

# **THE KIDS ARE ALL RIGHT: LESSONS FROM RECENT CHANGES IN STUDENT PREFERENCES IN NORWAY'S OIL-DEPENDENT REGIONS**

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**Abstract:** Climate change education has been conducted in Norway for many years, but recent research indicates that there are regional differences in how schools include climate change in educational approaches. In particular, there are indications that climate change seems to be perceived as more controversial in regions with significant exposure to the Norwegian fossil fuel industry, which is predominantly clustered on the West Coast, and most notably in the city of Stavanger and its surrounding communities. However, school leaders in this region have detected a clear shift in student preferences for study programmes, an observation the author found evidence to support during his MA research project. The reported trend is that today's students orient themselves clearly towards sustainable solutions and renewable energy and request study programmes that fit this preference. Regardless of opinions among teachers on anthropogenic climate change, this was creating a need for the schools to adopt study programmes for sustainable solutions and renewable energy to attract the most and best students in the transition from lower to upper secondary school.

The article suggests that this elucidates a little-acknowledged source of student power: the power students have to choose one school or one study programme over another at transitions in the education ladder. The author argues that the shift in student orientation is probably in part due to successful climate change education, but not only through the formal school sector. There are at least two other channels of climate education: non-formal education through media and environmental organisations, and direct peer interaction. This points to new and interesting challenges for the climate change education practitioner, such as how to include considerations on career options in climate

change education and how to utilise the combined force of the various channels of climate change education. Keeping the message open for a plurality of voices and approaches, and understanding that students are not only ‘responsible consumers’ or ‘active citizens’, but are also in the process of deciding what to do with their lives and starting professional careers, are two important lessons.

**Key words:** Climate Change Education; Education for Sustainable Development; Student Climate Strike; Upper Secondary Education; Peer Influence.

## Introduction

In 2019, students all over the world organised student climate strikes, helping place climate change at the centre of the global agenda (Wahlström, 2019). This represents a recent example of how climate change and formal education overlap, as schools and classes were the recruiting arenas for this mass mobilisation that built on combinations of direct peer networks, social media, and traditional media coverage on an international scale. The importance of including climate change in education, however, has been recognised for a long time, with the establishment of climate change education (CCA) as a natural component of modern formal education (EACEA, 2018; UNESCO, 2010). As climate change education becomes increasingly central to education, so grows the need to understand what impacts it has had on students. Waldron et al. (2019) considered how climate change education tends to follow one of two contrasting perspectives on student empowerment. Either the onus is placed on students as *consumers*, with individual actions as a pathway for sustainable societies, or students are addressed as *citizens*, urged to explore political action as a pathway to meaningful impact on climate change. ‘Conscious consumers’ or ‘active citizens’ represent two broadly recognised pathways to student empowerment on climate change (Waldron et al., 2019)

This article argues that in addition to these two paths, a third source of student power should be recognised. Climate change education, both through formal education and non-formal channels, seems to have had an

impact on Norwegian students' preferences for which *careers* they want to pursue in higher education, most notably in regions with heavy exposure to the oil industry. Through his MA research project, the author found that school leadership in upper secondary schools in the city of Stavanger, the so-called 'oil capital' of Norway, has experienced a clear expectation from students to deliver study programmes on renewable energy and sustainable technology instead of the established programmes aimed at the traditional oil industry. The school leadership reported that students who would have previously been in the target group for advanced studies as engineers and experts in the fossil fuel extraction industry, now had a preference for career pathways associated with renewable energy and sustainable technology, and school leadership felt pressure to deliver accordingly. Thus, this article will lay out the argument that student expectations and choices on study programmes and careers constitute a third pathway for student contributions to solutions on climate change, one that is little acknowledged in existing literature.

### **Climate change education**

There are strong arguments for understanding climate change education as a key factor in all aspects of sustainable development (Guilyardi, 2018: 20) and as a central factor in development education (UNESCO, 2010; Mochizuki and Bryan, 2015). The natural connection between development education, education for sustainable development, and climate change education has furthermore been established by several academic arguments (see, for example, Bourn, 2015: 45-47), who have argued that there are strong symmetries among these 'adjectival educations' in regard to methodology, skill set, content and action outcomes. In general, climate change education is regarded as necessary for achieving the changes societies need to address this global challenge (IPCC, 2014: 5). Moreover, recent years have seen a change in the conceptual timeframe for climate change, whereby climate change is no longer a future risk, but a present reality (Allen et al., 2018: 51).

However, as anthropogenic climate change has been given increasing importance and attention, opposition to this narrative has also become more entrenched. In spite of the broad consensus in the scientific community on

anthropocentric climate change and the severity of its impacts (Cook et al., 2016), there is a small but vocal minority who claim the opposite to be true (Dunlap, 2013). These so-called climate change sceptics are a diverse group, whereby some deny anthropogenic climate change altogether, while others simply regard the effects as minor or even positive (Dunlap, 2013; Jylhä, 2017; Uscinski et al., 2017). Concerning schools and education systems, there are few studies into how climate change scepticism impacts climate change education. On the other hand, there is significant literature on specific examples of climate change education projects, like the establishment of sustainable schools (Jackson et al., 2007), or evaluations of particular climate change programmes in schools (Flora et al., 2014). However, this literature tends to focus on ‘best cases’ and not on the general picture, where hostility towards climate change education might be a real challenge in some situations.

