

CURRICULUM AGILITY AT FACULTY, DEPARTMENT, PROGRAM AND COURSE LEVEL

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ABSTRACT

This short paper describes the first prototyping of a self-evaluation process of Curriculum Agility at a Faculty of Technology in Sweden. The process comprises guided, semi-structured, individual interviews at different organisational levels within the faculty, a joint narrative based on those interviews, prioritizing development strategies per level, and jointly mapping them on importance and implementation time. The self-evaluation is part of and based on the research on the principles of Curriculum Agility. The results show the interplay in timely curriculum change for futureproof engineering education between the teaching staff, the systems and the people who control the systems. The self-evaluation brings together the different perspectives and perceptions within the faculty and gives insight in how those affect

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the willingness towards and occurrence of curriculum development. This work in progress indicates how doing such a qualitative self-evaluation paves the road for transparent strategic dialogues on a holistic level about what to give attention and organize differently.

1 INTRODUCTION

1.1 Transforming the engineering curriculum in a timely manner

For a higher education institution (HEI), having Curriculum Agility means *“to be responsive to changes in societal, industrial, and student characteristics and needs, by proactively adapting relevant organisational structures, learning outcomes, learning activities, and assessments in a timely manner”* [1][2]. The pandemic in the past two years has shown how much flexibility and responsiveness can be required of all educational organizational structures within a short amount of time. But Curriculum Agility is particularly important to engineering education, which for a few decades now is said to need to adopt to the fast changes in technology and society [3]. Certain engineering disciplines indicate that part of what they teach their students will have already become obsolete only a few years after graduation [4]. That means that the body of knowledge and skills that is taught in the curriculum needs to be adjusted accordingly and timely.

Another reason why Curriculum Agility is important is the increasingly diverse student population at the HEIs [5] as a result of globalisation, inclusivity, and accessibility. It makes personalisation of the learning ever more important for students to be able to go successfully, and at a desirable pace, through their program of choice. And those adjustment lie both on pedagogic principles of flexible education in pace, place, and time, as well as a flexibility in learning content. Furthermore, it prompts revisions of the traditional ways of teaching. For example, the perceived usefulness and willingness to co-create the education with students themselves is growing [6].

A fourth reason for Curriculum Agility is that engineering education is changing due to changing ethical perspectives [7], which change the intentions and approaches of the engineering profession. There is a growing understanding that engineers of the future work from within a social context and carry responsibility towards sustainability [8]. That inserts an added complexity to their work and asks for a shift in competencies that engineering students need to learn [9].

All these reasons together make the actually needed curriculum changes to be of an innovative or even transformative kind [10]. The engineering curriculum needs agility, to be able to grow with and towards what is happening in the outside world. But changing a curriculum has become a wicked problem, as it is nested within the contemporary organisational structures, policies, and legislation of HEIs. Many different stakeholders are involved who all have their own needs, constraints, politics and traditions.

2 METHODOLOGY

2.1 The Principles of Curriculum Agility

This research is part of an ongoing research project that started in 2018. What it takes to be able to work towards Curriculum Agility has been captured in nine principles by a diverse group of engineering educators from all over the world, in a series of so far eight, focus-group type, co-creative workshops during different conferences and seminars on engineering education [1] [2]. The widespread input of the participants has so far resulted in a more inclusive and less normative approach to what timely curriculum transformations are envisioned and desirable. The principles were sought to be in that line of thinking, and applicable in international settings under different circumstances. The set of principles as used is listed in the first column in table 1. The principles were divided in three areas. The principles on Curriculum Vision and Strategy looked at the proactive adaptability vision and which stakeholders involved in order to make that vision come true. Secondly, the principles on Curriculum Quality and Provision looked for the space for innovation within the existing structures while safeguarding the quality and conserving that which remains valuable in the transformations. Thirdly, the principles on Curriculum Design and Research deal with the changed design of the more agile curriculum and the pedagogical and didactic competency needed to make it successful.

2.2 The role of this sub-research in the whole process

The currently ongoing step in the workshop series is to provide universities with a self-evaluation method on the 9 principles of Curriculum Agility. Both the principles and the self-evaluation tool are developed through continuous prototyping. This sub-research was the first prototyping activity for the self-evaluation and served as input and inspiration for an upcoming co-creative workshop day in June 2022 on the self-evaluation. The main questions to answer in the Curriculum Agility narrative were: How are we doing at this moment? What enablers and barriers are present in our situation? And what do we want to grow towards? The richness and practicality of the resulting data of this trial was of interest for the ongoing research.

2.3 Method (describe briefly what reviewer 1 wants to see)

A choice was made for a qualitative, narrative approach to scanning the engineering Faculty of a Northern Swedish university on their Curriculum Agility. Because the concept is still relatively unknown and covers different aspects of the curriculum from organisation and management to course content, a guided process was picked, in which the interviewer informed the respondents as well as questioned them. Multiple levels within the organisation were included, i.e. Faculty, department, program, and course level. Respondents were first interviewed alone, and then invited for dialogue and strategizing together with the other respondents. This way the resulting narrative would be a multi-perspective mapping of their Curriculum Agility, and one they all agreed on.

