Listening to youth: how to close the knowledge–action gap in climate change education

Smriti Safaya and the Climate Change Education and Activism Research Team

Abstract Students are knowledgeable and rightfully concerned about how climate change affects them, yet few take consistent mitigating action. While 'knowing more' can help one 'do more', there are many barriers to activism that will not be addressed purely by increased climate change awareness. A diverse research team of school and university students, teachers and a PhD researcher-teacher investigated the appetite for climate change activism in Hong Kong schools to identify opportunities for addressing that knowledge–action gap. Propelled by student and teacher reflections, this article offers tangible suggestions for actions schools can take to authentically champion youth climate agency.

Youth demands in climate change movements like 'Fridays for Future' are clear, informed and loud; however, that volume has yet to effectively reach those with great influence to make positive pro-environmental impacts (Boyland *et al.*, 2021). With IPCC's 6th report highlighting greater certainty of anthropogenic drivers for climate change, the urgency to mitigate the impacts calls for a focus on youth activism, and how communities amplify young voices. While schools are the primary source of learning about the topic, there is a void about how to promote action as youth are no longer just looking for more information on the 'what' and 'why' of climate change (Scott, 2021).

A Hong Kong (HK) study considering youth views about climate change education (CCE) suggests the city's secondary school students have slightly more environmental awareness than some of their global counterparts (Jackson and Pang, 2017). Most local school students having taken liberal studies, a compulsory course with 12 hours of direct instruction on climate change, reported increased understanding of the topic, but only half of them demonstrated any pro-environmental behavioural change (Zhu *et al.*, 2014).

This knowledge–action gap calls for further exploration of the obstacles and opportunities for effective learning about climate activism, and not just about climate change. This participatory action research (PAR) makes a unique contribution to the CCE conversation, as youth and practitioner voices are front and centre in designing the study, conducting peer-led interviews, and analysing and reporting key implications for educators locally and globally.

Methodology

With the goal to learn from those who directly engage with climate change education (i.e. teachers and students), a PAR approach was key to dissolving researcher hierarchies, giving students voice and co-creating knowledge (Jacobs, 2016). This mixed-methods study was conducted by a core research team (CRT), comprised of three local and international school science teachers, two undergraduates, a PhD researcher-teacher, and a student research team (SRT), composed of 12 secondary school students (15–18 years old) from one local and one international school in HK. With the PAR approach, the SRT began as study participants and then trained as peer-interview facilitators, coders and co-authors. In total, there were 35 students (15–18 years old) and nine science and geography teachers across four schools, who chose to participate in this study based on personal interest in CCE. Though they only represent a minority across HK schools who engage more readily in climate change education issues, having their views provides insight into how to support those already intrinsically motivated to do so.

All participants completed a survey and a semi-structured interview, with some common questions between student and teacher versions to assess their unique impressions of climate change education and activism.

Fourteen online interviews (11 group and 3 individual) were conducted using *Zoom*, with two additional interviews completed as written responses. An example interview question for teachers is, '*How equipped do you feel to incorporate climate change education into your curriculum (consider factors such as available resources at your disposal, your expertise, administrative support, flexibility in your curriculum, time, etc.)*?' An example question for students is, '*Considering all the ways you learn about climate change issues in school (clubs, classes, etc.) and outside of school (for example from family, friends, social media, news, NGOs, etc.), which do you feel is the most effective in encouraging you to engage in activism and why?*'

