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## A futuring approach to teaching wicked problems

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### ABSTRACT

This paper investigates how the teaching and learning about “wicked” environmental problems may be fostered through an educational approach premised on futuring – the active imagination of the future. The growing academic interest in possible and desirable futures provides a promising starting point for restructuring education as coupling knowledge to imagination and teaching to policy practice can open up new, experiential ways of learning. Empirically, this paper draws upon research on an experimental futuring course employing a “mixed classroom” formula in which students and policy-makers learn together about sustainability challenges. Drawing on the notion of inquiry, this course is set up with the aim to foster a critical engagement with the ways futures are imagined in political debates and decision-making. Through complementary activities, the students were pushed to imagine possible futures around a central theme, the transition to a circular economy, in interaction with the policy-makers and other practitioners. This culminated in a “Museum of the Future”. From our action-research-based investigation of the learning experiences in the course, we conclude that a futuring approach to teaching wicked problems results in a more active attitude of students towards the space in which wicked problems and solutions are collectively imagined and deliberated.

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## Introduction

In their classic article “Dilemmas in a general theory of planning”, Rittel and Webber (1973) argue that “social professions” such as urban planning are characterized by wicked problems that elude simple problem-solving. Because “the definition of a wicked problem is the problem itself” (Rittel & Webber, 1973, p. 161, italics in original), addressing wicked problems implies a need for an “an argumentative process in the course of which an image of the problem and of the solution emerges gradually among the participants, as a product of incessant judgment, subjected to critical argument” (Rittel & Webber, 1973, p. 162). While the argument is made in the context of social problems, the idea has been extensively applied, tested and explored in other domains as well, not in the last place the

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domain of environmental and sustainability issues (cf. Peters & Wals, 2016). Surprisingly, given the emphasis on collective sense-making, Rittel and Webber and the subsequent literature on wicked problems pay little attention to role of the imagination of the future while this is crucially important for a future-oriented discipline like urban planning (cf. Beckert, 2016; Pelzer & Versteeg, 2019; for a notable exception see Brown et al., 2010), including the field of geography education (Hicks, 2012; Pauw & Beneker, 2015).

The purpose of this paper is to investigate how an educational practice focused on a reflective engagement with the way in which the future is imagined in society can contribute to learning about wicked problems.

To do so we will share insights from a course that we organized in the winter of 2019–2020, “Techniques of Futuring: A Mixed Classroom with Policy-Makers”. It is taught at the Master level in the Faculty of Geosciences at Utrecht University in the Netherlands since 2016. In the faculty, it is embedded within geography, planning and sustainability education. Students can either take this course for 5 or 7.5 ECTS (which each year more or less equally divides the students group). The theme of the course, which is different each year, was “The transition to a Circular Economy” in the 2019-2020 edition. This year the course attendants consisted of an international group of 22 students (16 female and 6 male) with a range of disciplinary backgrounds, ranging from various geography tracks, spatial planning, sustainability sciences, sustainable business and innovation, public administration and organisation sciences, international development studies, and geography education and communication and 12 policy-makers from multiple ministries, the province of Utrecht and Utrecht municipality. Policy-makers were selected on the basis of their professional involvement with the topic. Every week, the students spent one afternoon in a “mixed classroom” with policy-makers and a full day in a design studio.

Facilitating a meaningful exchange among the students and policy-makers is a central aim of the course. This requires a subtle tinkering with the appropriate form such as staging reflective conversations between policy-makers and guest speakers, probing interviews of policy-makers by students on what policy-makers working on the “Circular Economy” actually do, and feedback sessions in which policy-makers constructively critique the students’ work. The culmination was an assignment and group exercise wherein the students worked in a weeklong design studio to create a fictional museum situated in 2050, the “Museum of the Linear Economy” building on the preparatory work they had done in the Friday sessions of the Mixed Classroom. This was a physical museum, fictionally staged in 2050, inviting the audience to look back at the successful transition from a linear to a circular economy (Figure 1). As the student teams designed a physical object that makes sense in a museum setting of 2050, they actively engaged in worldbuilding, picking a key event between 2020 and 2050 that helped understand the process of the transition, thus effectively combining fore- and backcasting, to explain how social change occurred. One of the student teams conceived the “country” of the Autonomous Federation of the New Netherlands (AFNN), which was founded after the Great Dutch Flood of 2037 and which was fully based on circular principles. The team conveyed this future through a detailed scenario, an art piece from that future world and a presentation in which a resident from the AFFN took the stage. Another team started from an existing shopping mall in Utrecht, the Netherlands, and suggested it had become an urban living room, rather than a place for mass consumption.



