



Project Title: Modernising Undergraduate Renewable Energy Education: EU Experience for Jordan

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To help finalise the QA Report, and to provide information for the Final Report and the Conference, we need information from each partner (Jordanian and European) relating to **impact and sustainability at the institutional to the personal levels.**

Impact

The following table provides you with some prompts to solicit comments and statements about **impact**. At this level we do not need the statistical details about numbers of students etc., as these have mostly been provided already, or will be supplemented once the student mobilities have been undertaken over coming months.

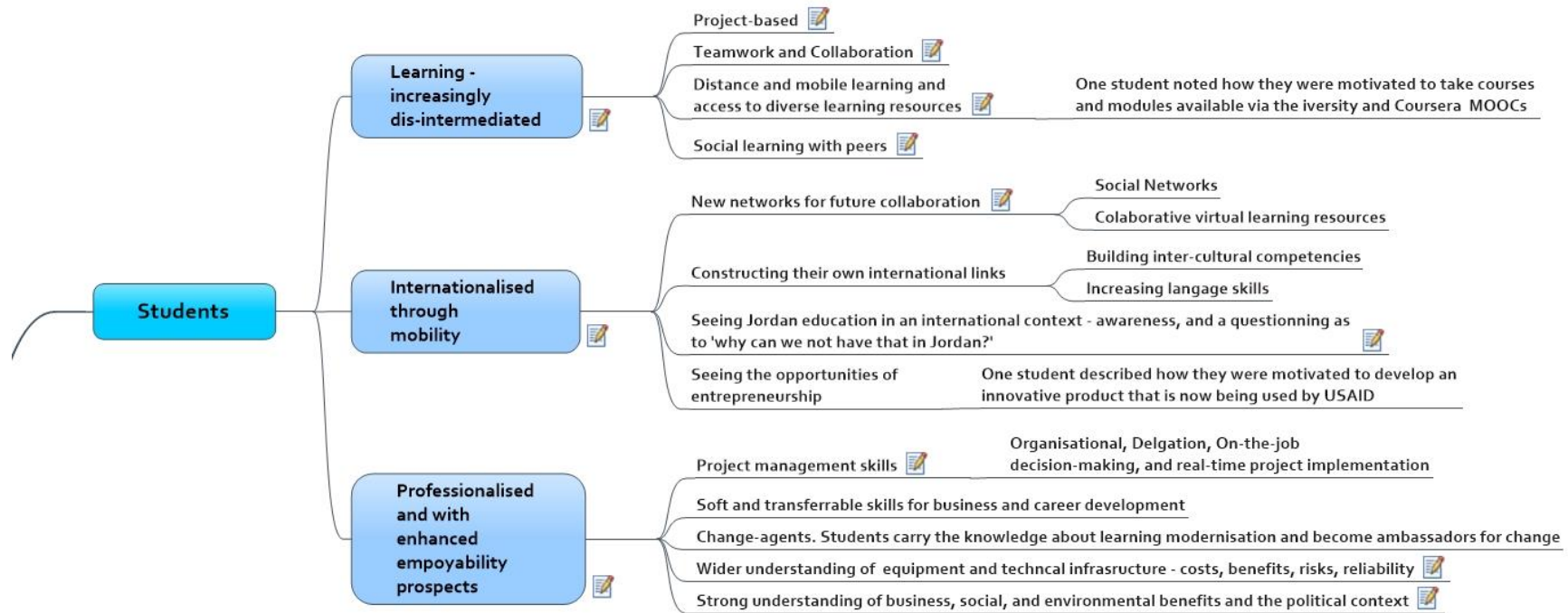
The starting point for comments needs to be the counterfactual thought: “What has happened through MUREE that could not have happened if the project had not been undertaken?” So, how has the project impacted on individuals, disciplinary departments, institutions, and (very important) the links between the European Union and Jordan?

For example, while there have been bilateral links between Jordanian Higher Education Institutions (HEIs) and HEIs in European countries, the EU funding has enabled a multi-lateral network to be established. It is highly unlikely that such a network could have been built using country-level funding. However, we also need to know about the impact on individuals. During the last monitoring visit in Amman, I took groups of students to talk privately to the EU monitoring team. The students talked about ‘life-changing’ experiences when they undertook mobility to EU partners.



Following the meeting an online survey was implemented asking all MUREE participants (Questions asked are appended at the end of this report) to communicate their experiences and impact. The survey was undertaken during September 2015, and responses covered student impact, staff impact, institutional impact, and policy impact. In addition, the responses identified a series of challenges to the Jordanian universities in developing future impact and value from MUREE.