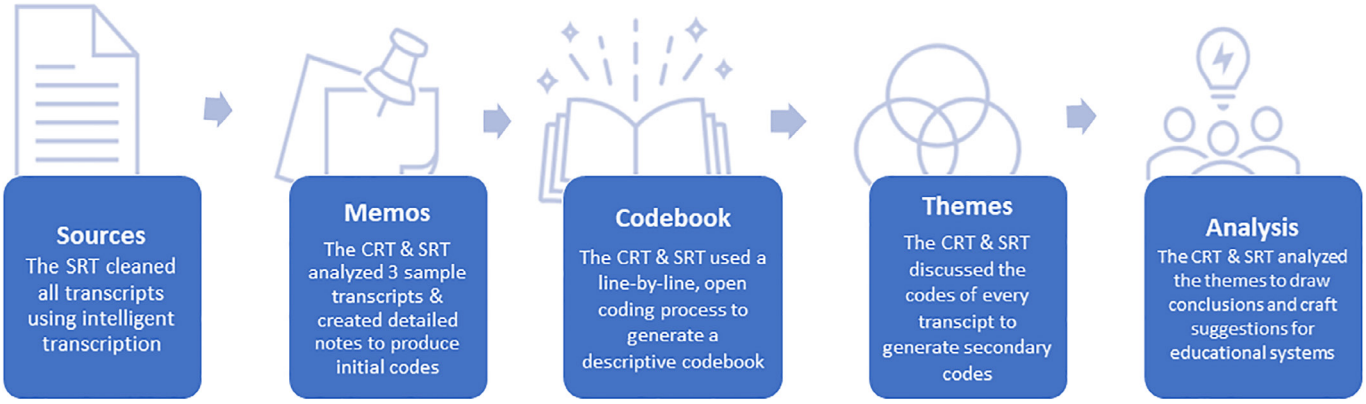

Figure 1 The qualitative analysis work flow with members of the core research team (CRT) and the student research team (SRT)

Research team discussions about coded findings and potential themes were held over multiple *Zoom* calls, where the emphasis was on discerning student and teacher views and practical pedagogical implications (Figure 1).

Findings

Voices from surveys

A school's role: knowledge about climate change education (CCE) and activism

One-third of students and 56% of teachers consider climate change as the most important issue among social, political, economic and other environmental issues. Promoting climate activism in schools was stated by 98% of the participants as either 'important' or 'very important', which reveals expectations of the weighty role schools play in CCE. Even though schools rank third after news (first) and social media (second) in terms of sources to learn about CCE, about three-quarters of the students have 'some' or 'frequent' exposure to climate change through classes and/or extracurricular activities (Figure 2). What is apparent is the noticeable 'limited' and 'none' exposure levels to CCE among peers and family. This points to opportunities for embedding CCE in social ways that permeate the whole school community. There is a similar deficit of exposure to government-led initiatives, which suggests a need for more effective publicity campaigns.

Encouragingly, 74% of students and 89% of teachers consider themselves 'knowledgeable' or 'very knowledgeable' about climate change issues. Among the various subjects taught at school, sciences, humanities and liberal studies (only offered in local schools) are commonly where students learn about climate change and the actions they can take to address its effects (Figure 3). However, students and teachers alike feel learning about climate action is always secondary to content knowledge. Exposure to CCE also depends on course combinations during the student's secondary school life, which spotlights the potential imbalance of learning experiences. For an issue of such importance, climate change and activism education needs to become a multidisciplinary part of students' learning journey.

Direct and indirect activism

Fisher and Nasrin's (2021) definitions for 'direct' and 'indirect' activism shift the focus towards outcomes rather than process. Direct activism comprises actions to reduce one's own carbon footprint. Indirect activism aims to affect policy and practice of organisations and governments by reducing collective carbon footprints.