### **The Norwegian climate change context**

Norway is among the world’s top exporters of oil and gas and the Norwegian fossil fuel industry is heavily clustered on the West coast around the city of Stavanger. There are considerable indications that this region also has the highest resistance to climate change policies (Opsvik, 2018). Recently, an academic research project on resistance to anthropogenic climate change in education systems has been undertaken at the University of Stavanger by Skarstein, who is among the lecturers at the one-year post-baccalaureate teacher certification programme there (Skarstein, 2020).

The background to Skarstein’s research project is connected to the collapse in the oil price in 2014 from \$115 per barrel to just \$50 and fell further to \$30 by the end of 2015. This sent the fossil fuel industry into a massive downturn. One consequence was that highly educated staff from the oil sector were laid off and had to find routes to new employment (Hvinden and Nordbø, 2016). The government established re-education packages for the entire region of Stavanger, and one option was to enlist on a one-year post-baccalaureate teacher certification programme. The University of Stavanger expanded the capacity at these classes fourfold, from 20 to 80 students a year, whereby the

main increase was former employees in the oil industry, typically engineers and technical staff (Andersen, 2015).

This sudden quadrupling of a teacher training programme is in itself an interesting case for further studies, but Skarstein noticed one effect in particular; the attitudes to anthropogenic climate change appeared to have changed in the class. To investigate this further, Skarstein established a research project based on collecting responses and opinions on anthropogenic climate change from all the national post-baccalaureate teacher certification programmes in Norway, in addition to the one in Stavanger. The study is now published, and concludes thus: ‘The finding that association with the petroleum industry appears to reduce a pre-service teacher’s intent to teach about the climate challenge is perhaps the most consequential finding of this study’ (Skarstein, 2020: 15)

### **Climate change education in Stavanger and Oslo**

Skarstein’s preliminary analyses formed the backdrop for the research questions for my MA dissertation, which was completed in September 2019 at the Development Education Research Centre in University College London (UCL). I work with environmental issues and global development topics in my professional job, and have done development education (DE) workshops in various parts of Norway. My experience was that the various areas of Norway have different approaches to how international topics such as the are presented at their schools. By example, the question of how to handle biodiversity and the re-introduction of large predators to Norwegian forests – most notably wolves – is seen very differently in schools in farming and sheep raising areas, compared to more urban schools (Erlie, 2001). The wolf-sheep-conflict is a well-known conundrum in Norway, but it points to how the specific situation for local communities is highly important for understanding how schools approach various topics. I am an advocate for high quality education for sustainable development (ESD) and DE, and I see climate change education as an integral part of this. For this reason, I wanted to investigate how regional contexts in Norway might have had an impact on climate change education. To do this, I established a research project oriented towards the

upper secondary level of formal education in Norway. This level was chosen to ensure a high level of academic education among the teachers and respondents. Furthermore, the research project aimed at getting a broader perspective than that of the individual teacher. For this reason, the research project was oriented at interviewing so-called ‘Heads of Department’. This is the intermediate leadership level at Norwegian schools directly responsible for the practitioner teachers, but is also part of the school leadership under the principal. I narrowed my focus to departments for ‘hard’ science subjects, typically maths, physics, chemistry, and biology. An alternative could have been to focus on social science teachers, but I wanted to investigate how the schools relate to the scientific part of climate change education in particular. ESD has historically been located in science subjects with Sinnes and Straume (2017) highlighting how ESD in Norwegian schools is often dependent on personal engagement in a range of schools:

“As shown in the review of Norwegian curricula, there are opportunities (and also requirements) to work with sustainable development in the school, but the lack of formal expectations contributes to the need for a personal commitment to include it in teaching” (Sinnes and Straume 2017, translation by author).

The research project was constructed as semi-structured interviews followed by a comparative analysis. This methodology was chosen as a compromise of options, to be able to fit the project into an MA programme. Early feedback in the research programme was that these respondents have a very hectic workday, and the research method would need to have a low threshold of participation. This meant that the gathering of data could be carried out through direct interviews at the office of each respondent. A simple questionnaire was considered, but I discarded this approach as not suited for gathering the relevant information. I was most interested in the reflections and the open-ended thoughts about how climate change education is done at the individual schools, and the method of semi-structured interviews seemed a better fit for this than a simple questionnaire.

An option could have been to interview students, something that was briefly considered. However, this would have raised new dilemmas of selection process, and a substantial number of respondents would have been needed to gain a clear picture for a comparative analysis. Also, the time constraints given in an MA programme had to be taken to consideration, and this element pointed towards interviewing school staff or teachers, as they could be contacted easily through regular email, and could more easily be trusted to provide consent for the interviews. The strength of interviewing the leaders of departments was that I could gain more clarity of the bigger picture of how schools conduct climate change education, and how the leadership group would react to non-conventional opinions on anthropogenic climate change from teachers. This came at the cost of not getting a direct, first-hand account of how classroom sessions are experienced by the practitioner teacher, which was admittedly a significant limitation for the research project. Yet all respondents had been teachers prior to taking the position as leader of the department, and typically continued to teach some education sessions as cover for absent teachers. The respondents highlighted how this allowed them to maintain the direct relationship with the students at the school to some degree. This fact should at least partly compensate for the limitation of not interviewing the teachers who conduct the classroom sessions; the respondents still maintained some direct contact with the students themselves and participated directly in the joint planning sessions for the school year.