Figure 1. The empty museum of the linear economy before the opening on 22 January 2020.

In their contribution to the museum catalogue, all teams merged existing historical developments with fictional developments that took place after 2020.

Both this assignment and the overall rationale of the course were based upon the idea that the future is actively imagined (cf. Beckert, 2016; Bendor, 2018; Candy & Dunagan, 2017; Jasanoff, 2015; Pelzer & Versteeg, 2019; Tutton, 2017) in what we call processes of “futuring”. Where much societally engaged research is about problem-based learning, we define futuring as *attempts at shaping the space for action by identifying and circulating images of the future, a process by which relationships between past, present and future are enacted*. With the space for action, we mean the collection of possibilities for action shared by two or more actors. We deliberately use the verb “futuring”, because it stresses the agency of actors in engaging with images of the future to shape possibilities for actions in the present. In the classroom, then, we teach a specific epistemology of how futuring can be done, understood and investigated, employing a range of notions like “techniques of futuring” (Hajer & Pelzer, 2018, 2018), “fictional expectations” (Beckert, 2016) and “imaginative logics” (Pelzer & Versteeg, 2019).

Our approach to education in this course closely follows the idea of “inquiry” as developed by pragmatists John Dewey (1938) and Donald Schön (1992), who use this term to describe the reflective and collaborative processes through which research and education can contribute to problem-solving in society (the researcher being in the problematic situation and aiming to impact upon that situation, cf. Schön, 1992). Their reading of inquiry is a particular one, placing educational practice in the context of a commitment to democracy. For them understanding scientific practice as inquiry should support public debate and political decision-making. For research and education, this emphatically implies a focus on “redescription” and imagining the future (Biesta & Lawy, 2006; Reason, 2003; for an empirical illustration see Macintyre et al.,

2019). This specific take on inquiry, which guides our educational practice, overlaps to some extent with the notion of what is now known in educational research as “inquiry-based learning” (cf. Spronken-Smith et al., 2008), in that it implies a learner-centred process based on continuous and ongoing process of testing and exploring, is situational in its orientation, based on learning in communities and that emphasizes the contextuality of knowing (as opposed to knowledge in terms of general laws). Within the broader inquiry approach to this course, futuring can be understood to be a specific application that prioritizes an interest in exploring what “could be” over a search into trying to mirror “what is” by actively identifying and circulating images of the future (cf. Snaddon et al., 2019). Following our “Deweyian” take on inquiry in this course, our approach to futuring aims to foster in our students a critical engagement with the way the future is imagined in society. This critical approach thus stands out in that it aims to assist and mediate between (policy) practitioners by “opening up” (Rickards et al., 2014) and fostering “ontological expansion” (Bergson, 1983) in terms of the kinds of future possibilities that can be imagined, deliberated and acted upon in practice.

This inquiry-based approach to education aims at creating a “community of inquiry” (Lipman, 2003) that fosters processes that foreground the agency of students, and also mobilizes the reflexive potential of engaging practitioners. It is in their interaction that students can reflect on and make sense of how alternative futures, like the transition to a “circular economy”, may come about. We define agency in this context as the capacity to liberate oneself from given goal definitions and to do “things otherwise” (Giddens, 1984; Hoffman, 2013). The inquiry of the students, in interaction with policy-makers, is based on different forms of knowledge that relate to different aspects of futuring: the problem context, images of the future, how they shape the space for action. Here Rittel and Webber’s three premises about social professions are useful. These three premises – emphasizing problem definition, goal formulation and social context – relate to three kinds of knowledge in the literature on transdisciplinary science (Pohl & Hadorn, 2008):

- Problem definition relates to system knowledge and “addresses questions about the genesis and possible further development of a problem, and about interpretations of the problem in the life-world” (Pohl & Hadorn, 2008, p. 431).
- Goal formulation relates to target knowledge and “addresses questions related to determining and explaining the need for change, desired goals and better practices” (Pohl & Hadorn, 2008, p. 431).
- Social context relates to transformation knowledge and “addresses questions about technical, social, legal, cultural and other possible means of acting that aim to transform existing practices and introduce desired ones” (Pohl & Hadorn, 2008, p. 431).