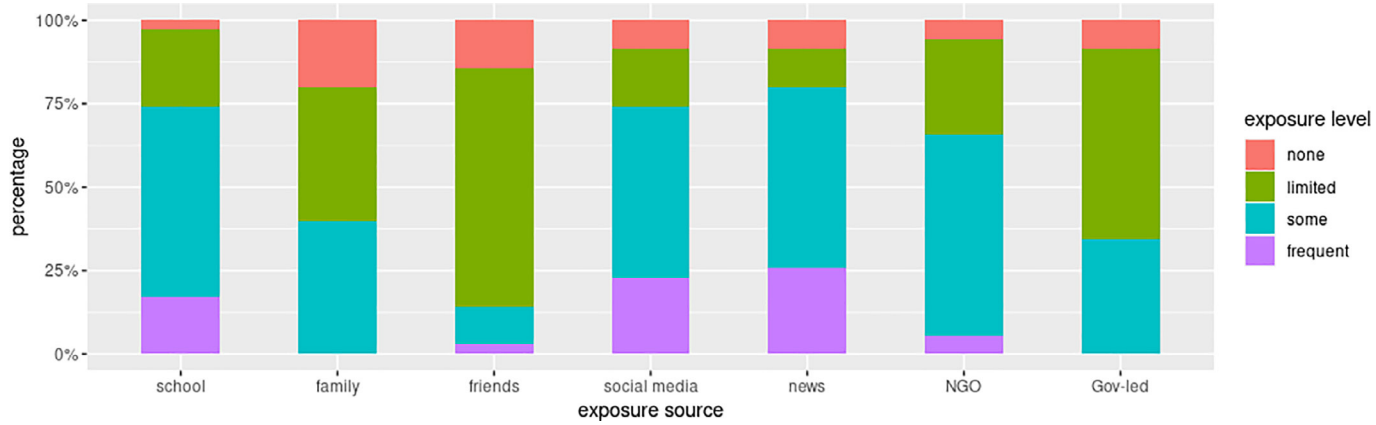

Figure 2 Student levels of exposure to learning about climate change through different sources in and outside of school

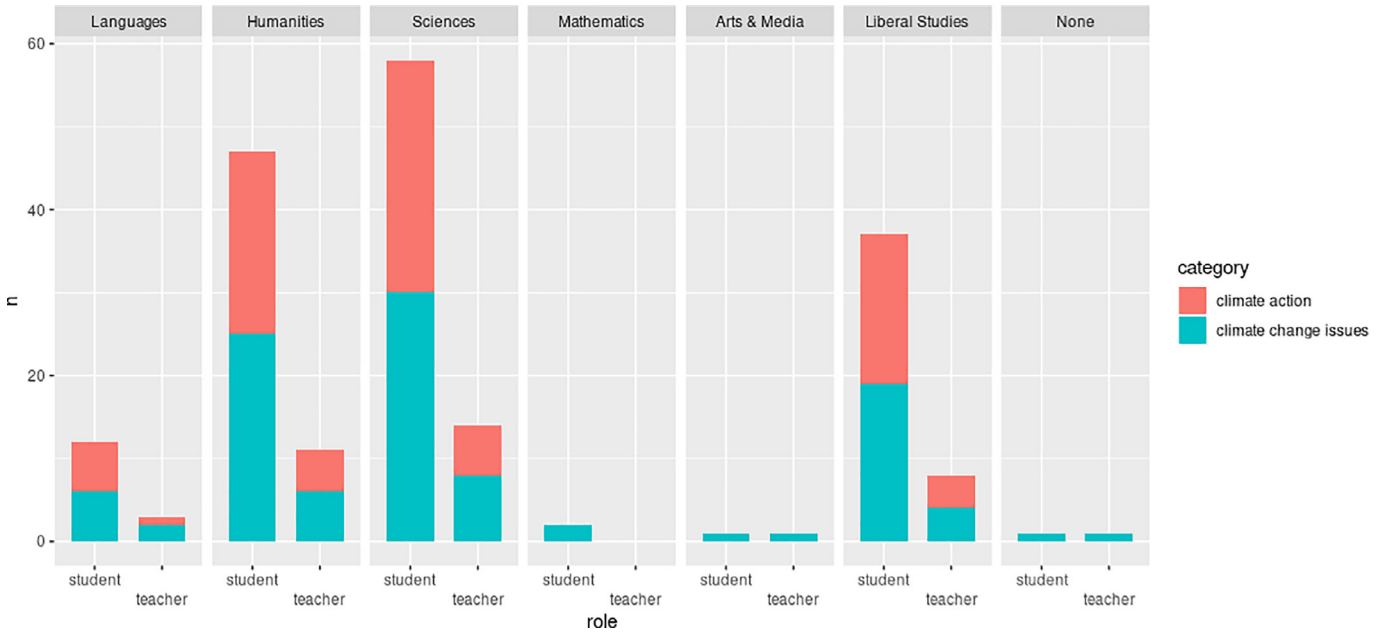

Figure 3 School subjects where students learn about climate change issues and climate action

There is little difference in student and teacher perceptions about which specific actions constitute climate activism (Figure 4). Of actions categorised as direct activism, most students and teachers consistently perceive building one's own climate change knowledge, recycling waste and carrying reusable cutlery as climate activism, whereas doing climate outreach and saying 'no' to plastic straws are seen by fewer participants as forms of climate activism. Within indirect activism, doing climate change-related research is commonly perceived as activism whereas organising petitions is less so. Though there are some differences in levels of perception, the majority of participants consider a variety of activities as examples of climate activism.