I recruited four respondents in the Stavanger area and four in the Oslo area, the latter being comparatively less exposed to the fossil fuel industry. I chose schools with high intake thresholds for students in their area to find schools where one could reasonably expect a high academic level. Stavanger is not a large city, so the number of possible upper secondary schools was limited. The schools in the two areas had relatively comparable backgrounds, locations and student profiles, and the respondents were two men and two women for each area. The selection was based on recruiting four random respondents in the Stavanger area at relevant schools, and then finding schools with a similar profile in the Oslo area. The recruiting was straightforward, with only one case of a request being turned down due to time constraints.

The research questions were twofold: firstly, to investigate how schools include climate change education in science-based education and if climate change is placed as a central theme in multi-disciplinary projects. Secondly, I wanted to explore how schools handle teachers who are climate change sceptics. On the latter research question, I used an interview guide with several sub-questions. How did the respondent rate him/herself on adherence to anthropogenic climate change, and how would the respondent rate the rest of the teacher collegiate at the school? Were any of the teachers' outspoken sceptics to anthropogenic climate change? Would it be feasible to give a vacant teacher position to a candidate who held sceptical views on climate change, if the person was otherwise suitable for the job? How would the respondent react if a student came forward with a notification of concern about a teacher having taught climate change sceptic content in a classroom session? Although these questions were intended to find differences in handling strategies, they essentially resulted in the same answers from all eight respondents. This was all the more interesting when one of the respondents in the Stavanger area placed herself in absolute defiance to anthropogenic climate change. On a scale from 1 to 5, where 5 was 'totally agree' with current climate change being due to human activities, she placed herself on a 1 – 'totally disagree' with the science of anthropogenic climate change.

The other seven respondents placed themselves at 4 or 5 on this scale. Yet despite this outlier's presence in the sample, all respondents answered much the same on the other questions. All eight estimated their school's teacher collegiate to rate between 4 to 5 on the aforementioned scale. None of the eight would accept blatant denial of anthropogenic climate change in classroom sessions from teachers, but this was uniformly held as highly unlikely to occur. Any notification of concern would be treated seriously and professionally. And if a candidate for a vacant teacher position insisted on flagging strong opposition to human-caused climate change during a job interview, it would not be favourable for the individual's chances of securing the position.

That is not to say that there were no differences at all between the two areas in how climate change education was undertaken, as concerned the first research question. The differences should be seen in light of how the Norwegian tradition for curriculum management leaves much room for individual teachers to make their own plans for how to address the annual ‘learning targets’ throughout the school year (Mausethagen and Mølstad, 2015: 30-32). Also, the teachers have a week of planning before the students start in August, when they set up plans for the year as a group. Most schools will try to establish a multi-disciplinary project each year, where the concept is largely decided locally at each school. ESD is a frequent over-arching label used for these projects, but they vary strongly on topic and concept.

With this frame of reference, it was interesting to note that as a whole, the respondents from Stavanger were less likely to report that their school had included climate change in multi-disciplinary projects, if at all. Among the respondents from Oslo, however, this was reportedly undertaken at all schools, and at a bolder level. Typical to the Stavanger area, two schools had chosen the theme ‘Water Management’ for a large multi-disciplinary project on sustainable development. One of the respondents highlighted how this was a theme that could unify the school as a whole and underscored that ‘water is important too’. While water’s role in sustainable development is indeed important, the municipality did not have a history of troubles with its water management systems. The thematic choice was all the more conspicuous when the school in question was located some few kilometres from the biggest industrial cluster in Norway for fossil fuel extraction. This stands in contrast to Oslo, where all respondents reported that climate change represented either one important element in multi-disciplinary projects, or that the school had selected climate change as the core topic for such projects. Among the Stavanger respondents, none had undertaken a multi-disciplinary project with climate change as the core topic. At most, it had been one of several elements.

This apparent regional difference in how climate change has been included to different degrees in multi-disciplinary topics is an interesting find in itself. A more thorough research project would have to be established to say

something more certain in this regard, but it hardly seems likely that the low prevalence of climate change education in the multi-disciplinary projects was mitigated by a stronger emphasis on climate change education in individual classroom sessions. Climate change education has also been recommended for multi-disciplinary projects rather than piecemeal inclusion in individual classroom sessions (Gkatzos, 2017: 7-12). If anything, it seems to correlate with the overall trend observed in analysing the respondent interviews; climate change education appears to have been given somewhat less emphasis in the schools of the respondents in the Stavanger area, compared to the respondents in the Oslo area, most notably in extra-curricular pedagogical activities.

This is perhaps not so surprising. Schools are dependent on teamwork between teachers, and if one topic causes friction and heated arguments, it is understandable that colleagues select other topics for collaboration (Fullan, 1993; Farber, 1991). However, this is also illustrative of how the regional context has an impact on the practice of climate change education, something that warrants further academic research in other areas of the world.