These are visualised in the following diagrams, and are available on the MUREE Website as an interactive mindmap, with a set of quotations from the students noting the enthusiasm with which they regarded the mobility experiences, and the very clear impacts they identified. Since MUREE is about delivering a high-quality experience for the students they have clearly identified value.





The e-learning experience was "flexible"! For me not having to commit to any times or attendances was much more comfortable ,and since I spend a good amount of time "online" it made it easier to access the material and study it , if not on a daily bases but on a more scheduled time. Also the weekly online quizzes seemed to ensure the independent process of learning, at least for me.

Having multiple instructors for this course made it feel a little crowded if to say, but there was much more added value and experience. I'd imagine if the course was during a normal semester it could've been much better. Also I found it harder to "explore" the material provided in depth and invest any time with the instructors since it was a "once in a course time" meeting for some.

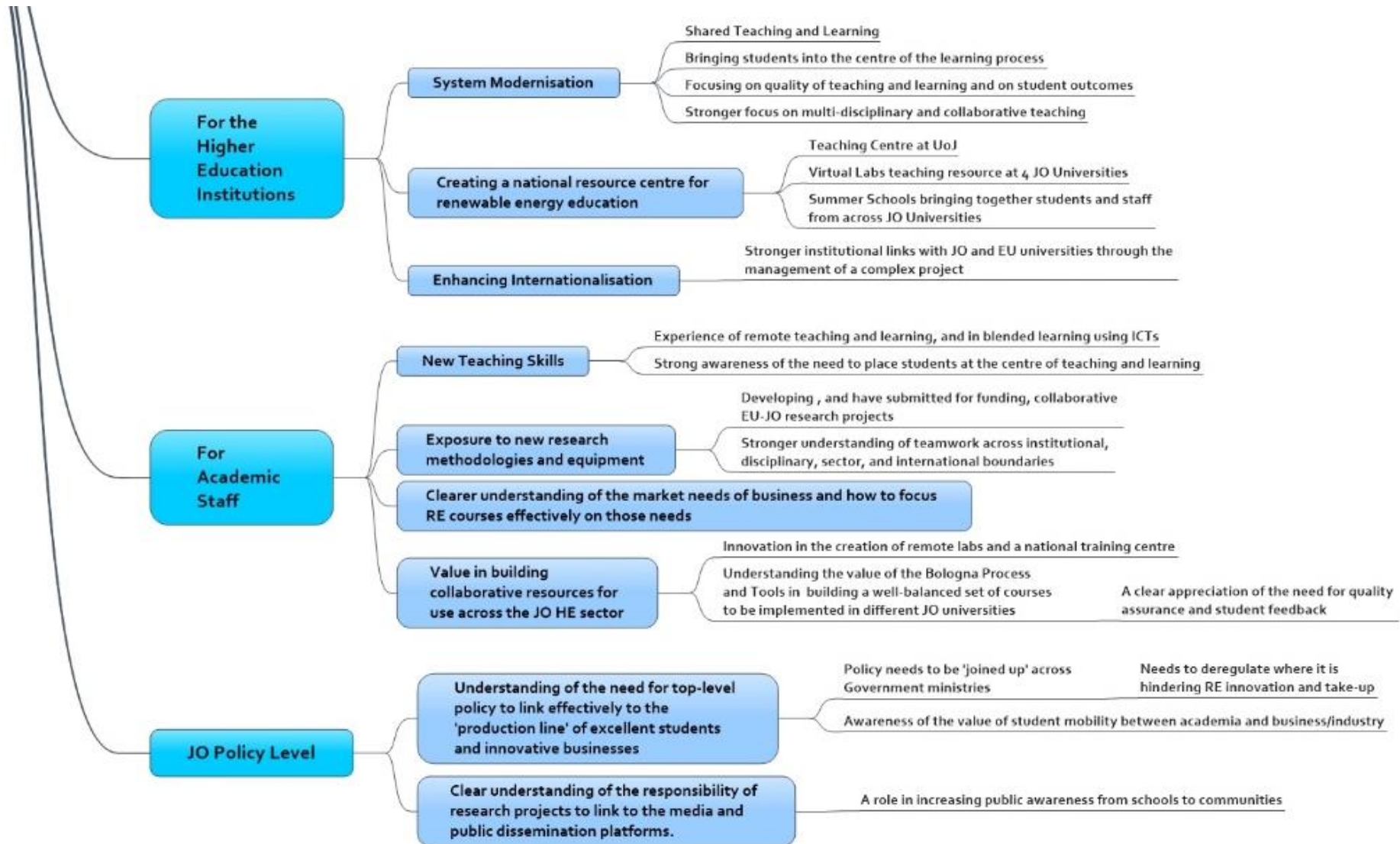
Learning from more than one source is very good, because it let the students get info and experience from more than one source in different regions which makes them more modernized and aware for the science and technology development around the world.

