A survey was recently conducted by the author to glean the prospects of, and the inclination towards incorporating the paradigm of sustainability (with a focus on energy efficiency in the case of this particular project) in university-pedagogy. The survey was part of the Higher Education, Research and Development/Energy project in Europe, of which the Faculties of Architecture of the Norwegian University of Science and Technology in Trondheim, and the University of Sarajevo in Bosnia were partners.

The individuals who were contacted with the survey questionnaire (by e-mail), were professors, associate professors, adjunct professors and lecturers in universities around the world, a sizable percentage of them obviously being from the two partner universities. The 15 questions sent encompassed inter alia pedagogical aspects, outputs/results, collaborative approaches, integration with other disciplines and other sectors outside academics.

**Intention exists, needs to be materialized**
Over 95% of the respondents said that they have been and will continue to strive to impress upon their students the imperativeness of converting knowledge into action. Most of the respondents said that they were aware of the need for life-cycle thinking and believed it was indispensable if sustainability had to be properly understood.

It was good to see that a majority of them always introduced life-cycle thinking to students in their lectures. In architecture especially, life-cycle thinking is very critical, if what is designed and implemented has to be sustainable over a long period of time. Life-cycle thinking would motivate one to think in terms of reducing life-cycle costs, by risking higher capital investments and managing to reduce the long-term maintenance expenses. How something designed and built today would ‘behave’ in the years to come, in the face of rapidly-fluctuating external factors in a highly-globalised world, is what one is taught to think about through ‘life-cycle thinking’.

Interestingly, there were as many respondents who were aware of the triple-bottom-line approach and who taught it to their students, as there were who either had not heard about it, or felt that it was not relevant at all to the subject/s they were teaching. The authors contended that it was possible to introduce the concept of holism in most subjects, by being a little creative about the pedagogical approach one adopts. Holism essentially is the overarching truth that ‘everything is somehow related to almost everything else.’

**Technology is not a cure-all**
Technology is often looked upon as an elixir, as a panacea, as a cure-all. But it is not so, and that need not be proven. Human behaviour and the way humans understand and use technology is what matters. The Internet is a marvelous invention but it has its dark underbelly, as we all know and agree.

Hence, it was really surprising (and alarming) that quite a few respondents said that they would teach students that technology is a ‘cure-all’! If sustainability is to be taught, it would be a folly to start off with the premise that technology can solve all our problems. It is here that there is a distinct need to convince teachers that this is not the case, and it would not be a good idea to drill this into the minds of students. These students are the ones who will go out into the world in the near future and tackle real-life problems and challenges, and the education imparted to them ought to help them to succeed in this.
### The Questionnaire

1. **How many years have you been a University teacher/lecturer/professor?**
   - A. Less than 1
   - B. Between 1 and 3
   - C. Greater than 3

2. **Is sustainability and/or energy efficiency in the built environment a component of the subject/s you teach?**
   - A. Yes, very much so
   - B. No, not at the moment, but will include in future
   - C. No, there is no scope for these

3. **Would you ever tell students that with technology everything is possible, when it comes to optimizing energy use, improving energy efficiency and achieving sustainability in the built environment?**
   - A. Yes, I always teach that
   - B. No, never
   - C. Not sure

4. **Have you introduced the triple-bottom-line approach to sustainability in energy-related issues to your students?**
   - A. Yes, I have done that
   - B. No, not yet, but would like to
   - C. No, I am not aware of it or its applicability to my subject/s

5. **Would you teach students to differentiate between ‘improving energy efficiency’ and ‘reducing absolute energy consumption’?**
   - A. Yes, I would
   - B. Not sure if there is a difference between these two terms

6. **When you teach (or will teach) sustainability, do you (or will you) encourage students to adopt life-cycle thinking while planning, designing or solving problems?**
   - A. Always
   - B. Often
   - C. Never; do not plan to
   - D. Never do currently, will try to incorporate

7. **Do you think you are successful in enabling students to think laterally and creatively and be motivated to convert knowledge to action, theory to practice?**
   - A. No, but would like to
   - B. Yes, more often than not
   - C. Sometimes, depends on the motivation levels of the students

8. **Do you think that Joint Masters Courses with universities in different parts of the world help students to get holistic and realistic views of issues related to energy efficiency improvements and sustainability?**
   - A. Yes, this is true and I am in favour of more Joint Masters Programmes
   - B. Yes, but one must not stress too much on this
   - C. Not necessarily; often it is a wasted effort