### **An unexpected finding**

The respondents shared an unexpected finding on a topic I had not included in my interview guide: student preferences for study programmes. Three of the four respondents in Stavanger reported that their school had experienced a clear shift in student preferences, away from the subjects associated with the fossil fuel industry. Here is a typical sequence where this issue came up:

*Respondent:* “If you ask me about where this was ten years ago, it was much more an attitude that students would like to enter the oil industry, they live in Stavanger after all. But now, not many students here think this way, they would rather go into the alternatives to oil. The Sustainable Energy and Environment study program at the Norwegian Technical University, and that kind of study programmes, so they can work with wind power or whatever the alternatives are for the oil industry. That’s kind of where the students are now”.

*Interviewer:* “Is this change away from the oil seen as a positive thing, or is more with regret that they see the need to get out of the oil sector?”

*Respondent:* “No, it is not something they see as very grim at all. They are probably more positive than my generation. I do not have the impression that they are gloomy about this at all. They want to work with contributions to a positive change. It would be great if we could enhance the focus on this at our school. I would love to see that happen”.

A similar response came from two other respondents in Stavanger (the topic did not arise in the interview with the fourth Stavanger respondent). One respondent was even more clear, as this shift in student preference meant that the school had to consider closing down a tailor-made study programme that prepared students for applying to the most prestigious university programmes for ‘oil engineers’ with a strong focus on geological science. This respondent highlighted the same connection between the fall in employment in the oil sector after 2014, and the general trend in society:

*Respondent:* “We see much less interest in geosciences from students today. We were big on geosciences before, but the interest has stopped completely now. I think of that as unfortunate, because we need geologists for things other than the oil industry”.

*[later in interview the same subject came up again]*

*Respondent:* “Many of the youth of today have this attitude of ‘oil should go away’, and then they are not motivated to the same degree by oil-related things, like when we have excursions out to ConocoPhillips for geoscience classes (...), to motivate for a future profession in geology. And we have stories of students who have become geologists in oil companies, who said that the excursions were a factor in them taking an education as geologists. But (..) it has

become more difficult to motivate students with these excursions, as I experience it”.

*Interviewer:* “Why do you think this has changed?”

*Respondent:* “Times are changing and the attitude to the oil industry is different now, and among other things, unemployment among parents [implied: after the fall in oil prices in 2014], this also had an effect... Many just assumed they should do the same as their parents. But if your parents are unemployed, then the link stops there completely. Then the students form the opposite opinion... that they want to go in a different direction in choosing studies and jobs”.

What this shows is that the respondents were detecting a shift in the landscape around them, regardless of their personal opinions. This limited research project did not interview students and can therefore draw no definite conclusions about how students themselves view the different options on further academic studies and career choices. But while the respondents could only speculate on the motivation for the perceived changes in student orientation, the respondents in the Stavanger region arrived at the same opinion: the students seemed increasingly interested in the new fields of renewable energy, at the expense of the traditional fossil fuel sector. This trend has also been supported by articles in the media about how study programmes in higher education, aimed at the fossil fuel sector, have fallen sharply in popularity (Christophersen, 2019; Sagmoen, 2017). What my respondents reported was that the same effect was present at the transition from lower secondary school to upper secondary school as well.

### **Impact of climate change education on transition to upper secondary school**

In Norway, the transition from lower to higher secondary education is a major shift in schools, one that sets the student on track for further career options. Most other European countries have a similar education system, where students go from lower to higher secondary education at around 14-16 years

and are expected to make a choice between vocational training or preparatory studies for higher education (EACEA, 2018: 9). In this transition, the student typically must choose between study programmes or ‘subject packages’, like advanced mathematics, physics, chemistry and biology (UNESCO, 2012: 38). There can also be packages of subjects that are oriented towards specific types of university programmes, as is the case in some of the upper secondary schools in the Stavanger area. Whereas primary schools receive students and pupils that live in the school district, for upper secondary schools the opposite is true – *the students choose the schools*, and schools need students to select them in competition with other schools. Student preferences thus create pressure to deliver the study programmes that answer to these preferences, representing a source of real yet arguably underrated ‘student power’.

In short, what my respondents revealed was that the change in student orientation was forcing their hand in how the school should react. As one of them put it: ‘It doesn’t really matter whether I personally believe in climate change or not – the students do, and that decides the direction for us as a school’. The desire to avoid disagreements and move ahead with a strong emphasis on renewable energy was described with clarity by the respondent who had dismissed any major human influence on the climate, the outlier who had placed herself at a ‘1’ on the aforementioned scale:

*Respondent:* “This with sustainable development and renewable energy is much more than whether or not you believe in man-made global warming. So, a big ‘YES’ to more on [renewable energy in our school]. But exactly this about the ‘question of faith’ on man-made climate change, I do not think this belongs in the school system”.

*Interviewer:* “So if there had been a possibility for this school to [establish] a big educational project on renewable energy, you would be positive?”

*Respondent:* “Yes, absolutely”.

## **Student power**

This shift in student preferences could be viewed as just a natural consequence of the energy industry now turning their focus towards renewable energy and sustainable solutions after pressure from civil society, the science community, and progressive politicians. Such a change, and the likelihood of finding good jobs in the green economy, is likely an influencing factor (Bourn, 2018: 201-219; Mochizuki and Bryan, 2015: 20). In addition, the job market for engineers today is international, and internationally there is a massive demand for renewable energy experts (see, for example, U.S. Bureau of Labor Statistics, 2019). But these factors aside, there is surely another important variable influencing these forces of self-interest; normative effects of value-based climate change education in the students' school years. As can be seen in the earlier two sequences from respondents, the students were reportedly proactively pursuing jobs and careers where they could 'work with contributions to a positive change', understood as contributions towards a more sustainable future. This was highlighted by other respondents as well, also in Oslo where the students had reportedly already formed their opinion on anthropogenic climate change and now wanted to work with delivering solutions for a sustainable society.