In this paper, we want to understand how a reflective engagement with futuring in the context of wicked problems works as an educational practice. In the remainder of this paper, we will use these guiding concepts to make sense of the futuring course we set up and developed for students. This is done by elaborating upon three key dimensions of a reflective approach to futuring: (1) futuring as *connecting to dynamics in practice*, (2) futuring as *experiential making* and (3) futuring as *orientation to the future*. In the

discussion section that follows, we summarize the key insights from our reflections and describe our contributions to the wider debate on university education and transdisciplinary scholarship. In the conclusion section, we discuss four practical recommendations for others that aim to develop similar approaches to education. In the next section, we describe the methods we employed to investigate learning about wicked problems in our educational practice.

## Methods

In order to reflect and generate insights from our course as a case study, we used several sources of data to reflect on how the three core premises of the course and the related activities contributed to the experience and learning processes of students. Critically reflecting on the premises and set up of a course coupled with students' learning experience is a common form of action research methodology in educational research (cf. Kemnis, 1988; Cantor et al., 2015; Logghe & Schuurman, 2017; Norton, 2018). Action research is linked to knowledge co-production, an important aspect of our course. The students, educators and practitioners are on a learning journey together, testing and developing the approach to the wicked problem at hand as the course progresses. In this process, student experiences and final products are important sources of knowledge for both the students themselves and the teachers. Action research and knowledge co-production methodologies are historically related to content-driven, problem-focused and multidisciplinary approaches to research on complex emerging societal problems, which makes them ideally suited for the analysis of our novel approach to education (Norström et al., 2020).

Iterating between the data and analysis we identified a number of findings related to the three premises of the course that we present in the result and discussion section. The reflections by students were mainly used to critically reflect on how they experienced the course set up and whether or not this matched the course premises: i) futuring as connecting to dynamics in practice, ii) futuring as experiential making and iii) futuring as orientation to the future. In sum, we used the following sources of data:

1. *The instructors' experience*: the first two authors of this paper are involved in the course as the developers and tutors. The overall framing of this paper and the notion of futuring aligns strongly with our personal teaching philosophy and the concomitant educational activities. In writing up the paper we tried to be transparent about our choices, convictions, and experience of the course and we have devoted a part of the reflections on each of the three premises to student reactions (based on data sources 2–4), which also include critical remarks.
2. *Course diary*: author three participated in the mixed classroom as part of a Master's programme in Educational Geography. She combined this with a tailor-made elective course for which she evaluated this course. She kept a "diary" of the course, which includes a description of the different steps, but also her own reflections. She also led a "check-in" every Friday morning,



wherein the students reflected on their progress and learning journey. All these check-ins were recorded.

3. *Group evaluation*: during the last Mixed Classroom session (15 January 2020), the two instructors and author three organized an extensive group evaluation. This evaluation started with the development of a concept map about key challenges related to the central topic: the transition to a circular economy. Students and policy-makers were asked to compare their maps to a similar concept map they made at the beginning of the course to identify key new insights. Subsequently, everybody reflected on all course events to connect their insights to specific moments and identify the five most important meetings. In small groups, they discussed how the key lessons and the contributions of specific meetings could be understood for their learning experience in the course, and how these might contribute to improving the course.
4. *Formal course evaluation*: 18 out of 22 students (81%) filled out a digital formal course evaluation. This evaluation included generic questions (e.g., about study load), but also specific questions about, for instance, the weekly Mixed Classroom and the design studio.
5. *Student review of draft article*. In the process of writing this paper author three, participating student in the edition of the course investigated in this paper, continuously checked whether the analysis was truthful to the student experience. In addition, we have asked two other students to critically read the text of this article and explain whether the experience of students was represented in an accurate, fair and, as far as possible, complete manner. This has led to the rephrasing and refinement of a number of insights.

## Results

In this section, we discuss students' experience of the education activities related to the three core premises of this course, which follow from our specific take on futuring as a "Deweyian" form of inquiry: i) futuring as connecting to dynamics in practice, ii) futuring as experiential making and iii) futuring as orientation to the future. The quotes by students in this section are derived from the course diary (source 2), group evaluation (source 3) and formal course evaluation (source 4).

