

Future Education Innovation

Report on requested topics for future education innovation at Wageningen University & Research

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1 Introduction

In 2020 higher education organisations have been forced into online education by the pandemic. The results of the "chase the sunlight" conference of CDIO (CDIO-partners, 2021) shows universities and polytechnics worldwide that were able to make that shift rapidly. In general problems and unwanted consequences were reported in combination with a "but we could do it" message. Wageningen University is no exception to that, as shown by Stevens et al. (2020a, 2020b). Besides the stress and harmful consequences reported, there seems to be a consensus that the situation also teaches us some lessons for change in our future education.

In the last months of 2020, Wageningen University & Research conducted a small-scale survey to determine what education innovation topics are requested by lecturers and other university staff for 2022. The hope is that from 2022 onwards the pandemic will have less influence on education and that the lessons learned during the pandemic could be used in combination with other ideas to improve education. This report describes that survey and the conclusions that come from it.

2 Methods

Lecturers and other staff were requested to respond to an anonymous online survey. They were asked about their opinion on required education innovation in general, and they were also asked about the importance of 5 topics for education innovation:

- 1. Entrepreneurial learning/academic entrepreneurship
- 2. Educating for responsible engineering/the ethical or responsible engineer
- 3. Information technology and the information technology-driven engineer
- 4. Challenge-based learning
- 5. Teaching excellence in education

They could score each topic's importance on a 5-point Likert scale: 1: Not at all important, 2: Slightly important, 3: Moderately important, 4: Very important, 5: Extremely important. Also, there was an option to give free-text feedback on each topic.

3 Results and discussion

The survey was answered by 17 persons that gave 75 free-text responses in total. Also, 85 Likert scale scores on the importance of the topics were given. Even at this relatively small number of persons, this combination provided a wealth of information as explained below.

3.1 Ideas about education innovation in general

The survey started with the question "What are your ideas on research, education innovation projects, workshops and training, needed for education at WUR from 2022 onwards?". All persons responded to this question, and the answers (shown in appendix 1) were about three general subjects:

- 1. Balance in blended learning, personal learning & diversity
- 2. Scientific and general skills including responsibility
- 3. Organisation, support & facilities and Covid time solutions

The comments partly covered the five topics for education innovation mentioned on the previous page. But challenged based learning was not mentioned, and there was more emphasis on finding new approaches in blended learning with vital roles for on-campus and face-to-face interaction. The remarks on "Scientific and general skills, including responsibility" showed different opinions. Two persons requested more education time for content/technology and more focus on embedding scientific skills training in courses. They indicated that the attention has shifted to much towards general skills during the past years. One person requested that education should to be linked to research. One person welcomes education on personal leadership, resilience, transformative processes and entrepreneurial mindset & attitude. Two persons indicated the importance of ethical skills and responsible behaviour.

With regard to organisation, support & facilities and Covid time solutions; there were requests to enhance studio spaces; introduce Zoom, supply a budget for home offices, have more time and more staff, have resources to prepare all teachers for optimised blended learning, create knowledge clips, and find tools suitable for courses. There was also a request for innovation projects on curriculum level, designed/carried out by teachers, supported by skilled innovation coordinators to supplement the program directors. The covid time related requests were: a workshop training to use lightboards in knowledge clips and a VR training to substitute travelling to any place in the world.

3.2 Importance of the five topics

The "1: Not at all important" score was not used for any answer and all topics scored above: "Slightly important" on average as shown in table 1. There are differences in the average scores, with especially "Entrepreneurial learning/academic entrepreneurship" scoring less. But the relatively high SD limits the stand-alone use of this table without the free text information given.

Requested topics for future education innovation (from 2022 onwards)	Average	SD
Teaching excellence in education	4,35	0,79
Educating for responsible engineering/the ethical or responsible engineer	4,18	0,81
Information technology and the information technology-driven engineer	4,00	0,94
Challenge-based learning	3,71	0,69
Entrepreneurial learning/academic entrepreneurship	2,88	0,99

Table 1: The average importance scores for the five topics sorted from highest to lowest.

