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Evaluation of a student workshop module on the healthiness, sustainability and ethicalness of plant-based diets

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Introduction and context

Consumption of proteins of plant origin is inversely associated to normal weight (body mass index) among EU adolescents (Lin et al., 2015). Early prevention of CVD(Satija & Hu, 2018), Coronary Heart Disease , obesity, weight gain, hypertension (Borgia et al., 2015) and diabetes mellitus (Qian et al., 2019) is plausible through plant-based diet (Bechthold et al., 2019). Dietary patterns differ among EU adolescents. Those with healthier dietary patterns are more conscious of its health benefits (Giménez-Legarre et al., 2019). Young people lack cooking skills, knowledge on vegetables and pulses/legumes (Stamer et al., 2019).

Compared with omnivorous and ovo-lacto vegetarian diets, a 100% plant-based diet has the lowest GHGE, the lowest water use and the lowest land use (Chai et al., 2019). Consumption of fruits and vegetables is expected to increase in Europe, while reduction is foreseen in meat, processed meat and seafood (Santeramo et al., 2018). Positive attitude towards the plant-based concept for consumers in Belgium and The Netherlands, while plant-based is newer in Denmark or Spain (Faber et al., 2020). The main facilitators identified towards plant-based consumption among DK Millennials: taste, cooking skills, social support and perceived healthiness (Reipurth et al., 2019). It is not about just pleasure eating, or the nutrition and health, but bringing the sustainability and climate change that all co-occur and co-cause each other (Swinburn et al., 2019; Willett et al., 2019).

Industry needs new professionals that are able to bring forth knowledge, beliefs, attitudes, perceptions, behaviour as well as processing new plant-based products that are feasible and meaningful to the new generation of consumers. Interest for food among the DK population is in decline (specially among men) and meat consumption is still high in all generations (Reipurth et al., 2019; Stamer et al., 2019). Nevertheless, there has been a rise in the demand for foods that are alternative to those of animal origin. Hence future professionals should be able produce easy to eat sustainable and healthy plant-based foods, and consequently making PB diet more accessible and convenient. From Industry Stakeholders: there is sufficient technological know-how to process foods of animal origin, but some of the know how is not directly translatable to plant-based foods, hence it requires a re-learning or re-adjusting of existing techniques (Interview to private participants to PhD course innovation Towards Plant Based Consumption, November 2019).

Specifically at UCPH-Food, current students have requested more education in plant-based food processing, therefore it is of key interest to invest in plant-based research and teaching in this area. As part of this course, I will be giving a lecture focused on consumer issues, more particularly on the healthiness, sustainability and ethicalness of food consumption, which will constitute the centre of the present study.

An important issue is that the approach to "food" at the Department of Food Science and in the teaching in general, has been usually monodisciplinary, and with very little interaction with social sciences and nutrition, reflecting the traditional trends in Denmark (Christiansen et al., 2015). The main educational program where I teach is called MSc in Food Innovation and Health where there is a multi-disciplinary approach, and where case based learning is implemented (Krogh et al., 2015). Additionally, the MSc course Integrated Food Studies has a strong multi-disciplinary focus, and is formulated on Problem Based Learning (PBL) principles (Krogh et al., 2015). Despite all previous educational improvements, many of the courses paradoxically remain "*magister-dixi*" style, where student participation is limited. Therefore, the planning of new courses includes a more student-oriented approach taking into account how students learn and study (Entwistle, 2009) particularly in the current era of social media influence (Fleming-Milici & Harris, 2019; Hsu et al., 2018). Previous research showed that online resources are capable to meaningfully contribute to student learning (Chan et al., 2019; Dogan et al., 2019; Latif et al., 2019; Prudencio, 2019; Salha et al., 2019; Wilkinson & Ashcroft, 2019; Wong

et al., 2019). Additionally, voting (Ingalls, 2018) and therefore achieving consensus through online means seems a promising way to improve the classroom experience for students (Florenthal, 2018, 2019; Ingalls, 2018; Parra-Santos et al., 2019).