While direct and indirect activism examples are similarly perceived as activism, both students and teachers participate significantly more frequently in direct activism (Figure 5). A quarter of students and 11% of teachers never perform any indirect activism, whereas all participants have performed at least one form of direct climate action, with saying 'no' to plastic straws and recycling household waste being the most frequent. Teachers generally reported they practise vegetarian habits, bring reusables, build their knowledge of climate change issues, talk to others about climate change and sign climate-related petitions. In contrast, students reported they participate slightly more frequently in climate-related protests, volunteer with climate-related organisations and conduct climate research. Interestingly, none of the teachers surveyed participate in protests, a controversial topic that will be discussed further in the qualitative findings.

Knowledge–action gap

Though it seems more climate knowledge correlates with more climate activism (Figure 6), the difference between knowledge levels is not statistically significant for either direct or indirect activism, with p-values of 0.087 and

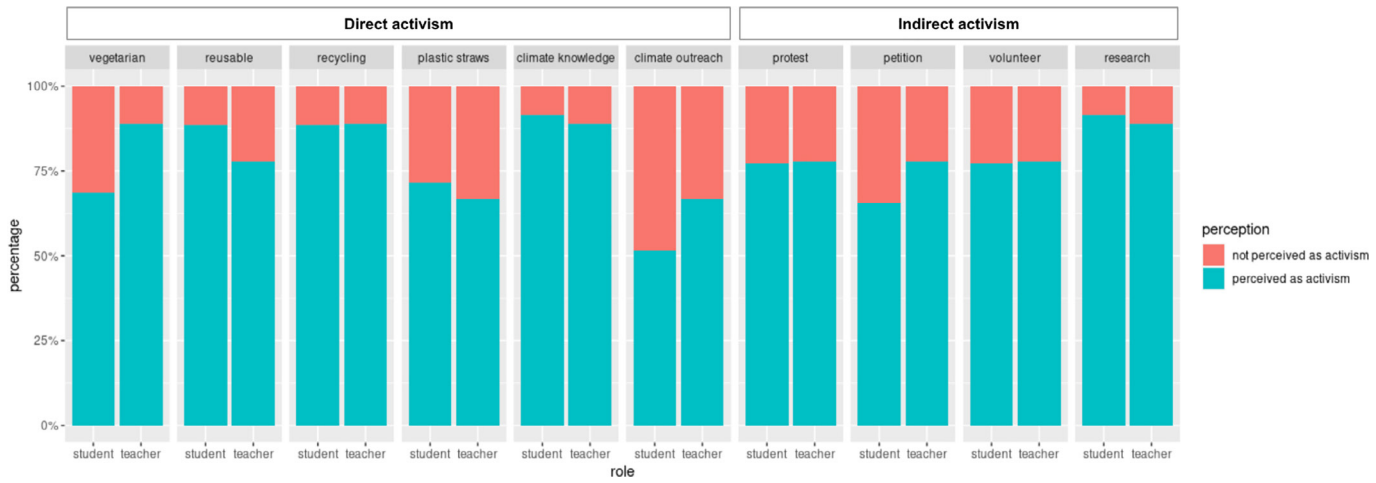

Figure 4 Comparison of student and teacher perspectives of actions that are perceived as activism or not, categorised using the direct and indirect activism definitions by Fisher and Nasrin (2021)