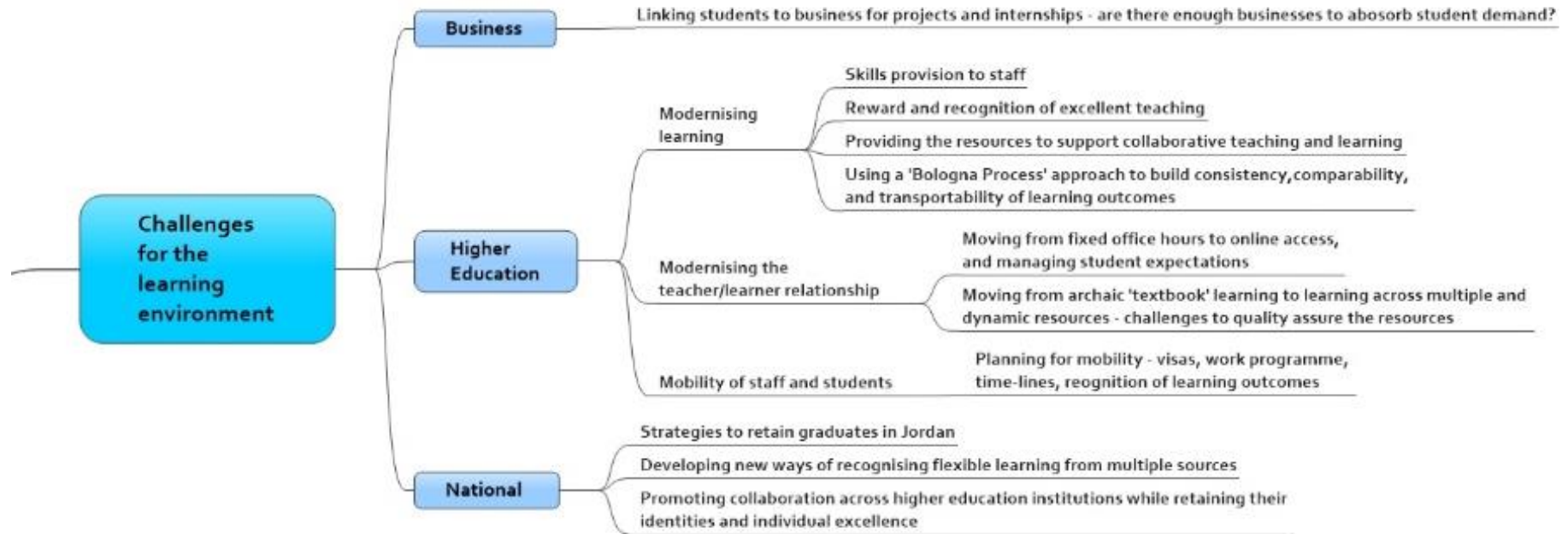
I found that MUREE program (course and visit) was very useful for me. Visiting Europe helped me to break the barrier of afraid of dealing with European universities, professors and students by visiting UNED and Ciemat, we got new ideas of developing education and new labs in Jordan to raise the level of education of using sun energy and its applications.

One of the experiences was practicing the design of a grid connected photovoltaic system for a residential building using PVSOL premium. Another was learning about biomass and the zecomix project, and actually seeing a "prototype", also listening to the cons and pros, the ups and downs faced by the project leaders was insightful. Learning how the Energy crisis is being dealt with in Rome and Europe, comparing some data between Jordan and Italy, sharing the policies, etc, was also inspiring and "useful". In summary I can say that after this course my perspective on investing energy has not only "changed" but "matured", especially after visiting a European country and learning about Renewable Energy Technologies in a practical way.

The most amazing thing i noticed was the flexibility in the idea of blended learning, especially that in our time most of students have other commitments. The other thing is the cultural immerse of ideas through having European instructors. For the remote lab , in my opinion its an marvellous idea and huge flexibility in taking the data, but that is for beginners in engineering, because i still think that to make new data , new changes , you need to think outside of the box (remote Lab) , so the remote lab can't be held in researcher's institutions, because it stops the progress (flow) of ideas, also any changes in the lab will cost time and effort to make , but still it's a great idea for undergraduate students, to understand the concepts behind many things in a flexible way .