This unexpected finding from my research triggers several questions of how change of perspectives happens, about student power and interaction with career choices, and how education is necessarily a process in constant change. I suggest three factors of influence as highly important for the change in student orientation, as described by my respondents. Firstly, it seems plausible that climate change education in the formal school system has been key, as there has been a clear emphasis in the Norwegian curriculum on environmental issues and anthropogenic climate change in particular (Wolla, 2015: 19-21; Hansen, 2010). A second factor is the substantial climate change education efforts through non-formal channels in Norway, in particular towards children and youth. There are several nation-wide environmental organisations for children, with the single largest environmental organisation in Norway being a youth organisation for members 13-25 years old,

predominantly teenagers. Indeed, several of the respondents mentioned how students at their school were active in local chapters at this organisation.

As a third factor, peer influence from friends and classmates might be a strong amplifying force. Peer influence has been demonstrated to be significant in how students make their choices for preference in higher education (see, for example, Brooks, 2004: 101), and it seems reasonable to think that this is transferable to the earlier step from lower to upper secondary education. If anything, the peer influence seems likely to be much stronger at this level, as the overwhelming majority of students will typically remain in much the same social groups from lower secondary schools when starting at the upper secondary schools. In the picture of student peer influence and collective norm formation, the recent student climate strike movement seems quite significant.

### **Student climate strike and peer influence**

The degree to which the student climate strikes will influence our world leaders and national politicians remains to be seen, but there can be little doubt that it will influence the attitude of a generation of students. Mobilisation for the large demonstrations was done predominantly through peer networks (Wahlström et al, 2019: 18). My respondents claimed a significant number of students had participated on the first climate strike in Norway on 22 March 2019, and for the schools located in the city centres of both Oslo and Stavanger, it had been an overwhelming majority. At present, little academic research has been published on the student climate strikes, but it is likely that these strikes will increase the peer pressure among today's youth for educations and careers in renewable energy and sustainable solutions, with an adverse effect on fossil fuels. The respondents from the Stavanger area did not dwell on which factors behind the perceived change in student orientation might be the most significant. Rather, they seem to have regarded the various factors as cumulative and mutually enhancing. The student climate strike was seen as amplifying an already ongoing process. In this perspective, climate change education, both through formal schooling and through the non-formal channels of student activism, can be seen as part of the same macro-trend.

For the respondents, this was also a concern for the future of their schools. The upper secondary schools who succeed in establishing student programmes preparing for higher education in the direction of renewable energy and sustainable solutions will stand to gain students and growth in classes. This ‘market mechanism’ for free choice of upper secondary schools greatly empowers the student, a fact that has been given little emphasis in current academic literature. In general, there seems to be much attention in climate change education and development education towards small, incremental life choices as consumers, such as eating less meat, limiting energy consumption, or mending clothes instead of buying new when possible (Waldron et al., 2019). But perhaps the most significant choice for any school student is which schools and study programmes they will pursue in the jump from lower to upper secondary school, and if/when continuing to advanced studies.

The respondents in Stavanger had one clear message: climate change education has already made an impact on how students choose to engage with the world and on which career pathways they wish to follow. More thorough research into which factors of influence have the biggest impact on student school and study programmes would be interesting, but it seems fair to say that climate change education in Norway has probably contributed to young people wanting to join forces with those who are working to mitigate climate change, as evidenced in their school applications. This is perhaps most salient in higher education, where applications for petroleum-related studies have fallen dramatically (Mortvedt, 2017), but the response from the respondents in the Stavanger area indicates the same effect for upper secondary schools, too.

This points to a need for expanding our understanding of climate change education, and by extension, development education as well. We must understand that pupils and students are at the start of their lives and will make decisions on which direction to go with their life choices. Climate change education, and by extension development education, influence the moral compass that students use in orienting themselves for the future. This resonates clearly with the notion of 21st century skills (Bourn, 2018).

Sustainable solutions must not only be seen as necessary; the next generation of professionals are evidently also motivated in delivering them. This is also reflected in the earlier sequence with the respondent, where the students were reportedly not ‘grim and gloomy’ about careers working with solutions for a sustainable future, but instead actively wanted to find jobs ‘that contribute to a positive change’.

### **Conscious consumers, active citizens and career choices**

At its core, this is to understand that students are not primarily consumers, but active citizens who seek to equip themselves with the tools they see fit for contributing constructively for a better and more sustainable world – for some, also when it comes to professional career choices. These individuals expect the education system to provide accordingly and have the power of free choice to select schools that meet their demands. The respondents in my research project had detected this as a shift in student preference for study programmes directed towards renewable energy. Even though the respondents highlight several factors, from the economic shock after the oil price collapse in 2014, to peer influence from the ongoing student climate strikes, the general trend of a transition towards renewable energy solutions was not to be mistaken, and the school leaders now faced the challenge of delivering a credible response.