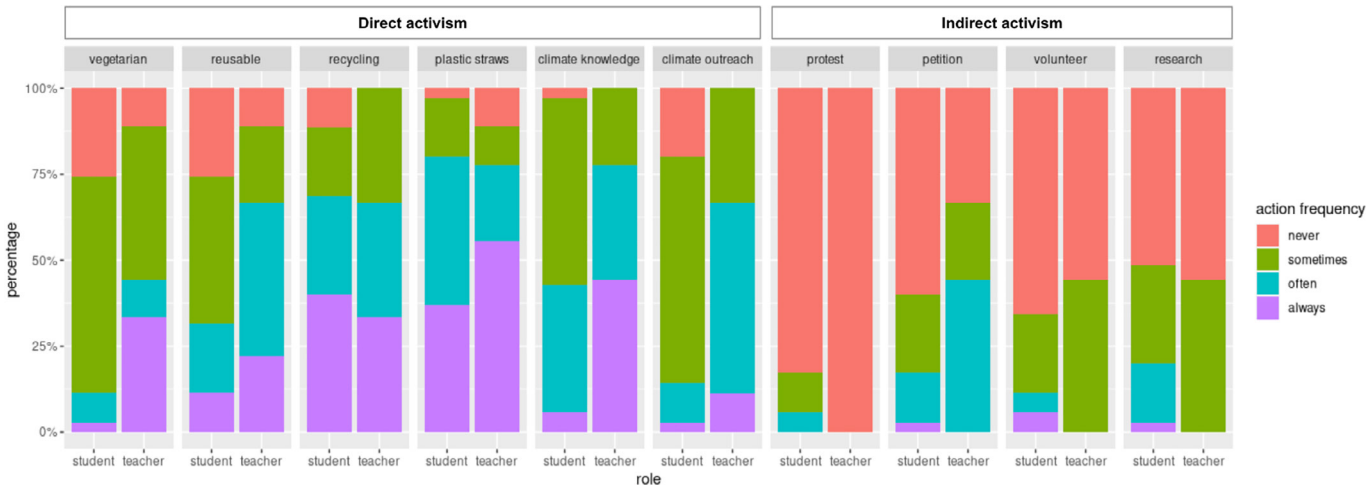

Figure 5 Frequency of specific actions performed by students and teachers, grouped by direct and indirect activism

0.51 respectively. The impact of this gap is discussed in greater depth later in this article in relation to interview responses.

Climate activism seems to positively correlate with exposure as students who learn about climate change issues from a variety of sources tend to engage in more climate activism. This links to students during interviews expressing having ample knowledge but lacking the information about how to apply that knowledge in the form of action. This relationship is very weak, however, with R^2 values of 0.11 and 0.14 respectively (see Figure 7). Still, these findings reinforce that overall CCE efforts are leading to greater youth engagement in climate activism, though it can be enhanced.

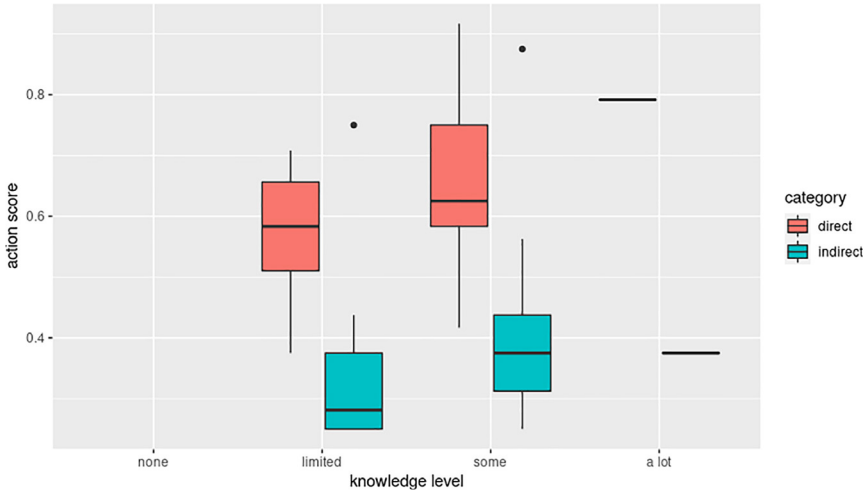

Figure 6 Box and whisker plot showing the median, interquartile range IQR and 1.5 × IQR extensions of action score against level of climate knowledge; action score is calculated by adding up and normalising the tally on the frequency Likert scale of direct and indirect activism by student and teacher participants