A cross-disciplinary module has been developed in 2017 with the title "Consumer issues: Healthiness, Sustainability and Ethics of Food Consumption" (30 students at 7,5 ECTS course with code NFOK16000). It consists of a short didactic situation (devolution) where the epidemiology, the sustainability and the ethics of plant-based consumption are presented, followed by an adidactic situation, namely a group work (action/formulation/validation) (Christiansen & Olsen, 2006). For the latter purpose the course is divided in 4 smaller groups by assigning them a number from 1-4 and asking them to come up with evidence supporting the healthiness/sustainability of plant – based diet or meat-based diet from either the vegetarian/vegan or the omnivorous sides. The reason for this random distribution was to expose students to reality of having to support views opposite to own in a real job situation (e.g. environmentalist working for animal farming industry). Finally, the institutionalisation consisted of a voting element where all students could choose the better formulated group statements. This module brings three perspectives around food consumption, namely, healthiness, sustainability and ethics of animal production.

The first two times the Module- workshop was run (2017 and 2018) worked well; however, after student feedback we needed to improve the instructions (devolution) and the use of time. Therefore, in 2019, students were further asked to read material at home (be prepared for the lesson), both pro meat and against meat consumption. The "devolution" was shorter, instructions were clearer in terms of what was the consensus statement and the way it was going to be presented and debated in the course; finally, more time was given for students to prepare the presentations and questions in the classroom. They had to write their main conclusions on Socrative (Florenthal, 2019; Munusamy et al., 2019; Zainuddin et al., 2020) so that at the end the group would be able to vote (Grzych & Schraen-Maschke, 2019; Ingalls, 2018; Tunyova, 2019) on those statements they would agree more with on the basis of the current scientific evidence.

This workshop (3 hours) could become a stand-alone module that could be implemented or replicated in other courses or programmes, and more specifically, in the NFOK20001U Foods based on Plants, Algae, and Fungi (to be started in 2020). To confirm whether this module could work as stand-alone in other courses, it was further implemented as part of the PhD

course Innovation Towards Plant-Based Consumption held in November 2019 at the Department of Food Science, and students (both from academia and outside academia) were asked to evaluate the module (positive, negative and potential improvement).

Therefore, the objective of this work is to evaluate the implementation of a student workshop where students achieve multidisciplinary discussion and a joint consensus statement (Horst, 2008), on consumer-oriented innovation towards plant-based products.

Methodology

The module was implemented as a practical workshop during a PhD course, with 12 participants, 2 males, and 5 were from the food industry. Five were PhD students and two were MSc students or free-lance participants. The workshop happened in the second day of the course after having had one day focused on the epidemiology and health impact of plant-based consumption and on the second day, they got two presentations on the sustainability of plant-based vs. meat-based foods. Participants, as mentioned earlier, were further divided in groups (of three people each, one industrial partner at least in each group), and they had to report their discussion and consensus on how to innovate plant-based foods on the basis of health and sustainability. In order to evaluate the module, participants were asked to voluntarily provide their thoughts about the specific workshop. Data were collected through a short questionnaire administered using Socrative ® platform.

Results

In total 7 out of 12 participants provided a feedback evaluating the workshop. Table 15.1 displays the students' feedback regarding the implemented module, underscoring the positive elements and providing suggestions on how to improve it in the future.

Table 15.1. Students feedback regarding the implemented module (qualitative).

Positive aspects	Possible improvements
It was nice to be included, as it gives everybody regardless of position and work, something to think about and relate to.	
	Could be improved by the delivery of the content in darker screens and bigger fonts to increase readability. Distribution of groups more randomised so people can get a good clintch and perspective of others
Good way to discuss different approaches and get ideas from other people perspective especially if individuals are involved in other areas of the food industry.	
Explicit time to discuss during lecture time. Including one industry partner per group.	Workshop at the beginning of the course to not have any influence in ideas or thoughts. But maybe also nice to have some knowledge.
The space given to think and discuss was super inspiring. The lenght of 30 minutes was good to be able to discuss properly about the problems.	Ask for realistic rather than ideal world for the next pb foods generation
	The voting in the end, as all suggestions had nice parts.
That the groups was divided so each one had a person from the industry. This was good to inspire the talk.	
Allocating one person from the industry in each group was a very good idea.	
Good time to think and discuss upon the issues we currently has, good to know perspective of other stake holder in the field (industry).	More time to discuss and more specific question to direct the discussion (it's too general now).

