



Creating Climate Entrepreneurs – a Tale of Contextual Learning

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Abstract

As the effects of climate change become visible the need for climate change innovation is obvious and urgent. It is therefore alarming that Europe is simultaneously undergoing a steady decline in its ability to innovate and its citizens are no longer eager entrepreneurs. The European Institute of Innovation and Technology has founded a Climate Knowledge and Innovation Community (Climate-KIC) whose role is to catalyse Europe's transition to a climate resilient and low carbon economy. A key element to achieving this aim will be to reinvigorate the innovative and entrepreneurial instincts of Europeans to create businesses that combat climate change.

Here, we describe the 6-week Contextual Learning Journey that we developed to accelerate the education of climate change innovators. Delivering climate innovation that is economically, socially and environmentally sustainable, at a magnitude and on a timescale that prevents societal catastrophe, sets our approach.

Our mission is to create a strong climate change innovation community as defined by three key challenges:

- *The challenge is multidisciplinary; our students are formed into multidisciplinary teams.*
- *The challenge is context dependent; geography, politics and socio-economic factors are heterogeneous and successful climate innovation recognises this.*
- *The challenge is systemic; the material prosperity of our society is based on complex and interdependent value and supply chains and successful innovation encompasses this.*

The Contextual Learning Journey (Paris to London to Zurich) ran in trial form in 2010. Although there were short didactic presentations on climate change and elements of entrepreneurship the majority of the course focussed on the students learning by doing. They did this through coached experimentation, site visit studies and the creation (in multidisciplinary teams) of climate innovation business ideas. Our survey of the students indicate that the course has indeed been transformative for them, created a strong community and led to two business ideas being spun out with external funding.

1. Introduction

Climate-KIC is one of the three Knowledge and Innovation Communities (KICs) designated by the European Institute of Innovation and Technology (EIT) as key drivers of European excellence, innovation and growth. Climate-KIC aims to significantly accelerate the innovation required for a transformation to a low-carbon economy, and to ensure Europe benefits from new technologies, company growth and jobs. In its education programme Climate-KIC aims to create a generation of climate change entrepreneurs and innovators with the multidisciplinary skills to develop economically, environmentally and socially sustainable approaches to mitigate global warming and adapt to its effects. The education programme started in 2010 with a six week Contextual Learning Journey (CLJ) designed and developed by a key group of international partners.

The education programme is based on the premise that innovation and entrepreneurship are crucial to generate sustainable economic growth, competitiveness, and societal well-being. It acknowledges that the capacity to develop ideas and new technologies into commercial opportunities requires a



unique toolset and cognitive mindset, and that future climate innovators and entrepreneurs need a broad range of skills to become agents of change.

This paper recalls the design and implementation process of the pilot CLJ to address these needs. The pilot was very successful and is currently being taken forward as part of the one year Climate-KIC Scholar and three years Climate-KIC Fellow programmes.

2. Design of the Contextual Learning Journey

The underlying principles of the CLJ are to bring together students from a large variety of disciplines, backgrounds, and academic levels for a significant period of time. This shared learning experience, combined with a high pressure environment of travel and working to deadlines, creates an enhanced sense of community drawing together students of different experience and cultures. It is also important that students are enthused with the values of innovation whilst reaching a good level of knowledge to better understand the issues related to climate change. This is delivered through world class teaching, stimulating site visits, and access to leading experts in the fields of climate mitigation and adaptation to build a strong community of active students and alumni with a common understanding of climate change issues and practicable innovation and entrepreneurship skills.

Our mission is to create a strong climate change innovation community as defined by three key challenges:

- The challenge is multidisciplinary.
- The challenge is context dependent.
- The challenge is systemic.

To meet the challenges our students collaborate in multidisciplinary teams, who work together to create common solutions; they gain an understanding of the heterogeneous nature of geography, politics and socio-economic factors that need to be considered to enable successful climate innovation; and they appreciate that the material prosperity of our society is based on complex and interdependent value and supply chains.