The interviews were semi-structured, 60-120 minutes each, with 4 respondents from different levels within the university (faculty management, departmental director of

education, head of program, and the latter two also functioning as senior lecturers). For each principle, respondents talked about the perceived strategic importance at their own and other levels, how much it was happening already, including examples, and which enablers and barriers were present. Short narratives were written based on the interviews. In a separate session, the respondents were asked to map desirable priorities that came out of the interviews on scales of must-have to would-be-nice-to-have, and (very) short-term to (very) long-term implementation. Next, their input was grouped and labelled in one visual overview, showing the different and similar viewpoints at the different levels. That was the basis for the final joint strategic session, in which the respondents were asked to discuss, group, prioritize and (re)position the strategic development points for increasing the curriculum agility of their faculty, and tweak on the narratives.

3 RESULTS

3.1 Summarizing the narrative

The set-up of first individual and later group discussions resulted in honest, modest, and insightful narratives which increased transparency throughout the organisational layers. It extends beyond the scope of this paper to show the depth of the acquired Curriculum Agility narratives. In table 1, brief summaries of each principle's narrative can be found.

Table 1. Narrative summaries for each of the Principles of Curriculum Agility (based on the principles as described in [1] and [2]).

Curriculum Vision & Strategy		
1	Educational Innovation: Towards Agility	Although for the faculty there is no literal vision of being agile towards changes in society and technology, at each level the respondents do feel it is an aspiration of their faculty. At this point, a more generic quality system for change and improvement is the focus. The willingness to change is different at the different levels, time is the biggest barrier.
2	Management Approach: Change Culture	Ensuring and maintaining a culture rather than a "one-person engagement" for change is deemed very difficult by all respondents. Teaming up over different departments, collaborating, and supporting initiatives are mentioned as facilitators. Barriers are the big cultural differences between departments, especially in collaboration with other faculties.
3	Stakeholder Involvement: Co-creation	Involving external stakeholders has suffered greatly during the pandemic, but interaction with industry and students is still happening at certain places. Internal stakeholders are not usually co-created with but are part of a quality system based on feedback, adaptation, and approval processes. It doesn't always result in the desired engagement.
Curriculum Quality & Provision		
4	Legislation and Policy: Reframing the Rules	Finding the space for innovation in between the rules is most feasible for the program director who is also involved in teaching. That double role creates opportunities for agile curriculum changes. Faculty managers also report some room for manoeuvring. Apart from that, the rules are indicated by all respondents to rather have a perceived change-inhibiting effect on teaching staff in general, particularly at department level.
5	Organization and Governance: Responsive Administration	The people working at the faculty can empower the systems that are used, up to a certain level. Finances are both a facilitator and a barrier, because of the faculty-budgets structure. Responsiveness often depends on the (pedagogic or contextual) understanding of what, how and why change needs to happen, and that can be a barrier.

6	Decision Making Process: Accommodating Implementation	Curriculum and course approval procedures have been directed at quality control, which sometimes collides with the aspired trust-culture. Informal leadership and delegated decision-making make more direct decisions possible, with some co-creation happening there. Timeframes are perceived long, 1.5year for bigger changes, half a year for smaller changes, and problematized mostly to the level of detail required at those deadlines.
Curriculum Design & Research		
7	Programme and Course Design: Dynamic Content and Flexible Education	Holistic learning goals bear the challenge of translating them into examination. There are wishes for more variable examination formats. Courses are mainly made flexible on content by using project education. Programs differ in level of flexibility for the students and internationalisation. In new courses or programs, difficulty is perceived in students choosing them, needed to break even and in maintaining progression through the years.
8	Pedagogy and Didactics: Scholarship of Teaching and Learning	There is a lot of facilitation of SoTL possible, with funds for visiting courses, conferences, and a meriting system in place at the university. Teaching is put on equal terms with research by the faculty. In the departments the enthusiasm for pedagogic development varies highly. Pedagogic development is facilitated for those who are willing and open. There is quite a bit of traditional teaching going on, despite efforts on incorporating inclusivity, sustainability, and active + project-based learning.
9	Learning Spaces: Flexible Solutions	Blended and hybrid social, physical, and digital learning environments are used, especially since the pandemic, and funds are available for more development. The pedagogic side of using these resources is still in its children's shoes. GDPR hinders.

The strategic mapping of Curriculum Agility priorities within the faculty resulted in increased insights in and agreement on issues within the faculty, which need attention. Outcomes varied from on short notice letting teaching staff know it is not that hard to change course or program plans (related to principle 4), and to provide (more structural) support for them (principle 1 and 7), to long-term building of a more unfluctuating positive teaching culture (part of principle 8). Also long-term was the wish for involvement of students and administration in curricular development work as co-creators instead of evaluators (coming from principle 6 and 3).

4 CONCLUSION

The chosen self-evaluation method proved to result in a multi-level understanding of the Curriculum Agility of the Faculty of Technology, as was intended. The dialogue provided by the method was highly appreciated by the respondents. In a follow-up, it would be interesting to include student level as well as higher management (at university level) in the process. Selecting respondents should of course be done in a way that gives the broadest information possible. To that avail, multiple same-level respondents could be considered as well, as much as resources permit.

Importantly, during the mapping process, the principles were all confirmed in their importance by the respondents, who had not been involved in formulating them. There was a natural flow from one principle to the other in the interviews and group discussions, but the grouping of the principles can be reconsidered. However, this first prototype of a self-evaluation of Curriculum Agility gave practical indicators per principle and forms a solid basis for a Curriculum Agility mapping method to increase the understanding of how capable engineering education is to adopt to the fast-changing future, and what is necessary and desirable to work on.



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