

# Physical activity behavior and learning in higher education

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# Impact

Upon entering any classroom at university, students are expected to sit until class has ended. Research has shown that sitting for long hours is linked to various health risks. So why are students expected to sit throughout their classes? It may only be justified to put the students' health at risk *if* sitting is beneficial for learning. In this dissertation, I did not find any evidence to suggest that there is a difference between sitting and being lightly active with regards to their effects on learning. Therefore, I encourage for all stakeholders of higher education to promote a learning environment that facilitates light physical activity. Although the intervention study within this dissertation focused on learning within tutorial group meetings at Maastricht University, the findings and recommendations can be informational for other types of education, including primary, secondary, and vocational education, where sitting in class is also the norm.

When the learning environment is designed such that it is normal to sit, then the students will sit. Currently, it takes a bit of courage for a student to insist on standing up in class. By doing so, they are likely to be asked: "why are you standing up?" But no one asks a student who is sitting in class: "why are you sitting down?" Humans are social creatures after all, and it is convenient to adhere to socially acceptable norms. A simple analogy would be to perceive standing as taking the stairs and sitting as taking the elevator. Taking the stairs is a normal behavior and encouraged to boost one's physical health; we take the elevator when it is necessary. Similarly, breaking up sitting with standing in class should be seen as normal behavior, and encouraged for one's physical health, whereas sitting should serve its function of recuperation. To make it socially acceptable to stand in class, one step would be to incorporate this message into teacher trainings, for teachers to encourage students to break up sitting time by standing up, and for teachers to lead by example. Eventually, when the students decide to stand during their classes, it should be seen as a natural, everyday occurrence that does not need questioning.

Knowledge dissemination organizations, such as the Kenniscentrum Sport & Bewegen and the Mulier Institute, could assist with sharing this practice-focused and policy-relevant message: that a physically active learning environment should be perceived as normal and encouraged within society. Other than reaching the teachers and students, governmental bodies should be informed that sitting for long hours is bad for health, whereas standing during education does not compromise the students' learning. Investing in the students' health now minimizes the future burden on healthcare and the economy. A 2019 study found that most Chinese citizens spend an equivalent of 256.47 EUR to 1,282.27 EUR per person per year on healthcare, with each hour spent sitting down associated with an equivalent of 31.55 EUR increase in personal,

annual healthcare expenditure [65]. Another British study estimated that in 2016-2017, an equivalent of 0.78 billion EUR spent by the National Health Service (NHS) on adults was attributable to prolonged sitting [66]. Therefore, governmental ministries, especially the ministries of health and education, should be informed of the health risks and economic burden that comes with the current norm of sitting in universities and other educational institutions. Instead, a physically active learning environment should be perceived as normal. Thus, there should not be any hesitation to allocate sufficient budget to universities and other educational institutions to encourage a physically active lifestyle among their students.

Currently, monetary budget is used to provide each student with a chair and low desks in every classroom, making it appear like sitting is the only option. Imagine a classroom with desks that can be used for sitting *and* standing. This makes it possible to normalize standing in class. Undoubtedly, there are investment costs involved in purchasing standing desks. Just as how the Vereniging van Universiteiten (VSNU; Association of Universities in the Netherlands) negotiated prices for publishing in open-access with academic publishers, I request for the VSNU and other university associations to negotiate a reasonable price for standing desks with the suppliers, to promote standing as a norm within higher education. A cost-free option would be to simply make standing a normal behavior in class. A desk is only needed for note-taking, whereas the sharing of content, brainstorming of ideas, and intellectual debate can all be done while simply standing on one's two feet.

According to Article 25 of the United Nations' Universal Declaration of Human Rights, "Everyone has the right to a standard of living adequate for the health and well-being of himself". Students have the right, and should be given the option, to lead a healthy and active lifestyle. It is the collective responsibility of all stakeholders involved (researchers, teachers, knowledge dissemination organizations, governmental bodies, university associations, and most importantly the students themselves) to provide a physically active learning environment for the students. Students should also play a role in making it normal to be physically active during their classes. I urge for students to fight for the right to be physically active and request the option to stand in class. Then, when the environment is conducive for physical activity, I ask for the students to embrace and make use of this opportunity to break up their sitting with standing in class.

Before wrapping up, I would like to clear up some potential misunderstandings. When I recommend providing students with the option to stand in class, I do not mean to stand in a rigid and static manner. While standing, it is common to move and take some steps. Furthermore, I do not mean to encourage standing throughout the day. I also do not mean to force students to stand up in class. Rather, I recommend allowing the students to make an informed decision as to when they would like to sit or stand. In

this dissertation, we did impose a 2-hour standing intervention on the students who volunteered to participate. This duration was selected to match the real tutorial meetings that occur at Maastricht University, and to provide a controlled condition for easy comparison. Further research is needed to explore the optimal duration of standing that would balance learning, an active lifestyle, and comfort while standing.

As it stands, there is no reason for universities to continue enforcing a learning environment where sitting is the only option. There is no evidence to argue that sitting is any better than being lightly active when it comes to learning. Instead, spending long hours sitting down leads to higher risks of various diseases, resulting in high healthcare costs, which impact us all as a society. The university's learning environment should be one that encourages an active lifestyle. I recommend for the investment in standing desks within the university environment, in order to provide the students with the option of having a healthier and more physically active lifestyle, while maintaining their performance on learning. I call for teachers, knowledge dissemination organizations, governmental bodies, university associations, and all stakeholders, including the students themselves, to stand up for the students' right to live a healthy life.