3.3 Feedback in free text fields

The free text feedback fields of all topics were used often and in total 58 of 85 fields were used. All topics had 11 remarks or more:

Teaching excellence in education

All free-text remarks were in line with the high average score; this topic is seen as very to extremely important. The topic contains two different subtopics which both were commented on: Teaching career and capacity to create high quality balanced blended learning. Both were seen as crucial without exception.

Educating for responsible engineering/the ethical or responsible engineer

All responses stressed the high importance of this topic for education at Wageningen University, and that it should focus on the full scale from small personal decisions to solving global problems. Most comments indicate that the topic is already incorporated in education but that it should be more.

Information technology and the information technology-driven engineer

This topic has two subtopics which are quite different: using IT for learning and IT skills of future engineers. Both subtopics received free text remarks that give the impression that the subtopics should not be combined into one topic. The most positive comments were for the "IT for learning" subtopic. The responses on the IT skills were a bit more mixed.

Challenge-based learning

In general, challenge-based learning is seen as a good idea, but there are also concerns that it will result in not enough time for training academic skills, and that it will take too much time from teachers.

Entrepreneurial learning/academic entrepreneurship

There is support for this idea as being necessary for education and the future of students. But this is not a consensus, and there are also multiple concerns. It is not seen as relevant for the first two years BSc, seen as less important while taking away too much time for training academic skills, seen as just one way to go for a creative and value crating mindset, and seen as a topic that would not interest all students. Also, it is seen as a topic that is more suitable for a polytechnic (HBO).

4 Conclusions

The survey response was limited to 17 persons, and differences in scores are not significant by their values only. The free text responses yielded useful ideas that were consistent with the scores.

Most responses were on balance between online and face to face teaching. In general, the respondents see options for more online education than pre-pandemic. But they stress the importance of the role of face to face and campus education. That is not much different from pre-pandemic opinions as described by van Puffelen, van Berkum, and Diederen (2018).

With one exception, the ideas on more online education are not about merely flipping the classroom. Flipping the classroom often focuses on exchanging two forms of Teaching and Learning Activities (TLA's). Most ideas in the survey responses require optimising the complete combination of TLA's geared towards higher learning goals and more active and personalised learning. This can be achieved by selecting TLA's on their characteristics towards a type of learning and create a smart design using (many) kinds of TLA's as described by van Puffelen (2017). In the years before the pandemic, the reported education innovation at WUR was more on course than on program level (van Puffelen & Vonk, 2020). In 2020, the pandemic shift towards online education could only be done by quick changes on the course level. That might still be on the responders' minds as quite some remarks were on the course level.

But there were remarks on program level as well. One respondent requested assistance on program innovation. And many comments were on learning goal at program level for the skills needed in future. The ideas for those learning goals differ amongst the respondents. Some feel that the recent introduction of more general skills education has already caused an insufficient focus on academic skills and the connection between research and education. Others see a clear need to focus more on other skills, including IT and a value-creating mindset seen with challenged based and entrepreneurial education. But opinions differ about entrepreneurial skills like whether they are more essential for polytechnics than for universities, whether they should be seen as optional and whether they should be seen as just one option for a creative and value-creating mindset. Challenged based learning received some of those critical remarks as well, but more responders were in favour of it.

In the existing situation, there are courses on general skills. And also, all master students have creative academic consultancy type education. In addition, there are student challenges and many options resulting from an effective entrepreneurial education policy. This resulted in some "this is enough" and "already too much" reactions. In general, there seems to be a need for a new balance and integrated plan for all types of skills mentioned above. That could also be seen as a follow-up on the vision of education (Wageningen University, 2017). Research into the existing situation might be a good first step for that.

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Appendix 1

Answers to the question "What are your ideas on research, education innovation projects, workshops and training, needed for education at WUR from 2022 onwards?" grouped by subject.