The CLJ design was informed by these values as well as a strong influence from business discipline knowledge, and expertise in innovation and entrepreneurship education. The key pedagogic influences were drawn from problem based learning [1], cognitive apprenticeship [2], enquiry-based learning [3], situated learning [4] and communities of practice [5]. Using this knowledge base five learning outcomes were developed for the CLJ.

5 learning outcomes of the CLJ

- to develop a common understanding of entrepreneurship and climate change issues in Europe
- to acquire the ability to communicate about climate change causes, consequences and solutions
- to develop and deliver ideas, products and services in response to climate challenges especially related to the KIC research and innovation programmes
- to learn about working in international and multidisciplinary groups, including the handling of group dynamics associated with new teams working under high time pressure within a competition
- to understand how businesses lever academic expertise and integrate it into their strategies, and how they react to climate change in their respective business and political environment

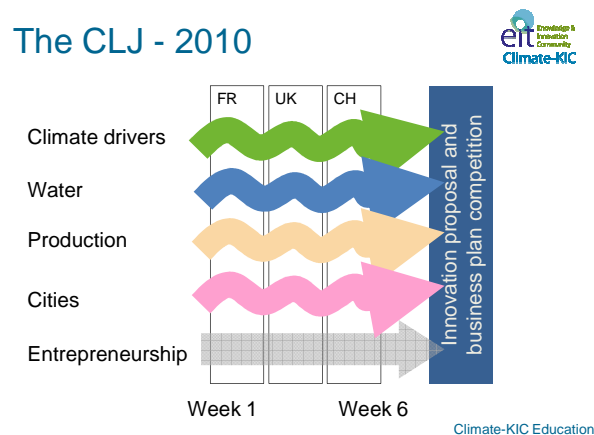
To achieve the learning outcomes a context rich journey across Europe that immerses students in the reality of issues faced by different countries was developed. Throughout this journey students design their own business plan, creating a practical emphasis on the ability to develop an idea or product.

3. The 2010 Contextual Learning Journey



The CLJ started in Paris, continued in London, and ended in Zurich (figure 1). The journey was designed with a consistent theme of business and innovation running throughout, with each site bringing its own expertise and specialism: Paris for climate science, London for business and finances, and Zurich for research and innovation-based business idea development. Two professional coaches travelled with the students ensuring continuity across locations, and providing guidance and support to the students as learners.

(Figure 1 – Route map of 2010 CLJ)



Out of more than 200 applications, 50 students, originating from 14 different countries, were selected to attend the CLJ 2010. The group was composed of 9 PhD students, 36 Master students and 5 from corporate and public partners. In terms of the subject disciplines 19 were from the natural sciences, 13 were from engineering, 12 were from business and management, 3 each from social sciences and architecture respectively. Before and during the CLJ 4 students had to cancel their attendance or could not continue the journey due to unexpected occurrences; two more students left the CLJ for personal reasons.

The CLJ programme incorporated three major components:

1. The four Climate-KIC Research and Innovation themes:
 - Assessing Climate Change and managing its drivers
 - Transitioning to resilient, low-carbon cities
 - Adaptive Water Management
 - Zero Carbon Production Systems
2. Entrepreneurship Education
3. Coached Business Planning

Teaching and learning was conducted through a mixture of lectures, site visits, and interactive tasks on both business planning and research in climate change mitigation and adaptation. Students were furnished with a basic understanding of strategy, marketing, finance, project management, and business planning. This knowledge was applied in the development of business plans by the students, which they focused on throughout the journey, supporting their development as entrepreneurial thinkers. The research topics encountered ranged from designing optimal systems for water reuse at Suez Environment in Paris, to the assessment of risks through modelling and simulating by reinsurers like Willis in London, and the challenges of sustainable urban planning for a city like Zurich.



The CLJ concluded with a competition where the student's business plans were presented to an international judging panel composed of business people, scientists, and EIT representatives. The judges provided feedback on each idea and a prize was awarded to the best business idea.

