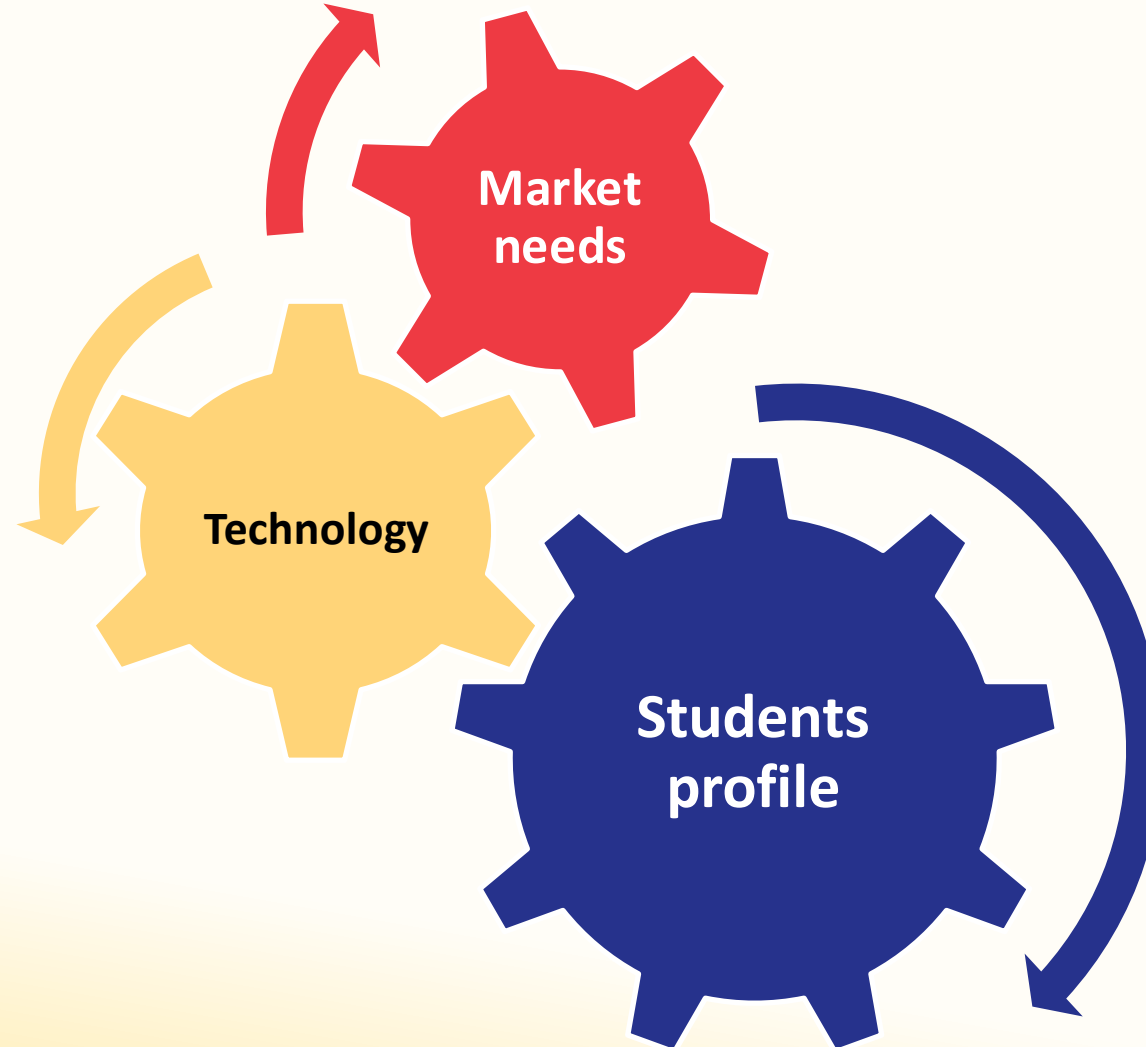
For generic GAs, HEIs focus on soft skills and simple transferable skills rather than those related to the needs of knowledge-based economy.

Linking assessment to LOs and setting threshold do not in reality assure the achievement of GAs



Teaching & Learning Pedagogies

Teaching & Learning for Industry 4.0



Using ILOs - HEIs in Bahrain



Teaching and learning methods are linked to ILOs, and are included in units and program descriptions



General skills and competencies, such as teamwork, communication skills and some level of critical analysis and problem solving are addressed most of the time.