The VLE method was very flexible and it gives you the opportunity to choose the place and the time for studying. We also had a new experience with the weekly quizzes which helped us to memorize the new topics that we had studied. We also had a very exciting experience of having different instructors from different countries and universities that's why the course wasn't traditional like the other courses we have taken before. The welcoming at UNID institute was warm and interesting at the same time, also the idea of making testing devices with low cost was tempting to push the students in the university of Jordan to try it, my idea at remote lab was explained above, and for the rest it surely gave me a push to think in way to immerse the Spanish experience I learned in the middle-eastern experience that I have into a one better understanding for the concept of renewable energy systems and management.





Sustainability

At the Quality Meeting in Berlin (27-28 July) we discussed the issue of **sustainability**. This is a critically important aspect for the Commission, so we need to detail a robust sustainability plan. The following key sustainability characteristics were identified:

- Six new renewable energy courses are active, strongly emphasising Bologna and ECTS principles. They are implemented in the curricula of the Jordanian partners. Institutions have embedded the courses officially into the curricula and study plans, and are fully committed to continue offering and updating them according to the new advancement in the field of RE in the future.
- Remote labs are functional and are being used successfully by students from the five Jordanian partners. The labs will be sustained by the four partner universities (PSUT, JUST, MUTAH and HU) and plans are underway to open them to students in other Jordanian universities outside the consortium.
- The training centre at the University of Jordan will play an important part in the sustainability of the project by hosting regular workshops on RE to train stakeholders in the country including fresh graduates and engineers in the field including the private sector.
- A renewable energy network has been established by the project, which currently includes over 55 academic and industrial members from Jordan and Europe. This network will play an important role in the sustainability. Key members of the MUREE consortium already involved in organising an international conference in Jordan on RE, which takes place every two years. The next conference in 2016 will be linked to the network, providing a clear opportunity for the network to promote research, teaching, training and business development. The MUREE website (with its social media components) will be used to become the website for the network.
- Sustainability of joint research between European and Jordanian researchers particularly in the field of engineering education, has already led to publication of two papers in the annual IEEE frontiers of education conference, and there are clear plans to publish a paper on the IEEE transactions on education.
- Partners will sustain mobility from staff and students by strengthening bilateral relationships through MoUs.

MUREE Impact
Impact for Students
<p>Please detail particular examples where your participation in MUREE activities have had a particular impact for you. For example:</p> <ol style="list-style-type: none"> 1. What new skills and competencies did you obtain through the use of the labs? 2. Have you started to build new links with other students and universities in Europe? 3. What did you learn about new teaching and learning practices? 4. Do you think that MUREE has provided you with extra career potential? If yes, how? <p>Please feel free to tell us about your experiences, and please give specific examples if possible.</p>
Impact for Staff
<p>How has MUREE contributed to your:</p> <ol style="list-style-type: none"> 1. Teaching and learning skills and competences? 2. International research collaboration? 3. Ability to develop multi-national research activities? <p>Understanding about how to build an international curriculum?</p>
Impact for Companies/Business
<p><u>Particularly for Jordanian companies:</u></p> <ol style="list-style-type: none"> 1. How has participating in MUREE activities benefitted your company? 2. Have research links been created? 3. How can MUREE help you build innovative capacity in your company? <p>How can MUREE in particular help smaller renewable energy companies to develop?</p>
Impact for Institutions
<p>How has participating in the MUREE project helped the institution build multi-national teaching, learning, and research linkages?</p> <p><u>For Jordanian HEIs:</u></p> <ol style="list-style-type: none"> 1. How has MUREE informed the institution about developing modern teaching and learning practices, and in developing new innovative curricula? 2. How is MUREE helping to provide a flow of well-trained graduates who can help develop the renewable energy sector in Jordan? <p>How has MUREE helped to build Jordanian capacity in renewable energy, for example through strong ‘working together’ relationships between HEIs in Jordan?</p>
Impact at the Policy Level for Jordan
<ol style="list-style-type: none"> 1. What outcomes from MUREE are helping to form a national strategy for renewable energy? How has the Jordanian media become more aware of the need to build a coherent strategy for renewable energy, in particular through delivering highly-trained graduates into the renewable sector?