For the climate change education practitioner, this opens new pathways of pedagogy as well as new challenges. Not all students will become engineers, let alone enter the renewable energy sector. Yet there are other educations and study programmes that will be needed for a sustainable future, and sustainable solutions are not just black or white. For example, the estimates by the United Nations Intergovernmental Panel on Climate Change (IPCC) for limiting global warming to 1.5 °C rest heavily on the technology of carbon capture and storage, which currently only the fossil fuel sector can deliver on an industrial scale (Allen et al, 2018: 14). There is also the tension between the techno-optimist approach, that claims we can save the future by new technology and clever engineering, and the opposite analysis that argues our only path to sustainability is to downscale consumption of raw materials and

energy use (Barry, 2016: 6). Students must learn to reflect on these narratives and form their own opinions.

For students and teachers alike, this is difficult and unfamiliar terrain to navigate, but not without positive elements. As long as schools and educators provide a conducive learning environment that enables the students to educate themselves for the challenges of the future, the students themselves are probably in the best position to find a way forward. The kids are still all right.

## References

Allen, M.R, Dube, O P, Solecki, W, Aragón-Durand, F, Cramer, W, Humphreys, S, Kainuma, M, Kala, J, Mahowald, N, Mulugetta, Y, Perez, R, Wairiu, M, and Zickfeld, K (2018) ‘Framing and Context. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty’, in V Masson-Delmotte, P. Zhai, H O Pörtner, D Roberts, J Skea, P R Shukla, A Pirani, W Moufouma-Okia, C Péan, R Pidcock, S Connors, J B R Matthews, Y Chen, X Zhou, M I Gomis, E Lonnoy, T Maycock, M Tignor, and T Waterfield (eds). Geneva: In Press available: [https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15\\_Chapter1\\_Low\\_Res.pdf](https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_Chapter1_Low_Res.pdf) (accessed 9 December 2019).

Andersen, I (2015) ‘Nå blir det lettere for ingeniører å ta lærerutdannelse’ (Translated: Now it becomes easier for engineers to take teacher training), *Teknisk Ukeblad*, 19 November, available: <https://www.tu.no/artikler/na-bli-det-lettere-for-ingeniorer-a-ta-laererutdannelse/276009> (accessed 20 December 2019).

Barry, J (2016) ‘Bio-fuelling the Hummer? Transdisciplinary thoughts on techno-optimism and innovation in the transition from unsustainability’, *Transdisciplinary perspectives on transitions to sustainability*, by Byrne, E, Mullally, G. and Sage, C. (eds), London: Routledge, pp. 106-123, available: <https://pdfs.semanticscholar.org/6947/40d65e371da87078caeedef5e9ba42eee118.pdf?ga=2.34449761.1102691079.1582318276-545179010.1582318276> (accessed 15 February 2020).

Bourn, D (2015) 'The Theory and Practice of Global Learning', *DERC Research Paper No. 11*, London: IOE, UCL, available: <http://discovery.ucl.ac.uk/1492723/> (accessed 24 June 2019).

Bourn, D (2018) *Understanding Global Skills for 21st Century Professions*, Basingstoke: Palgrave Macmillan, available: [https://ucl-new-primo.hosted.exlibrisgroup.com/permalink/f/1klfcc3/TN\\_pq\\_ebook\\_centralEBC5567627](https://ucl-new-primo.hosted.exlibrisgroup.com/permalink/f/1klfcc3/TN_pq_ebook_centralEBC5567627) (accessed: 24 June 2019).

Brooks, R (2004) *Friendship and Educational Choice: Peer Influence and Planning for the Future*, Basingstoke: Palgrave Macmillan.

Christophersen, R (2019) 'UiB legger ned petroleumfag' (Translated: University of Bergen terminates petroleum studies) *Sysla*, 26 November, available: <https://sysla.no/offshore/a/LAQ4lp/uib-legger-ned-petroleumfag> (accessed 15 February 2020).

Cook, J, Oreskes, N, Doran, P T, Anderegg, W R, Verheggen, B, Maibach, E W and Nuccitelli, D (2016) 'Consensus on consensus: a synthesis of consensus estimates on human-caused global warming', *Environmental Research Letters*, Vol. 11, available: <https://iopscience.iop.org/article/10.1088/1748-9326/11/4/048002/pdf> (accessed 20 June 2019).

Dunlap, R (2013) 'Climate Change Skepticism and Denial: An Introduction', *American Behavioral Scientist*, Vol. 57, No. 6, available: [https://www.researchgate.net/publication/274306932\\_Climate\\_Change\\_Skepticism\\_and\\_Denial\\_An\\_Introduction](https://www.researchgate.net/publication/274306932_Climate_Change_Skepticism_and_Denial_An_Introduction) (accessed 10 March 2020).

EACEA/European Commission/Eurydice (2018) 'The Structure of the European Education Systems 2018/19: Schematic Diagrams. Eurydice Facts and Figures', Luxembourg: Publications Office of the European Union, available: [https://eacea.ec.europa.eu/national-policies/eurydice/sites/eurydice/files/the\\_structure\\_of\\_the\\_european\\_education\\_systems\\_2018\\_19.pdf](https://eacea.ec.europa.eu/national-policies/eurydice/sites/eurydice/files/the_structure_of_the_european_education_systems_2018_19.pdf) (accessed 15 February 2020).