Balance in blended learning, personal learning & diversity

- The recent period has clearly demonstrated that contact with students and lab classes are key to translate knowledge from books to knowledge that can be applied by students. If anything, I would like to increase the personal contact with students and the amount of lab classes.
- Focus should be placed on the personal aspect of learning. This is what we notice right now due to the COVID19 pandemic and the dominance of online education. Non-verbal communication is a crucial aspect of both teaching and learning. This is difficult to incorporate in online education. The future of education therefore should be more personalised. Teachers should learn how to work with different types of students and respects diversity in all it's diverse forms: gender, LGBTI+, age, cultural background, introversion-extraversion spectrum, etc. This could be addressed in workshops and trainings.
- More space for blended education, the lack of large parts of on campus education due to Corona has clearly proven that online-only is not the way to go for high quality education. Interaction and practical training on campus are crucial!
- More focus on engaged, embodied, transformative learning and more outdoor and project based learning.
- Everything will be blended (not hybrid!) education; all courses will rely heavily on online tools for students to prepare for oncampus indepth education. Large lectures (hoorcolleges) are no longer given, the big rooms are turned into smaller ones and we keep 1 for events.

Scientific and general skills; responsibility

- Education should be linked to research.
- We need more empowerment of students in their capacity coping with transdisciplinary and complex challenges of the environment, society and science. therefore the need to be trained in 21st century skills such as personal leadership, resilience, transformative processes and entrepreneurial mindset & attitude (amongst others). Students need to be able to become change agents in their field of study to prepare them for the professional role the want to play in the future.
- more focus on content / technology and less on general skills (much during the past years the attention shifted to much towards general skills...)
- How to embed scientific skills training in courses? Which research skills (laboratory skills) do students really need, and what is the best way to teach them? How can we make young students (first and second year) more owner of their learning process?
- Responsibility can play a much larger and more strategic role in future education innovation. For future-proof education, it is time to incorporate the phasing out of the fossil fuel industry for the energy sectors to prevent 'stranded education'. The same goes for the food system, where education about fossil fuel or cattle based agriculture has to be reduced in response to future developments in these sectors.
- I think there should be strongly invested in 2nd point, the ethical and responsible. The global challenges that we have created as humans can no longer be held at bay or turned away from, it does not allow anymore to educate for the purely instrumental or the market, professions have to be thoroughly civically engaged as a starting point.

Organisation, support & facilities and covid time solutions

- Enhance studio spaces so we can with ease record lectures and talks where we explain basics and use contact hours for engagement and co-creation
- Zoom. Works so much better for lecturing than teams.
- Individual budget for home office improvements
- More time available/ more staff
- Some education innovation projects on curriculum level, designed/carried out by teachers, supported by 'innovation coordinators' (who have a background in educational research), who help teachers and also introduce new educational approaches.
- It might be good that this innovation is designed/carried out by an education coordinator, who is assigned to coordinate and innovate on curriculum level. This might be the role of the programme director now, but they don't always have enough time/educational background in this. An education coordinator can create coherence and learning trajectories per study programme. Now there are often only separate courses that are innovated, but not a whole programme is innovated, based on a certain educational approach (which is done at other technical universities)"
- Although teachers have done incredibly well to keep teaching going this year, I think this experience has shown where some are lacking. I do not see a future that does not involve hybrid teaching. For me and others in my department, we require time, resources and funds to prepare for this. We need to create knowledge clips, we need to incorporate more flipped classroom teaching, and we need to find widely available (pref. free) tools suitable for our courses.
- Education innovation projects: virtual reality and augmented reality projects. In specific workshops about augmented reality we can learn how to implement this in our readers / selfwritten materials.
- Workshop training: Use of lightboards in knowledge clips.
- Because traveling in great groups is a problem right now, I would like to get education with VR. This would mean I could go to any place in the world without traveling but experiencing the places I want to visit.