4. The results of the 2010 Contextual Learning Journey

Many positive outcomes and results emerged from the CLJ 2010:

- A total of 9 teams developed business plans on the CLJ and of these two have been taken forward into active businesses and early start-ups (DeCo! and ElectricFeel).
- The six weeks were intensive and enabled strong community building among participants as well as lecturers and coordinators.
- Positive and constructive feedback was received from students with the majority stating that they would recommend the programme to a friend or colleague.
- The jury members unanimously agreed they had enjoyed participating on the judging panel and were impressed by the business ideas given the limited amount of time.
- All of the jury members were interested in the talented students; they appreciated the high level of presence and commitment, and sensed real entrepreneurial attitudes amongst them.
- Feedback from the students and coaches is being used to support the development of the 2011 CLJ ensuring that the course builds and improves on the 2010 experience.

Composting plant for climate and development

DeCo!, a low-cost, low-tech business idea presented at the Climate-KIC 2010 Summer School proposes innovative composting plants that produce organic fertilizers, which will boost agricultural production and aims to significantly contribute to the reduction of greenhouse gas emissions. Ghana is the first country to test such an on-site composting plant. The DeCo! team won the 2010 UNEP-SEED Award for Entrepreneurship, received funding from GIZ (Deutsche Gesellschaft für International Zusammenarbeit) and business support from ETH Transfer and the Climate-KIC Swiss Centre. <http://www.deco-farming.com/>

The experiences of the CLJ participants were overwhelmingly positive and below are a selection of quotes which characterise their experience;

E-mobility concept for large cities

ElectricFeel, a business idea emerging from the Climate-KIC 2010 Summer School, proposes a new urban mobility system provider, offering one-way rentals of electric vehicles for individuals and companies. The project is currently being nurtured in the Climate-KIC environment and receives pre-seed funding from ETH Zurich and business coaching from the former Head of R&D of Alstom Power. In December 2010, the project was awarded the special 100-year KPMG Inspiration Grant. Start-up of the company is planned for mid-2011.

"You actually understand what climate change is actually about."

"This is not something I could have learned at my own university."

"I think that the course was successful in building a community – the Climate-KIC provides us access to a network of support and contacts in academia and business so that we are empowered to act."

"It was genuinely unique educationally, in providing a learning opportunity that you cannot get anywhere else. Unique in what it taught, how it was taught and who it was taught to - everyone, business students, architects, engineers, scientists all learned something."



“As a group we were handed over to companies who told us about their activities, what was important to them and what their experiences were. We were able to engage in detailed discussions and practical tasks.”

“Something that stood out for me was on the visit to UPS where we discovered a problem of operating a fleet of electric vehicles that no one had come across before and I identified a potential technological innovation that would allow them to dramatically increase the number.”

“We were experts and mentors for one another – from the MBA students who helped the engineers write business plans to the scientists who explained climate change research and modelling to the architects. The most important part of this is not that it helped us to gain knowledge, but that it caused people to change their attitudes and to network”

“As one of two travelling entrepreneurship coaches of the Climate-KIC Summer School 2010, I tremendously enjoyed working with our high-calibre participants from all disciplines! I am still raving about the knowledge and idea "buzz" I witnessed last summer. I am still in touch with a range of summer school alumni, and am looking forward to hearing what they will be up to in the years to come.”

5. Conclusions on the Contextual Learning Journey

The planning and delivery of the CLJ 2010 was challenging particularly because of the short time for preparation (January-June 2010) and the high complexity of involving five co-location centres and a number of lecturers from different scientific fields and traditions. The work also spanned strategic, operational, and administrative tasks which made it challenging as well as interesting.

The Climate-KIC CLJ 2010 was very successful and work is already underway to build on this model for the 2011 CLJ. It is recommended that an academic study focused on the pedagogic innovation of the CLJ is undertaken to more deeply understand its contribution as an educational model.

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