

# One step ahead of national strategy: Adding global competence to engineering education

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## STRUCTURED ABSTRACT

### CONTEXT

A recent national commission in Sweden has proposed an amendment to the national Higher Education Act, in order to reflect the “increasing importance of internationalisation and international cooperation to higher education institutions and society as a whole” (SOU 2018:3, 35). The proposed amendment explicitly states that all university students should graduate with an understanding of internationalisation or intercultural competence. The general model proposed draws heavily on the concept of ‘comprehensive internationalisation’ as described by Hudzik (2015). How to best achieve this aim, however, will be a question for each university to answer according to their own conditions and needs.

### PURPOSE

Responding to an already present educational need, and staying one step ahead of national legislation, an initiative to add global competence to engineering education was launched in 2017 at KTH Royal Institute of Technology, Sweden’s largest technical university.

### APPROACH

Partly in order to circumvent the arduous process of re-designing the programmes, an elective university-wide extra-curricular Certificate of Global Competence was launched in 2017, targeting all domestic and international students. A course in global competence for teachers has also been designed and is given in the autumn semester 2018. Data from the student courses as well as from structural indicators of internationalisation have been analysed.

### RESULTS

Data from the first course offerings in the certificate programme indicate not only successful courses, but also hints at the potential of using students as agents of educational change. However, the course for teachers might still well prove to be a most crucial part of our university’s effort to ‘future-proof’ education for a globalised labour market.

### CONCLUSIONS

Each higher education institution faces its own challenges when trying to add on educational layers. Our paper will discuss the pros and cons of our particular approach, connecting insights gained to a global trend affecting most technical universities today, and highlight the potential of using individual students and teachers as agents of educational change.

### KEYWORDS

Global competence, diversity, educational change

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# INTRODUCTION: GLOBAL COMPETENCE IN THE EUROPEAN CONTEXT

Internationalisation of higher education in the fashion we now see came surprisingly late to Europe and has mostly taken place in the last few decades. While today using more or less the language and logic heard from universities in North America and Australia, the European trajectory has been markedly different. The late start may seem odd, given the geopolitical landscape of Europe, the already historically international character of the medieval universities, and the inglorious history of colonization. Partly, it could perhaps be understood as a legacy of a Eurocentric worldview traditionally held (and lived) by the European educated and wealthy elite. At a certain social level, national borders within Europe simply became less relevant and relevant linguistic skills were already provided as part of a 'good upbringing'. The broad masses, on the other hand, for whom cultural and linguistic differences would have been real issues requiring attention, were largely excluded from higher education even in their own countries.

The situation clearly changed during the 20<sup>th</sup> century with democratisation, the emergence of social welfare regimes and mass education, but internationalisation of higher education institutions (HEI) have nevertheless managed to stick to a predominant Eurocentric agenda, due to the overarching project of the European Union: a project where increased international student mobility *within* the Union has been – and continues to be – one of the more important means to foster a sense of European identity (de Wit, Egron-Polak & Hunter 2015).

This scenario is, however, now changing with the partial realisation of the EU project's ambitions – despite Brexit and other real or looming crises – and the gradual shift of HEIs in Europe to the use of English as the primary medium of instruction instead of respective national or local languages. Even though internationalisation to a large degree still equals inter-European internationalisation, European HEIs face increasing numbers of students coming from outside the Union, and European graduates are also increasingly considering the possibilities offered by labour markets outside their own countries, within or outside Europe. HEIs are indeed becoming good examples of both the democratisation and marketization of education as well as of the general flows of globalisation. (The UK was an early exception to this picture thanks to its native language and colonial past, and followed the US and Australia earlier than other European countries in taking 'the economic turn' in international education.)

One of the most important factors in this process has been the spread of English as a true *lingua franca*, seemingly making the traditional – and arduous – process of getting to know new countries and cultures through the lenses of their respective individual languages redundant. The standardisation of higher education (Hahn & Teichler 2015) has also helped create an image of the 'international' as an unrealistically homogeneous reality, thereby setting the scene for international understanding, as well as creating new arenas for international misunderstanding.

In this educational context, it is understandable that the notion of intercultural or global competence (i.e., intercultural understanding and the ability to communicate, work and function effectively and ethically in environments characterised by cultural and social diversity), recently has become more relevant for European HEIs. Originally, the call for global competence grew out of post-war America's need to understand, and make itself understood to, the non-English world. Today, ironically, the competence seems as much required for functioning in a world where most everyone communicates in (some sort of) English.

Speaking with Althusser (1990), it would seem that the introduction of global competence as part of higher education was 'overdetermined'. This may also well be the case. In early 2018, a Swedish national commission proposed an amendment of the Higher Education Act, to reflect the "increasing importance of internationalisation and international cooperation to higher education institutions and society as a whole" (SOU 2018:3, 35). The commission calls for all HEI graduates to leave university with an understanding of internationalisation or intercultural competence. The general model proposed draws heavily on the concept of 'comprehensive internationalisation' as described by Hudzik (2015).