9. **Would you introduce your students to lectures from other disciplines- applied sociology, applied law, applied psychology etc. in order to impress upon them that sustainability includes a lot more than just science and technology, and this must be accepted?**
   - A. No, will not try this
   - B. Yes, most certainly; have been doing it
   - C. I am a bit undecided on this

10. **Does having a class with students from different parts of the world make it difficult to teach sustainability and energy efficiency?**
    - A. No, not at all; it makes it challenging but more rewarding
    - B. Yes, at times, owing to cultural and experiential differences
    - C. Have never really thought about this/ Have not taught international students

11. **Do students in your class have the freedom to express their point of view, discuss and debate, with respect to sustainability and energy efficiency aspects and the conflicts which often arise when quality of life is factored in?**
    - A. No, it is a cultural thing; they do not participate actively
    - B. Yes, they have the freedom, but I am not able to build up an interactive session
    - C. Yes, they have the freedom, use it, and every class throws up new ideas

12. **How successful have you been in motivating students to convert their project reports and Masters theses (which may be very good and relevant case studies) into journal publications or publications of other types, to add to the volume of publicly-available knowledge on sustainability and energy efficiency in the built environment?**
    - A. Very much so; I make it a point to always explore such possibilities
    - B. Have not thought about this; but a good idea I would like to pursue
    - C. Do not think this is really necessary when there are PhDs and PostDoc doing this already

13. **Is language a constraint in communicating knowledge about sustainability and energy efficiency? Is there sometimes a case of ‘lost in translation’ when it becomes difficult to convey to students speaking other languages, the real meaning and implication of terms and concepts related to these subjects?**
    - A. Yes, sometimes
    - B. No, I do not think so

14. **In your opinion, how important it is to build bridges between the academia on the one hand, and the government, industry and society on the other, when dealing with issues like sustainability in the built environment?**
    - Give your answer on a scale of 10(1= very important & 10= not important at all).

15. **A Masters Degree in Energy Efficiency! If such a course/module would come up, how do you think you could contribute to it?**
    - Here we are focusing on applications extending to the built environment (utilities, transport, buildings and industry)? (Can you answer this in 1-2 sentence/s?)
Over 50% of the respondents considered the bridge-building between academics on the one hand and the government, society and industry on the other (integration, if we could call it so) as something which could not be ignored, especially when it came to teaching about and practicing sustainability.

Sustainability research and pedagogy cannot be merely about ivory-tower concepts and armchair ideas. University education has evolved from being an island to a ‘contiguous landmass’ linked to society, industry and government and working in close collaboration with these three, to solve practical problems which the world is facing at the moment. Education nowadays must perform be an enabler of sustainable development.

Paradigms like sustainability and sustainable development are multi-faceted and students from different nationalities, cultures and backgrounds have different notions about these. The pedagogue is expected to invite criticism, be willing to accept different points of view, and while trying to understand the reason for the differences, be able to ultimately convince students about the imperativeness of focusing on sustainable development.

About 50% of the respondents claimed that they gave their students the freedom to voice their opinions and that every class threw up new ideas which benefit all the students. Students from different parts of the world – developed, developing and transition economies – bring with them a lot of practical knowledge gained from experience.

Preaching environmental sustainability as a must-pursue to a class which has some students from the developing world (say Africa), is a bit unfair, as those students have every right to wonder why they should be deprived of the right to focus on economic growth first. Energy efficiency (even advising on cutting down absolute energy consumption) may still be fine when one is addressing a class full of students from the developed world – USA, Japan and Western Europe for instance. However, the African students may first want to know how to augment their respective national energy productions.

About 60% of the respondents said that sustainability was very much a part of the syllabus of the subjects they taught. Close to one-fourth of those who responded to this question, agreed that it could be made a part of the syllabus in the future (though not currently). A relative minority turned it down as being beyond the scope of the subjects they teach. It would be possible of course to identify creative approaches to incorporating at least sustainability into their respective syllabi.

Sustainability is very much an in-thing these days, and universities ought to gear up to keep up with the demands of changing times, and incorporate modern and relevant concepts into the courses they offer and the subjects they teach. Teachers can keep making efforts consistently to think laterally and modify their approaches. Closer collaborations with other universities, government agencies, society and industry are very much necessary.

There has been a paradigm shift in this regard, and that needs to be respected. The Western world can contribute to development in education in the transition economies and developing countries courtesy Joint Masters Programmes and more meaningful research activities.

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Venkatesh G. and Schwai M. HERD/Energy (2013-2015): Report of the survey conducted in March 2015, from the Norwegian University of Science and Technology, Trondheim, Norway, for the project “Rethinking architecture and energy efficiency in buildings and sustainable development.”