### *Futuring as connecting to dynamics in practice*

A first premise of the course is that the imagination of the future requires an understanding of the way in which the future is already in the "here and now" as an emergent potentiality and object to sense- and meaning-making processes by different groups in society. While the future is per definition "not yet" (Tutton, 2017), it can be observed and experienced in different manifestations. Complementing more formal and institutionalized techniques of futuring such as scenario planning, we also stimulate students to investigate more daily manifestations of the future in the present, such as meetings, excursions, cultural practices like rituals and other "micro" practices (Hoffman & Loeber, 2016). In doing so, we encourage students to investigate how people in daily life engage

with stories, images, rituals related to the future and how these understanding of the future constrain and enable action.

### *Educational activities*

During the course, there are multiple “real-world” engagements. Most prominent is the ongoing interaction between students and policy-makers during the Mixed Classroom meetings. In these meetings students interview policy-makers, policy-makers provide input on student assignments, and together they discuss the topic of the day, usually introduced by a guest speaker. To deepen this interaction we ask students that take this course for 7.5 ECTS to develop a “practitioners profile” after an idea by John Forester,<sup>1</sup> in which they write about the work experience of the policy-maker from a first-person perspective. Another relevant activity was an excursion to a place in Utrecht where social entrepreneurs experiment with circularity. This excursion included a conversation between a social entrepreneur and a policy-maker. A key concern for us is the way these interactions are actively “staged” (Hajer, 2009) and opened up for critical reflection, for example, by using the format of celebrity interviews in which practitioners are interviewed through a biographical interview with input by the students. A third form is the guest lecture by practitioners that explain how they engage with the future in their professional practice related to the circularity transition.

### *Student experiences*

The central learning outcome that surfaces in the observations by participants is that, in different ways, they developed a better understanding of complexity and policy-making. Reflecting on their pre- and post-course concept maps, approximately 80% of the students observed that their new knowledge concerns the role of collective action in relation to the future. Nearly half of the students in the group evaluation noted that they have developed in relation to this, an idea of the “relevance of politics and governance” and the “power of governments versus businesses” where they previously did not recognise this. Others note the importance of communication and values in this context, as one student observes: “my original thoughts were mainly with policy design (...) now after two months my thoughts are more focused on the values behind institutions that promote people to make a change and how to conquer value inertia.” Three students explained that the attention to the role of communication had fundamentally shifted their ideas about the relationship between government and non-state groups, such as businesses, as well as the “bureaucratic hassle that comes with the transition [to a circular society]”.

An important meeting for observing dynamics in practice was an excursion to an area in the city of Utrecht that actively experiments with circular concepts. During the excursion, students could experience and observe this experiment as an exemplar of what is already possible. As one student observes: “it was really nice to see what the people on the ground struggle with and what we need to do to actually change something”. In addition, it also enabled them to first-handedly observe how the participating policy-makers interacted with the local entrepreneurs in a plenary discussion.

A second important learning event in this context, was the guest lecture by a young practitioner from a consultancy firm. The lecture gave insight into, as one student explains, “work in practice and how to really make change out there”. Moreover, it



seems, the young advisor also acted as a role model for some students, helping them to envision their own future career possibilities. As one student observed: “she was working in our field and doing what a lot of us want to do.” Lastly, a key set of learning activities for connecting to dynamics in practice centred around practitioners profiles that students wrote about the participating policy-makers on the basis of in-depth interviews and participant observation. All participants positively valued the final classroom meeting in which the profiles were discussed. This assignment was introduced by a short interview workshop in the first week, which was also valued by the students, in particular for reconnecting with the practical skills of doing research.

### *Futuring as experiential making*

The second important premise of the course is that futuring can be conceived as a way of worldbuilding (Goodman, 1978) – shaping possible future worlds – that works through a gamut of ways of knowing (cf. Turnbull Hocking, 2010). Traditional scenario building approaches are important to understand feedback loops and the internal consistency of a future world. Building on scholarship on “experiential futures” (Candy & Dunagan, 2017; Dunagan et al., 2019), we found that it is very generative for the learners to complement these approaches with physically making and designing objects to enable deeper interaction with a future scenario. Informed by design scholarship and our experience we learned that this leads to a stronger engagement between (1) the student team and their imagined future world and (2) the student team and the different audiences they want to engage with, as they have to build a link from their ideas to the perspective of the museum audience through a “perceptual bridge” (Auger, 2013).