Erlien, W. (2001) 'Ulv i Norge-Internettbasert biologiundervisning med fokus på en kontrovers' (Translated: Wolves in Norway-Internet-based biology teaching focusing

on a controversy) Master Thesis, Norwegian University of Science and Technology, Naturfagsenteret, web publication, available: <https://www.naturfagsenteret.no/binfil/download2.php?tid=1545983> (accessed 10 March 2020)

Farber, B (1991) *Crisis in education: Stress and burnout in the American teacher*, San Francisco, CA: Jossey Bass Publishers.

Flora, J, Saphir, M, Lappå M, Roser-Renouf, C, Maibach, E and Leiserowitz, A (2014) 'Evaluation of a national high school entertainment education program: The Alliance for Climate Education', *Climatic Change*, Vol. 127, No. 3, pp. 419-34, available: <https://link.springer.com/content/pdf/10.1007%2Fs10584-014-1274-1.pdf> (accessed 9 December 2019).

Fullan, M G (1993) 'Why Teachers Must Become Change Agents', *Educational Leadership*, Vol. 50, No. 6, available: <https://pdfs.semanticscholar.org/f564/79b5eaf7befc64b9af74b8ed870444fb515a.pdf> (accessed 14 August 2019).

Gkatzos, D (2017) 'Teaching children's rights and climate change with the support of Act for Climate web-based learning environment', *UNESCO Prospects: comparative journal of curriculum, learning and assessment*, XLVII(47), Vol. 1-2, No. 180, pp. 133-147, available: <https://unesdoc.unesco.org/ark:/48223/pf0000264571> (accessed 16 December 2019).

Guilyardi, E., Lescarmonier, L., Matthews, R., Point, S. P., Rumjaun, A. B., Schlüpmann, J., & Wilgenbus, D. (2018). 'Global Warming of 1.5°C: Summary for teachers', *IPCC Special Report*, available: [https://refubium.fu-berlin.de/bitstream/handle/fub188/25436/Guilyardi\\_IPCC\\_2018.pdf?sequence=1](https://refubium.fu-berlin.de/bitstream/handle/fub188/25436/Guilyardi_IPCC_2018.pdf?sequence=1) (accessed 12 March 2020)

Hansen, P J K (2010) 'Knowledge about the Greenhouse Effect and the Effects of the Ozone Layer among Norwegian Pupils Finishing Compulsory Education in 1989, 1993, and 2005—What Now?', *International Journal of Science Education*, Vol. 32, No. 3, pp. 397-419, available: <https://www.tandfonline.com/doi/abs/10.1080/09500690802600787> (accessed 20 February 2020).

Hvinden, E C and Nordbø E W (2016) 'The fall in oil prices and the labour market', *Norges Bank Economic Commentaries* No. 7, available: [https://static.norges-bank.no/contentassets/d469bee4f3d94903bb5179df62e55a8d/economic\\_commentaries\\_7\\_2016.pdf?v=03/09/2017123501&ft=.pdf](https://static.norges-bank.no/contentassets/d469bee4f3d94903bb5179df62e55a8d/economic_commentaries_7_2016.pdf?v=03/09/2017123501&ft=.pdf) (accessed 17 June 2019).

IPCC (2014) 'Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change' [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)], Geneva, Switzerland: IPCC, available: [https://www.ipcc.ch/site/assets/uploads/2018/02/SYR\\_AR5\\_FINAL\\_full.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf) (accessed 9 December 2019).

IPCC (2018) 'Summary for Policymakers' in V Masson-Delmotte, P. Zhai, H.-O. Pörtner, D Roberts, J Skea, P R Shukla, A Pirani, W Moufouma-Okia, C Péan, R Pidcock, S Connors, J B R Matthews, Y Chen, X Zhou, M I Gomis, E Lonnoy, T Maycock, M Tignor, and T Waterfield (eds.) *Global Warming of 1.5°C*, Geneva: IPCC, available: [https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15\\_Summary\\_Volume\\_Low\\_Res.pdf](https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Summary_Volume_Low_Res.pdf) (accessed 10 February 2020).

Jackson, L, Birney, A, Edwards, D, Gayford, C, Mehta, P, Morgan, A, Reed, J and Riley, K (2007) 'Leading sustainable schools: What the research tells us', Nottingham: National College for School Leadership, available: [http://www.arcworld.org/downloads/14669\\_lead\\_sus\\_school%20\(2\).pdf](http://www.arcworld.org/downloads/14669_lead_sus_school%20(2).pdf) (accessed 8 July 2019).

Jylhä, K. M. (2017) 'Denial Versus Reality of Climate Change' in D DellaSala and M Goldstein (eds.) *Encyclopedia of the Anthropocene*, Vol. 2, pp. 487-492, available: [https://www.researchgate.net/profile/Kirsti\\_Jylhae2/publication/311915469\\_Denial\\_Versus\\_Reality\\_of\\_Climate\\_Change/links/5bb891a692851c7fde2f99e3/Denial-Versus-Reality-of-Climate-Change.pdf](https://www.researchgate.net/profile/Kirsti_Jylhae2/publication/311915469_Denial_Versus_Reality_of_Climate_Change/links/5bb891a692851c7fde2f99e3/Denial-Versus-Reality-of-Climate-Change.pdf) (accessed 10 March 2020).