In the proposal, the universities are left with the responsibility to achieve this according to their own conditions and needs. The present paper will describe the experiences of one technical university, already acting ahead of this new national strategy, but largely motivated by the same pull and push factors of internationalisation behind the proposed legislation.

# FROM IDEA TO IMPLEMENTATION

## The right idea at the right time

As the leading and largest technical university in Sweden, KTH Royal Institute of Technology has long had internationalisation on its agenda, and the social and communicative skills associated with global competence are also part of the CDIO framework for engineering educations, which the university had co-established (Crawley et al 2007). As with most other HEIs, the university has, however, measured the degree of internationalisation primarily using easily quantifiable elements such as the number of students on international mobility, the number of international co-publications, the number of bilateral or international partnerships and projects, the number of double or dual degree study programmes etc.

Like most other HEIs (Lou, Paige & Vande Berg 2012, Spencer-Oatley & Dauber 2015), KTH has tacitly relied on these structural measurements as a proxy for the real benefits of internationalisation: the cultural awareness and broadening of horizons, the acquirement of new linguistic skills, mutual understanding, social skills, emotional intelligence, the emergence and distribution of new ideas and practices, etc. Attempts to better prepare students for international experiences, e.g., through programmes with added language courses in their syllabi, had largely been failures, and the university had no real vision of how to systematically work with quality assurance and quality development of internationalisation, or with global competence. Nonetheless, there existed a sense of urgency to address these shortcomings among staff involved with internationalisation, and a sense of urgency, as Kotter (1995) points out, is the ideal starting point for organisational change.

The time was thus ripe for ideas about how to work systematically with global competence and – as part of a larger initiative to strengthen the university's education – the idea of a Certificate of Global Competence (CGC) was presented to the university management. The initiative came from the university's language department; a nexus for teachers working to both promote and support the university's internationalisation efforts for incoming and outgoing students.

The certificate model was both a reaction to a deeply felt need for educational change, and a reaction to earlier failed attempts to have the university's study programmes allow room in the syllabi for communicative and social skills in the way suggested by the CDIO model for integrated engineering education. While most programme directors generally agreed on the value of these skills, the programmes usually had problems fitting the desired engineering subject content into the syllabi. Moreover, most of the teachers regarded themselves as subject content experts, and typically did not consider the teaching of global competence or similar 'soft skills' to be part of their work description. The ingenious idea behind the CGC was that an extra-curricular certificate could work without changing existing programmes, thus doing away with the long and often frustrating task of trying to change individual programmes one at a time.

## Building consensus

Given that the certificate seemed to offer many benefits and few extra costs, the idea was met with almost unanimous approval when presented. Still, the process of obtaining the university's approval proved to be very lengthy. This could have been expected since the model did not adhere to the integrated standard of the CDIO framework. However, the prolonged process appeared to be primarily a consequence of the novelty of the certificate concept as such. While certainly not unique on a global level, nothing similar existed at the university, or at any other university in the country, or even in any neighbouring country. For this reason (and in line with the acknowledged stereotypical organisational habit in Sweden) it was deemed necessary to consolidate the decision within a consensus-building process, in which the certificate was presented to no less than eight university bodies (ranging from educational developers to the central strategic management group for internationalisation, via teachers, programme directors and administrators of various kinds). This process was embarked upon, even though the proposal already had been finalised with the help of a focus group consisting of the vice dean of faculty, the head of international relations, and two student representatives. The proposal had also been discussed with colleagues at a national engineering education conference (Kjellgren et al 2015).

When pitching the idea to the different groups at the university, the benefits both for the university and for its students were stressed, the main points listed below (Table 1):

Table 1. Benefits of the Certificate of Global Competence

Benefits for the university	Benefits for students
<ul style="list-style-type: none"> <li>• attracts students to more rewarding foreign studies and increase internationalisation activities</li> <li>• increases quality review and quality assurance for studies abroad</li> <li>• provides current education programmes with a complete model to be introduced without need to change existing educational plans</li> <li>• strengthens the university's international profile and broadens recruitment of new groups of students</li> <li>• supports and encourages successful meetings between domestic and international students</li> </ul>	<ul style="list-style-type: none"> <li>• utilises an attractive and flexible model that offers an official certificate</li> <li>• facilitates the students' studies of global skills</li> <li>• possibility to acquire global competence while at university</li> <li>• enhances students' employability</li> <li>• strengthens their further developing of global competence after graduation.</li> </ul>

### The certificate model

The 'additional' consultation procedure described above took almost two years. Was this because the certificate was something out of the ordinary? Actually, the general model followed a rather common scheme used by many universities in connection to international mobility: preparations before the international experience, the international experience itself, and some kind of debriefing afterwards. The difference was in the certificate's level of ambition, and the weight awarded to the activities before and after the time spent abroad (which, at many other universities, typically amounted to no more than one or two seminars and a workshop).