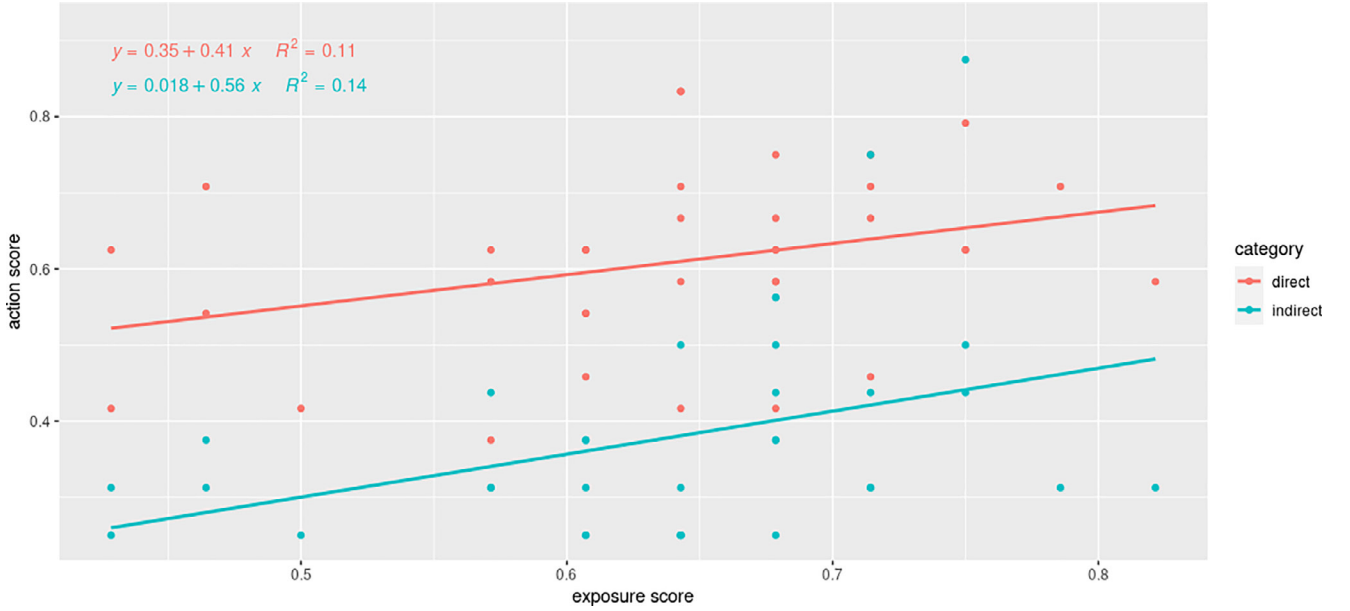

Figure 7 Scatter plot fitted with linear regression equation illustrating the distribution of action score against exposure score; action score is calculated by adding up and normalising the tally on the Likert scale from 1 to 4 within direct and indirect activism by participants; exposure score is calculated by adding up and normalising the tally on the Likert scale across all exposure sources by participants

Voices from interviews

Gaps in agency and power

Though schools provide CCE opportunities in traditional settings like science and geography classes, students generally feel they merely have surface-level exposure with limited hands-on experiences in climate activism to apply greater agency. This is especially the case for older secondary school students, who have significant academic pressures to focus on content learning. Teachers sympathise with their students' busy schedules and try to incorporate activities into their classes, but most find it difficult as some courses are inherently unrelated to the topic. They too have pressures to '*stay mainly focused on teaching the curriculum, teaching the syllabus*'. When teachers can embed CCE in their subjects, it is often with data that, as one teacher suggests,

> *… encourages student activism in climate change because the more they understand and the more they know, I think they will be more convinced that climate change is real and more pressing than ever. Therefore, they will try and do something about it.*