Throughout the course, we tried to convey to the student teams that they were not just working on a university assignment, but actually contributing to societal debates. In doing so we hypothesized that they would get a better understanding of the openness of the future, since they have the opportunity to contribute something to an ongoing debate and an actual audience, and in doing so explore their agency in shaping the possibility space for action in relation to circular futures (cf. Maggs & Robinson, 2016).

### *Educational activities*

This perspective of making and engaging with the future experientially was organized in different educational formats. As a first step, the teams made a “detective wall” (Figure 2), wherein a key event in their future world was investigated using a variety of sources, such as academic literature, own drawings, videos, etc. We introduced the detective wall as a creative tool to present findings and ideas about complex problems in an imaginative but purposeful way. Importantly, the concept of the detective wall was not meant as a final presentation of findings, but as an intermediate research step. The detective wall was built up early in the morning and had to be removed before lunch, as such emphasizing that the inquiry into the future was ongoing and not finished.

The key events presented by the student teams included the flooding of the Netherlands, the introduction of Give Back Day and the re-opening of a shopping mall as a community center. In class, the students visited each other’s walls to discuss what they saw and provided each other with input. The detective wall was a critical preparatory step for a museum object they would make next (Figure 3). In this task, the teams had the challenging task of thinking



Figure 2. Students working on the “detective wall”.

of an object that reflects their thinking about world building *and* had the characteristics to “do something” with the audience that would visit the museum. While the teams accompanied the object with a written text in the museum catalogue, the object had to speak for itself too – common at art schools, but not at all at a Geosciences Faculty. Finally, the student teams would present their object as part of the opening of the Museum of the Linear Economy (Figure 4). Here they had to consistently pretend it was 2050 and act as a persona from that year.



Figure 3. Students making the object for the exhibition.

### *Student experiences*

The responses of the students to the experiential making process can be described as ambivalent. On the one hand the groups felt uncertain and sometimes confused by the openness of the assignment. Combined with a packed and tight schedule, this led to frictions within the groups and sometimes with us, the teachers. Emotions rose particularly in the last week, when their contributions to the museum had to be finished and many deadlines coalesced. For the teachers, this was the fourth year they taught this course and the heightened level of stress in the last month had been a recurring issue. The experience of these years had been that the anxiety of student teams typically lasted for a relatively short and confined period, particularly related to the logistics and deadlines for the exhibition. The approach of us, as teachers, to this issue, was twofold. On the one hand, we had several conversations with individual students, the teams and the group as a whole about their experience of the process, trying to keep them motivated and thinking along in overcoming obstacles. On the other hand – and this might sound somewhat harsh – we let the students sometimes “struggle”, based on the conviction that they had enough creativity and versatility to overcome the challenges they were encountering and that doing so would also provide them with a sense of pride.

An additional dimension, which adds both to the difficulty and the subsequent sense of pride is that most of our students are trained as social scientists, not as designers. As one of the students put it bluntly in the student evaluation: “While I appreciate that creativity is part of this process, there is a reason why I am not studying arts or museum curatorship but social sciences.” However, as is overwhelmingly clear in the final evaluation, the majority of students explained that they appreciate the “practical element”, the “experimental feeling”, and the “room for creativity”.

In the overall course, there was a balance between more conventional academic education and design work. Yet, in the design studio days in January, the design aspect came to the forefront with essay and catalogue text deadlines around the same dates, which may explain the feelings of “museum overkill” and too little time to finish the more familiar academic components. However, it can also reflect a deeper feeling of uncertainty and distress characteristic of transformative learning (Haigh, 2014). Moreover, as



**Figure 4.** Two students present their world from the perspective of 2050.

Rogers and Tough (1996) describe under the telling title “facing the future is not for wimps”, it can also be seen as a common process in design work in which there is typically a period of distress before there is a sense of achievement and even victory. Indeed, at the end most students report looking back at the process with pride. This is illustrated by a diary excerpt of author three, who participated as student in this class:

December 22nd, first making day: “I first handedly experienced that when thinking of the future everything is possible and by really thinking about it we can find examples from the present in which we could already recognise elements of the future.”