Building on theory and international examples of best practice, the certificate was designed to be as substantial as possible but still able to fit within the different programmes' often very limited room for elective credits. It consists of three consecutive and compulsory elements: two courses with one international experience in between, to be done in consecutive order:

- Intercultural Competence, 4.5 ECTS (equalling 3 weeks of full-time study)
- International exchange studies or equivalent, 8-12 weeks or longer
- Global Competence, 3 ECTS (equalling 2 weeks of full-time study)

For the international experience, the time limits were set to 12 weeks or longer for exchange studies, or 8 weeks or longer for minor field studies, degree projects, or internships abroad. For international students, the time spent in Sweden is considered. The qualitative difference between having an international experience abroad and being involved in an 'international experience' at home can be discussed, but the inclusion was intended to encourage Swedish students to spend part of their university time abroad: something which had been identified as clearly desirable, as relatively few students made use of this opportunity. The CGC is to be issued together with the degree certificate. The issuing of the certificate only upon graduation was meant to serve as an encouragement for students to actually finish and collect their degree certificates (as many KTH students are 'lured away' by job offerings towards the end of their education).

For students on short-term exchange, those who do not plan to study abroad, or those who already have studied abroad but still want to improve their global competence, it is possible to only take the course Intercultural Competence, even though it won't count towards obtaining the certificate. In the future, short-term students will, in fact, be encouraged to apply to this course in order to help them get more out of their visit to Sweden. At the same time, this will contribute to the university's efforts to achieve 'internationalisation at home'.

Since not all students will go through the full programme, it is not designed purely as a before-during-after international experience education. This means that knowledge, skills and attitudes are introduced in ways that make them relevant already from the start. Self-reflection, target-setting, and documentation are central to both courses, but the temporal focus differs. In the first course, much focus is put on how the students can develop their competence while still at the university, while the second course focuses more on lifelong learning. The certificate does not feature mandatory language training, but the importance of language skills is highlighted in the first course, and language studies are encouraged. For a more detailed description of the two courses' learning outcomes, learning activities and assessment, see Kjellgren, Keller & Takau-Drobin (2018).

## LESSONS FROM THE FIRST COURSES

So far, we have given the first course three times, and it is now offered once every study period, i.e., twice each spring and autumn semester. In total almost 90 students have now taken the first course, with another 40 waiting for the course offered in the end of the autumn semester to start. The second course is running for the first time in the 2018 autumn semester. The courses are designed with a blended approach, using a combination of interactive online lectures, a few face-to-face meetings in the form of workshops in the classroom, and individual and group assignments. Assessment are done continuously, combining the strengths of formative and summative assessment to improve the learning process. Students are assessed in different ways, individually and in groups, before, during and after the classroom meetings. This is done to avoid the cramming of content and summative assessment at the end of the respective course, and to help form a better understanding of the actual learning taking place. Work on self-reflection journals are used to help the students increase self-awareness and expand their comfort zones. As described in the analysis made by the responsible teachers, Björn Kjellgren and Alena Ipanova, the first course was designed to systematically work towards:

- an open and inclusive learning environment
- coaching, as opposed to formal educational tools, to encourage student-centred learning and enhance motivation
- hands-on tasks and learning by doing, in order to allow new knowledge to be tested in real life already from the very start
- flexibility and the inclusion of students as course co-designers based on their continuous evaluation of the course
- continuous feedback and support, both from the teacher and from peers in smaller groups formed at the first meeting.

Evaluation of the course was done by analysis of three components: completion rate, course activity, and course evaluation. Completion rates are high compared to other extracurricular courses which KTH offers to students, about 0.95. Since much of the course activity took place online, activity could easily be monitored in the learning management system used by the course (Canvas), and we saw high levels of activity and online interaction, which most likely was helped by the regular assignments used, and the feedback on these provided by the teacher. The course evaluation analysed students' experiences of courses on three levels: the emotional level (meaningfulness), the cognitive level (comprehensibility), and the instrumental level (manageability). The KTH course evaluation survey tool (for details on this, see Berglund et al 2015) has been used both to compare different occurrences of the same course and as a vital part of the course development work. Students were given ample opportunity to give feedback throughout the course, and was at time required to, and the response rate of the after-course evaluation might have been negatively affected, but the overall picture from the course surveys (with response rates of about 45%), as well as from in-course surveys, have been very positive. Most students answering gave reassuring feedback about the positive changes in their attitudes and abilities to handle situations they personally had been experiencing. Students leaving for study periods abroad have also vouched for the practical use of the knowledge, skills and attitudes taught in the course.