Mausethagen, S and Mølstad, C E (2015) 'Shifts in Curriculum Control: Contesting Ideas of Teacher Autonomy', *Nordic Journal of Studies in Educational Policy*, Vol. 2015, No. 2, pp. 30-41, available: <https://www.tandfonline.com/doi/full/10.3402/nstep.v1.28520> (accessed 15 February 2020).

Mochizuki, Y & Bryan, A (2015) 'Climate change education in the context of education for sustainable development: Rationale and principles', *Journal of Education for Sustainable Development*, Vol. 9, No. 1, pp. 4-26, available: <https://journals.sagepub.com/doi/abs/10.1177/0973408215569109> (9 December 2019).

Mortvedt, F T (2017) 'Stadig færre søker oljeutdanning' (Translated: Still fewer are seeking oil education), *E24*, 20 July, available: <https://e24.no/energi/i/8wdLLE/stadig-faerre-soeker-oljeutdanning> (accessed 20 December 2019).

Opsvik, A H (2018) 'Dette mener nordmenn om oljeutvinning i Lofoten og Vesterålen' (Translated: The opinions of Norwegians on oil extraction in Lofoten and Vesterålen), Press release, *Norwegian Citizen Panel, University of Bergen*, 25 January, available: <https://www.uib.no/klimaenergi/114382/dette-mener-nordmenn-om-oljeutvinning-i-lofoten-og-vester%C3%A5len> (accessed 15 February 2020).

Sagmoen, I (2017) 'Stopp i fagskoleutdanning og fortsatt lave søkertall til petroleumsfag: Bransjen bekymret for mangel på folk' (Translated: Stopp in higher education and continued low numbers of applicants for petroleum studies: Sector worried about lack of labour), *E24*, 20 May, available: <https://e24.no/energi/i/oRgy2j/stopp-i-fagskoleutdanning-og-fortsatt-lave-soekertall-til-petroleumsfag-bransjen-bekymret-for-mangel-paa-folk> (accessed 15 February 2020).

Sinnes, A T and Straume, I (2017) 'Bærekraftig utvikling, tverrfaglighet og dybdelæring: fra big ideas til store spørsmål' (Translated: Sustainable development, inter-disciplinarity and in-depth learning: from big ideas to store questions) *UiO/NMBU Acta didactica Norge - tidsskrift for fagdidaktisk forsknings-og utviklingsarbeid i Norge*, Vol. 11, No. 3, available: <http://urn.nb.no/URN:NBN:no-61353> (accessed 10 March 2020).

Skarstein, F (2020) 'Climate beliefs in an oil-dependent economy: Norwegian pre-service science teachers' attitudes towards climate change', *Environmental Education Research*, available: <https://www.tandfonline.com/doi/full/10.1080/13504622.2020.1728233> (accessed 27 February 2020).

UNESCO (2010) 'Climate Change Education for Sustainable Development', Paris: UNESCO, available: <https://unesdoc.unesco.org/ark:/48223/pf0000190101> (accessed 20 December 2019).

UNESCO Institute for Statistics (2012) 'International standard classification of education: ISCED 2011', Montreal: UNESCO Institute for Statistics, available: <http://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-isced-2011-en.pdf> (accessed 15 February 2020).

US Bureau of Labor Statistics (2019) 'Fastest growing occupations: 20 occupations with the highest percent change of employment between 2018-28', *Official web page of U.S. Bureau of Labor Statistics*, available: <https://www.bls.gov/ooh/fastest-growing.htm> (accessed 2 February 2020).

Uscinski, J E, Douglas, K and Lewandowsky, S (2017) 'Climate Change Conspiracy Theories, Climate Science', *Oxford Research Encyclopaedia*, available: <https://oxfordre.com/climatescience/view/10.1093/acrefore/9780190228620.001.0001/acrefore-9780190228620-e-328?print=pdf> (accessed 17 June 2019).

Wahlström, M, Kocyba, P, Vydt, M and Moor, J (eds.) (2019) 'Protest for a future: Composition, mobilization and motives of the participants in Fridays For Future climate protests on 15 March 2019 in 13 European cities', available: [https://www.researchgate.net/publication/334745801\\_Protest\\_for\\_a\\_future\\_Composition\\_mobilization\\_and\\_motives\\_of\\_the\\_participants\\_in\\_Fridays\\_For\\_Future\\_climate\\_protests\\_on\\_15\\_March\\_2019\\_in\\_13\\_European\\_cities](https://www.researchgate.net/publication/334745801_Protest_for_a_future_Composition_mobilization_and_motives_of_the_participants_in_Fridays_For_Future_climate_protests_on_15_March_2019_in_13_European_cities) (accessed 15 February 2020).

Waldron, F, Ruane, B, Oberman, R and Morris, S (2019) 'Geographical process or global injustice? Contrasting educational perspectives on climate change', *Environmental Education Research*, Vol 25, No. 6, pp. 895-911, available: <https://www.tandfonline.com/doi/full/10.1080/13504622.2016.1255876> (accessed 15 February 2020)

Wolla, I A (2015) 'Utdanning for bærekraftig utvikling i norsk skole-En todelt kvantitativ undersøkelse om ungdomsskoleelever og deres naturfaglærere', *Master's thesis, Høgskolen i Oslo og Akershus*, available: <https://oda-hioa.archive.knowledgearc.net/bitstream/handle/10642/2755/Wolla.pdf?sequence=2&isAllowed=y> (accessed 12 February 2020).

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