January 2nd, second making day: “Sometimes during our discussion, group members want to look for confirmation whether we are doing the assignment right. We, quite quickly, on our own, realise that if we can make an argument for the choices we make and the ideas we develop then we are on the right track. It seems that we are getting more confident about our scenario.”

January 3rd, third and last making day: “After all we are able to finish our museum object and feel very proud.”

### *Futuring as orientation to the future*

The third premise of this course is that futuring starts from the recognition that there is more than one possible future. The fact that the future is multiple means that it is possible to conceive a wide range of “futures” that are likely, possible, or desirable (Robinson, 2003). Ever since the birth of the complex field of futurology, there have been disparate ways of relating to this question (for a comprehensive discussion see Andersson, 2018). In this course, we have consistently focused on the imagination of possible and desirable futures. Rather than looking at “likely” futures, the course centres on the aim to expand our understanding of what is possible and what can be desired (for the relevance of this to education see Hicks, 2002). For each topic at hand, this means an explicit attention to social and cultural dimensions, such as the decoupling of resource use and lifestyles in the transition to a circular economy.

### *Educational activities*

In contrast to the experimental nature of this class, the related learning goals aimed at a capacity to comprehend and evaluate future projections is largely embedded in conventional classroom activities, including lectures and class exercises. The course kicks off with a lecture that defines the course perspective on the imagination of the future and introduces the central topic. In addition, the guest lectures during the Mixed Classroom sessions provide different lenses at the imagination of the future for the topic at hand, including scenarios, modeling, research by design, the role of legal practices, and real-world experiments. On Fridays, students practice making their own scenarios.

### *Student experience*

The evaluation by the students of their learning about the notion of the futur is generally positive, yet it is difficult to separate how students think about the future orientation in the course and its overall experimental, mixed and socially engaging approach. A few students remark in the group evaluation that they have learned, in the words of one student, “how visions of the future can change decisions”. Moreover, approximately 50% of the students see

that their new concept maps about a transition to a circular economy are much less concerned with technology and policy design and much more with values and social dimensions such as inequality and lifestyle change as well. Their newly developed orientation to the future thus seems to be closely connected to a more comprehensive vision on what change is about (cf. Hicks & Slaughter, 1998).

This finding also echoes in the evaluation of meetings. The starting point for developing a future orientation was the introductory meeting that outlined the overall perspective of the course. This meeting was seen as important because it was “a good introduction to thinking about transition and transformation. This lecture really set the scene and was a constant point of reference throughout this course” as one student explained. A number of students indicated that it helped to grasp the topic of the circular economy in a new and understandable way. It was also appreciated, as some mentioned, that it “was inspirational but at the same time different from what was heard before (e.g., the acceleration of change). A very constructive and hopeful, yet critical lecture.”

Another important learning event was the first guest lecture in which an expert discussed how images of the future concretely shape innovation dynamics in the present and the role policy-makers play in this. This helped students to see the practical value of visions and how in this, as one student observed, the speaker connected “governments to business and how they can work together to create a sustainable future”. The next meeting after that was a scenario workshop in which the students developed their first future narratives for the Museum of the Linear Economy. In addition to fostering creativity, this workshop helped students to develop, as one student observed, “a practical understanding of how you actually make assumptions about the future”. At the same time, it confronted students with recognising that “the endless possibilities that exist within ‘futuring’, which made it really difficult sometimes to construct a real direction to go in”.

## Discussion

In the previous section, we analysed our own inquiry-based approach to education in this course, captured in the three central premises on a critical engagement with futuring: i) connecting with dynamics in practice, ii) experiential making and iii) orientation to the future. Each of the three educational premises inspires a concomitant set of educational activities that aim to foster specific learning outcomes related to futuring. On the basis of the results, we have identified different insights about how these activities contribute to learning about futuring, which we will discuss in this section.

### *Insights about connecting with dynamics in practice*

From the observations above follow two ways in which students learned to connect different forms of knowledge about the future to their own ability to make a difference. Firstly, the practical engagements with different groups of practitioners opened up the “black box” of the societal institutions they represent, such as policy-making and consultancy. Through the *active observation and explicit description of dynamics in practice* they learn to conceive how institutions work or do not work. This develops their sense of agency through system knowledge. Secondly, through these encounters, they learn to position themselves in relation to these institutions. This enables them to *envision their*



*own potential role* as they start to understand what they can do to shape change by engaging with exemplars and role models in the present. This develops their sense of agency through transformation knowledge.