Still, and while we were happy to receive this positive feedback through the course evaluation survey or directly from the students, we were also well aware of how badly the CGC model fit with the integrative CDIO approach otherwise embraced by the university. In the course evaluation survey, we

asked the students how they thought that the course could have been integrated in their study programme, or better synced with it. Overall, we received three main strands of answers:

The first one proposed to “make it a mandatory course in the programme syllabus”. This was also an opinion we had heard from some university management staff members when the model was presented to KTH’s Directors of first and second cycle education. Others were, however, quick to point out that most options tend to become less motivating when made mandatory, arguing for the attractiveness of not making the certificate mandatory. Furthermore, as stated earlier, the very difficulty of modifying existing programmes with extra courses was one of the starting points of the whole certificate process.

The second answer we received was “It’s already an integrated part of my programme, and in a good way too.” This was less expected, but of course makes sense from a participating student’s perspective. For such students, the content of the certificate is as real a part of their university education as anything else. By applying what they learn in this course in other courses of their programmes, the students are also actively acting as agents of change. Since the certificate does not add stress or administrative burdens to the existing programmes, while still enhancing them with this elective component, this was a nice answer to receive. To stop there would, however, ignore the very real lack of connection between what the students can learn by working towards the certificate, and the content of other parts of their programmes – the ‘hard skills’ that – in the eyes of most programme directors, teachers and councils – are what really count.

The third student answer pointed to another way: “Make the teachers take the course.” The idea of teaching the teachers is close to the heart of anyone wanting to initiate educational change at a university. It had indeed been part of the proposal already from the beginning to establish a special course in global competence for teachers in higher education. This course is now established and will be offered as a pilot in the autumn of 2018. The aim of the course is to provide teachers with tools to work effectively with cultural and social diversity, in order to strengthen their global competence and support integrated internationalisation in teaching situations. Listed below are the intended learning outcomes of the course, quoted from the course syllabus.

On completion of the course, participants should be able to:

- Discuss and give concrete examples of knowledge, skills and attitudes that support and develop global competence.
- Problematize their own and others' descriptions of culture and identifications based on, for example, gender, nationality, ethnicity, class, age, language and profession.
- Reflect on critical intercultural incidents in a constructive and solution-oriented way.
- Suggest and argue for strategies to better understand and constructively take account of the multitude of experiences the participant meets in teaching contexts.
- Present a personal action plan, grounded in self-awareness, for continued development towards increased global competence and comprehensive internationalisation in teaching contexts.

## **THE WAY FORWARD: GUERRILLA INTEGRATION?**

There are many different approaches to educational change, but to be effective they ought to be grounded in a realistic understanding of the teachers’ situation: a situation where teachers seldom have expertise in matters outside his or her subject area, and where – as a rule – there is very limited time (and official rewards) for educational development. At KTH, the general approach to educational development is to work foremost with the eager and willing among the teaching staff, until a ‘critical mass’ has been achieved, where after – if deemed necessary – an official change in practices can be introduced. This is a process which, in a way, is similar to the consensus building often favoured in Sweden, and already mentioned above. To facilitate this process, barriers to educational change must be low, time-economy is necessary, and arenas for pedagogical discussions must be created (Kjellgren et al 2018). At KTH, all teaching staff is required to obtain a minimum of 10 weeks’ equivalence of courses in teaching and learning in higher education. These courses serve as rooms for discussions and as arenas for consensus-building and dissemination of pedagogical theories and didactic practices, and are well suited to train teachers who can then act as agents of change, starting with their own practices.

If the course for teachers (there are also requests for training courses for administrative and managerial staff) can prove to become as popular as the certificate courses for students, and receive positive word of mouth, we expect to see what we already have witnessed in the student courses: they tend to attract individuals already aware of the need or interested, i.e., not necessarily the ones most in need. This 'organic' way of introducing global competence may, however, prove to be the most efficient one. We certainly hope that this will be the case, and we will continue to document and evaluate our work in the spirit of the Scholarship of teaching and learning.

What will happen if the proposal of the Swedish state commission, whose recommendations for a new national strategy we outlined in the beginning, will turn into legislation? Our university, along with all the other ones the country, would not only have to provide the opportunity for global learning, but also ensure it. With this possibility in mind, we have already seen keen interest from other national educational bodies for our certificate model. Regardless of what happens on the legislative front, we look forward to an increasingly interesting national discussion. A new law as now recommended would of course change the situation, forcing both the willing and the unwilling in one direction, thereby likely making lack of motivation a key issue that we have not had to address yet. We are, however, confident that the experiences that we, the university and its students and teachers, now are gaining through the work with the certificate for students and the course for teachers will serve as a very good foundation for future action, with or without new legislation.

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