Yet, there is a disconnect with the reality of how students feel, with many voicing that, '*we obviously know this is an important issue that we have to take care of. But we don't really know what we can do, except for recycling and basic stuff … What else can we do?*' The jump from knowledge to pro-environmental action is often assumed (with all good intentions), but is not necessarily linear (Barr, 2006). A consequence of limited experience with various forms of tangible climate activism is the lack of enthusiasm among peers, which perpetuates the mindset '*we're still students … we don't have much impact on the world*'. Moreover, the feeling of not being able to create meaningful change due to their young age, the sense that society snubs students' voices and the ineffectuality of going up against large 'untouchable' companies are additional obstacles. As students possess knowledge about climate change issues but have significantly less experience with addressing them, this knowledge–action gap is the pivotal barrier to tackle in CCE.

Climate activism: challenges, possibilities and influences

Both students and teachers linked climate activism with showing a deep interest in the issues and actively taking tangible actions to address them, such as joining beach clean-ups or recycling. Some participants, especially the teachers, recognised that activism can have negative connotations and socio-cultural norms may conflict with some forms of action, like protests. An international school teacher noted the lack of a direct translation for 'activism' in Chinese, with part of the Chinese characters for the term meaning 'radicalism'. This notion was shared by a local school teacher who equated activism with extreme measures that disrupt society, stating such actions would '*violate the importance of being harmonious in Chinese culture*'.

Doing beach clean-ups, increasing one's own knowledge about climate actions and recycling are common ways for students to partake in direct activism because they are easier to do on one's own. However, the momentum to continue such action depends on who else joins the movement. As one student shared, '*when even my friends don't feel like helping, I just think of giving up. If I can't convince my friends, then how can I convince anyone else?*'

While teachers consider educating students as their major contribution towards direct activism, some share the same concerns about impact, suggesting humans '*can make changes, but they are too minor*'. Despite the uncertainty, many teachers engage in indirect activism to convince their schools to be more environmentally friendly, sign petitions and boycott companies with poor environmental records. These actions are examples of what students find inspirational. Guidance from such role models is particularly influential for local students who are familiar with Chinese cultural norms about modelling desired behaviour rather than simply talking about it in class. While social media is one of the most important sources for CCE (Figure 2), students explicitly desire increased conversation and action supported by trusted adults like their teachers and family members. Additionally, gaining a sense of urgency and responsibility to preserve the environment, witnessing the impact of one's actions, being buoyed by one's peers, and receiving curriculum credit (for example, community service/service as action) when participating in climate activism, all motivate students to act. As one science teacher shares, '*I want them to be thinking beyond the curriculum and actually thinking about what we can do about climate change*'.

Implications for schools

Making climate change education a more relevant part of young people's lives through interdisciplinary school experiences (Reid, 2019) and having schools provide opportunities for greater student involvement in decision-making (Dunlop *et al.*, 2020) are some consistent messages being presented in environmental education literature. With participant quotes as triggers, the following are this research team's suggestions on how to put these ideas into practice.

'It has just been repeated over and over again, and it's getting boring'

Schools need to offer more experiential education approaches when teaching about climate change processes

and effects. This not only has potential to impact student learning but can develop their pro-environmental values. Across the sciences, students are asking for more field trips and hands-on research projects that connect teaching content to local environmental issues. Despite good intentions, a lecture is often received as a dull way to capture youth attention, as it is '*more like spoon feeding, instead of really having interactions*'. However, if it was delivered by a passionate activist speaking about their real-world experiences, students would take more notice and, perhaps, inspiration. Schools and teachers should prioritise embedding more engaging pedagogies by making time in their classes for students to go beyond expected content in the curriculum and learn about how to personally engage with the issues. This may be easier to do in science and humanities subjects, but needs to be incorporated across formal and informal curricula. Most teachers think students can see the connections on their own simply by giving them more knowledge about the seriousness of climate change. However, what students are asking for is support on how to take mitigation measures at individual and collective scales. Science teachers need to be intentional in making the environmental thread apparent in their lesson/unit planning, and teacher professional development could include auditing curricula to evaluate how they connect environmental issues to students' lives. This is all about linking content to lifestyle choices, local environment and businesses, and things students can be empowered to change. Students want to learn about practical applications of the curriculum's environmental concepts in industry and are eager to hear from members of the community implementing new technologies and strategies for reducing organisations' environmental footprints. This can invite those students who may not otherwise enjoy studying science to see the relevance to their lives by connecting climate change information with their consumptive lifestyle (i.e. specific stores/brands, energy, recycling, etc.) and implementing alternative choices.