### ***Insights about experiential making***

The feeling of pride mentioned by the student above was shared by the majority of the students, particularly during the opening of the Museum of the Linear Economy, when they could invite family and friends and their objects and presentations played a central role. As such, taking responsibility in staging the museum contributed to the agency students had in shaping the (public) engagement with possible futures. The overall trajectory of the learning experiences in the course aligns with findings in existing literature on collaborative, design-centered and (disciplinary) boundary-crossing learning. Group learning with a design focus increases conceptual understanding, but is characterized by a “U-shaped” learning curve with confidence levels high at the beginning and end, and usually low in the middle (Scager et al., 2014, 2016). Clarity of responsibilities, timelines and clear deliverables are crucial in this process (Fortuin & Bush, 2010; Scager et al., 2016), as well as having a continuous conversation about being comfortable with uncertainty. We made sure we came back to this conversation with students during the weekly plenary “check-in”, as well as in the supervisory meetings with the different teams. In the mixed classroom, some design activities were perceived as stressful and time consuming, potentially jeopardizing the time students had to engage with conceptual ideas about the future. At the same time: by putting a museum object in the world and arguing *why* this should be included in the museum looking back from 2050, key knowledge from the course was connected more tightly to the personal convictions and feelings of the students. This observation about futuring as experiential making can be captured in the first lesson on *world building as ownership*: the ability to personally identify with a possible future (target knowledge). The second lesson about experiential making concerns the role of communication. Through the educational activities like the detective wall and the museum object, the student teams had to continuously communicate the outcomes of their world building to different audiences, like fellow students, policy-makers and museum visitors. Put somewhat differently, through the practice of experiential making the groups arguably experienced a more holistic understanding of the system knowledge that was part of their world building and felt the agency to choose different ways to build “perceptual bridges” with different audiences. This lesson can be summarized as *worldbuilding as communication*.

### ***Insights about the orientation to the future***

The discussion of the results above suggests, again, two ways in which students learned to develop agency through developing an orientation to the future in this course. Firstly, by actively learning to engage with the future through lectures and exercises, students started to appreciate their role in critically investigating, creating and disseminating images of the future. In terms of agency, this capacitated their *ability to think and act beyond determinism and fatalism*, by spotting points of leverage or processes that may further social change. This connects their learning to target knowledge as they learn to conceive of a range of different possible and desirable future worlds. Secondly, because the classes and exercises were not just about the future, but integrated a broader understanding of transition dynamics, the course



also contributed to, what we call, an *enhanced ability to envision change*. This connected their sense of agency to the transformation knowledge they had obtained about the relationships between images of the future, policies, societal trends, and micro practices such as cultural rituals.

**Contributions to a reflective engagement with futuring**

From the set of lessons, we observed two contributions to a reflective engagement with futuring for each dimension, totalling six contributions in total (see [Table 1](#) for an overview).

All of the six contributions to futuring concern ways in which students develop a more active relationship to wicked problems by shaping and expanding people’s understanding of possibilities for action. The analysis shows that this is an outcome of distinct learning activities in which they connect imagined futures to dynamics in practice. Through the

**Table 1.** Summary of the contributions of the educational activities for each dimension of the course.

Futuring as ...	Educational activities	Contribution to doing and understanding futuring
Connecting to dynamics in practice	<ol style="list-style-type: none"> <li>1) Excursions (e.g., to potential exemplars)</li> <li>2) Guest lectures by practitioner</li> <li>3) Interaction sessions with practitioners (e.g., Mixed Classroom)</li> <li>4) Reflective writing assignments (e.g., practitioners profile)</li> </ol>	<p><i>Students observe and explicitly describe dynamics in practice: conceiving how societal institutions (i.e. consultancies or governments) work or do not work (system knowledge)</i></p> <p><i>Students envision their own potential role: understanding what students can do in shaping change by engaging with exemplars and role models in the present (transformation knowledge)</i></p>
Experiential making	<ol style="list-style-type: none"> <li>1) Developing design concepts (e.g., build and reflect upon detective wall)</li> <li>2) Artefact creation (e.g., making a museum object)</li> <li>3) Crafting and delivering a presentation</li> </ol>	<p><i>Students take ownership over their world building: personally identifying with a possible future (target knowledge).</i></p> <p><i>Students communicate through world building: understanding a possible future better by communicating it through different means and to different audiences (system knowledge).</i></p>
Orientation to the future	<ol style="list-style-type: none"> <li>1) Guest lectures by experts</li> <li>2) Scenario development for futuring intervention</li> </ol>	<p><i>Students think and act beyond determinism and fatalism: conceiving a range of different possible and desirable future worlds (target knowledge).</i></p> <p><i>Students envision change better: connecting images of the future, policies, societal trends, and micro practices such as cultural rituals (transformation knowledge).</i></p>