There is a number of challenges that need to be addressed for teaching & learning strategies to be aligned with the needs of industry 4.0 and students' profile

Challenges phasing HEIs in Bahrain

Utilization of Technology



Responsibility Towards Learning



Work-Integrated Learning

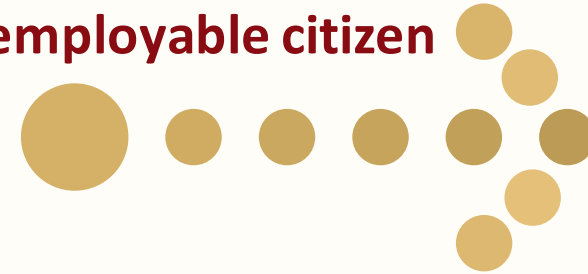


Top-up Vocational Qualifications



Effective learning

Responsible,
engaged &
employable citizen



The Learning Environment



The Learning Environment



The higher education sector in Bahrain saw rapid changes in its learning environment

The adaptation of Learning Management Systems (LMS) provides institutions with opportunities to deliver better services

University life should strengthen *'students' research capabilities, encourage creativity and innovation and promote lifelong learning*

The Learning Environment

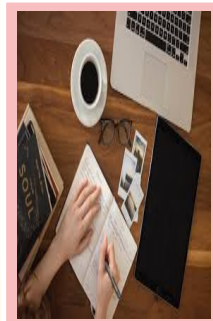
Challenges



The premises



Mining of LMS Data
and using outcomes to
inform improvement



The ability to design,
develop and deliver
online courses

Flexible Learning



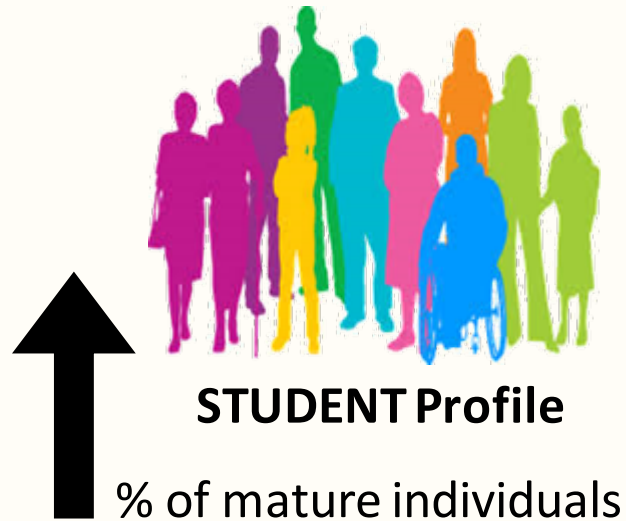
Flexible Learning



Flexible learning is to provide and access education in a responsive way *'in terms of pace, place and mode of delivery, ... allowing students choices and a degree of control over when, where, how and sometimes what they learn'*

The Higher Education Academy

Flexible Learning



Demand for a flexible, adaptable and fast changing higher education which will enable learners to combine work, study and social commitments

National Qualification Framework is a vehicle to provided learners with a wide range of flexibility when perusing a qualification

Flexible Learning



Blending formal and informal is seen as a suitable solution for flexible learning;

However,



distance, open and other non-conventional modes of learning are looked at skeptically in the region.



Most current legislations need to be revised in order to support recognition of informal and non-formal learning.

Conclusion

- BQA Reviews and the NQF have supported the institutions to adopt outcome-based learning.
- HEIs has defined program and unit intended learning outcomes, and to a lesser extent generic attributes expected to be attained by the institution's graduates.
- For HEIs graduates to better meet the needs of Industry 4.0, generic attributes needs to be widened to include attributes such as computational skills, creativity, decision making and emotional intelligence.
- HEIs need to instill in students the ability to self-learn and an appreciation for the need of life-long learning.
- Utilization of technology needs to expand beyond being used as a mean to deposit course material and upload assignments.
- Large data available in the institutions' LMS should be used to conduct institutional and scholarly research and outcomes should be utilized to inform decision making.
- There is a need to revise the current legislations to facilitate for the recognition of all types of learning.