'I have the knowledge of … what's going on, but not the knowledge of what to do about it'

Students are asking for guidelines and tangible ideas on how to participate in climate change activism. While students clamour for solutions, many realise global warming won't be managed by individuals and it is important science teachers emphasise the difference between solving climate change and doing your part. Instead of connecting content to the real world, students are asking teachers to connect content to habit. Examples of this might include coupling carbon and mineral footprints to specific electronic devices, industrial waste to certain brands and shopping habits, ecological impacts to different dietary choices, all of which prompt self-reflection and potential action. Teachers should support and encourage students to take leadership responsibilities in steering activities that engage in direct and indirect activism in their schools and the wider community. By giving space and scope to students to practise skills that allow them to initiate activities on their own, they are more likely to engage peer interests, thus promoting higher levels of engagement and commitment to act from youth like themselves.

'The power of an individual is not enough to achieve the goals'

Opportunities for action need to be inclusive and cater to the whole student body, so no student feels alone, hesitant or discouraged to act. Most schools have forms of student council to give youth a voice; however, often a teacher is still in charge and the youth perspective gets diluted. Schools should provide the latitude for students to mobilise peer communities to execute identified climate actions. Equitable representation in various multi-stakeholder decision-making bodies in schools builds an authentic platform for youth to learn how to negotiate their needs with warranted power. These experiences raise students' self-belief and abilities to engage in climate activism in school and beyond. Science teachers can support this by promoting open-minded discussions among students to share their views on climate change and taking action. Teachers should also encourage students to voice their opinions on the school's environmental measures and provide guidance in implementing various student-led environmental initiatives in classes, clubs or local environmentally friendly organisations.

'What the world needs in some ways is not another million vegans but 100 million people doing meat-free Mondays'

It is near impossible to convince everyone to act in a certain way and activism may be a sensitive topic for some. Negative or political connotations associated with some forms of activism, such as protests, can be alienating, and respecting local socio-cultural perceptions of activism is important when wanting greater buy-in from the student, teacher and parent communities. Therefore, the focus should shift more towards the positive goal being achieved for the greater good, and away from the potentially conflicting nature of a particular form of activism.

'One step forward, two steps back'

To develop an authentic activism culture effectively, schools need to avoid greenwashing by enacting visibly

consistent actions to show their values and commitments around promoting sustainability. This means embedded commitments at every level within their schools, where leadership and staff champion initiatives that holistically unite around some central pledges as part of the climate activism movement. For example, if recycling is essential to a school, it should be implemented school-wide, including science classrooms and micro-labs. Additional school-wide pledges could include creating policies around the use of air-conditioners/fans and lights in classrooms, green purchasing and catering. Teachers should also communicate the motivations and rationales behind these school-wide sustainability initiatives to students, such as how school facilities are designed by following the Green Principles of Chemistry, to encourage students to contemplate the green actions they take to avoid greenwashing.

'Children are looking at you and learning from you'

Even though many teachers expressed feeling relatively powerless to instigate larger systemic changes, students look to them as role models. Schools are not neutral spaces and the specific actions taken by teachers and parents inform what students see as priorities. When teachers model climate change activism, they impart solidarity to their students and create more CCE engagement.

Schools are places of opportunity, and the knowledge–action gap suggests students are eager to learn more about how to change the world, than feel the need to be convinced the world is in danger. It is our responsibility to play a vital role in helping students 'sound the alarm' and 'not allow the world to look away' (Thunberg *et al.*, 2021). Given the suggestions above, the '*code red for humanity*' raised by the IPCC report (McGrath, 2021) should be echoing through schools, convincing them that they have a part to play in mitigating climate change. By listening to youth, schools can teach about and enact climate activism to greater effect by incorporating it as an important component of climate change education.

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