interaction with practitioners, students come to understand the “future dimension” of action and develop capacities to imagine the future. In return, learning futuring strategies, they start to develop a new idea about their role and potential strategies for “making a difference” for the perceived possibilities for action in practice. This shows that in *futuring*, conceived as a verb, the capacity to imagine, a sensitivity to dynamics in practice and ability to shape social processes go hand in hand and mutually inform each other.

## Conclusion

We started this paper by pointing out that the work of Rittel and Webber (1973) and the subsequent literature on wicked problems pays little attention to the role of imagination of the future. The findings of our case suggest that such an approach has potential as a teaching philosophy. In this regard, the main take-away from this paper is that a futuring approach to education indeed contributes to an enhanced sense of agency among students in dealing with wicked problems. More specifically, our case illustrates that the empowerment of students emerges from their enhanced ability to observe and influence the space in which practitioners share and deliberate collective images of problems and solutions in addressing wicked problems.

We hope this paper inspires others to engage more with futuring in their educational practice. To aid this, we end this paper with an overview of four rather practical conditions for futuring as an educational practice:

- 1) *Time and redundancy.* Over the years we have learned that students experience this course as intensive. For futuring assignments, it is typically difficult, or even undesirable, to give a complete set of prescribed criteria. Students have to find out what “works” for their intervention by themselves. Thus, the course setup requires time for deep thinking, sensemaking and the headspace that is needed to do this.
- 2) *Grading.* While teaching this course, we found out that there are good reasons why art and design schools do not grade their students on a numerical scale. For the group process forms of “peer grading” can be applied, but it is almost impossible to apply a grade to a creative process. When embarking on a futuring course in an environment wherein a numerical scale or A-F scale is common, it is important to position the course in advance, for instance, by applying a Pass/Fail system.
- 3) *Committed teachers.* A recurring point in each evaluation is the positive appreciation of the personal commitment of the core teachers. We found that futuring interventions are always a form of co-production between students and teachers, requiring an ongoing tinkering and improvisation on the part of the faculty. As such futuring courses are very inspiring, but also very intensive to teach and formally available teaching hours per student often do not suffice.
- 4) *Failure remains an option.* With a public event at the course’ end aimed at fostering transformative dynamics, “failure” by students is more problematic than in a conventional course. Whereas failing is part of the learning journey, the course also aimed at a public event-cum-publication at a relatively high level. This was at times at odds with the experimental and horizontal character of the course and led the teachers to become rather strict curators as well. However, the two are not mutually exclusive: by allocating enough time for experimentation, reiteration and failure in

the design section of the course – a point on which we constantly seek to improve the course while doing justice to the other components – the quality of the final product increases and students become more confident in their abilities and final creations.

The kind of inquiry-based approach to futuring education discussed in this paper presumes a critical and reflective engagement with the way in which the future is imagined in society. In this course, this has resulted in a specific set of premises and educational activities. Future scholarship could further unpack and compare the different approaches to futures education and the relationship to wicked problems experienced in practice. The approach we have chosen – with a strong emphasis on experience, making and reflection on practice – might be complemented by other types of futures education with distinct premises and related activities. In addition, it would be worthwhile to test this approach with different publics. Because of the limited length of this article, there was no room to go into the experience of the participating policy-makers. From our own experience in this course, we know that an engagement with futuring enables policy-makers to “re-frame” issues, critically reflect on their role and responsibilities and to envision new possibilities for their work. For future research, it would thus be interesting to investigate what a futuring approach to teaching wicked problems contributes to this particular group, as well as other populations of academic and non-academic learners.

## Note

1. <https://courses2.cit.cornell.edu/fit117/>(visited on April, 1, 2020)

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