A key concept that arose from the positive aspects was that each group was multi-sector, and therefore it enriched the discussion. The general perception of the group was that the workshop was welcomed and helped them in expressing their own ideas and listening to others. As for the improvements mentioned included the form of delivery, e.g. fonts of the screens, the organization of the course e.g. the placing of the workshop at the beginning of the course, however, none of the respondents expressed any problems with the actual contents or on how the workshop went.

Discussion

Traditional university teaching is conservative and follows a model of authoritarianism, however, in the past 200 y most universities have been in-

spired by following Humboldt's "unity of research and teaching" principle where both teachers and students can jointly explore and solve research questions in a seminar (Christiansen et al., 2015). Therefore, this project subscribes to this model of seminar, but applying group work as "discussion group" (Christensen, 2015) with the objective to exchange multi-actor knowledge and thus improve the learning process of the participants.

This module then aligns to the learning objectives of the courses where it will be applied. Following the feedback from the students, it seems that the workshop has been successful. In particular, the option to listen to people with different backgrounds and discuss in a meaningful way. This is in agreement with expression of students of the regular MSc course. For example, a student expressed the following: Quote "I've learnt ... need for everyone in the food chain to cooperate to achieve these [sustainable] goals; and be more aware of how each part of the production process has an impact on sustainability".

Conclusion

In my opinion, the current format of the workshop is acceptable for students, it contributes to their learning, independently of the level (it has been applied at MSc and PhD levels), and it can be further implemented in new courses, more specifically as part of the Courses "Foods based on Plants, Algae, and Fungi" and "Meal consumer research" (both to be started in 2020), as it has all the elements for a stand-alone workshop-module within the area of plant-based consumption, and it brings the aspects of sustainable, healthy and ethics as requested by students.

References

Bechthold, A., Boeing, H., Schwedhelm, C., Hoffmann, G., Knüppel, S., Iqbal, K., & Schwingshackl, L. (2019). Food groups and risk of coronary heart disease, stroke and heart failure: A systematic review and dose-response meta-analysis of prospective studies. *Critical Reviews in Food Science and Nutrition*, *59*(7), 1071–1090. https://doi.org/10.1080/10408398.2017.1392288

Borgia, L., Curhan, G., Willett, W., Hu, F., Satijad, A., & Forman, J. (2015). Longtermintake of animal flesh and risk of developing hypertension in three prospective cohort studies (B. Chai, J. Voort, K. Grofelnik, H. Eliasdottir, I. Klöss, & F. Perez-Cueto, Eds.). *Journal of Hypertension*, *33*(11), 2231–2238. https://doi.org/10.1097/HJH.0000000000000722

Chai, B. C., van der Voort, J. R., Grofelnik, K., Eliasdottir, H. G., Klöss, I., & Perez-Cueto, F. J. (2019). Which diet has the least environmental impact on our planet? a systematic review of vegan, vegetarian and omnivorous diets. *Sustainability*, *11*(15), 4110.

Chan, T., Dzara, K., Dimeo, S., Bhalerao, A., & Maggio, L. (2019). Social media in knowledge translation and education for physicians and trainees: A scoping review [Perspectives on Medical Education.]. https://doi.org/10.1007/s40037-019-00542-7

Christensen, G. (2015). Group work. *University teaching and learning (1st* (pp. 189–199). Samfunds Litteratur.

Christiansen, F., Harboe, T., Horst, S., Krogh, L., & Sarauw, L. (2015). Trends in the development of danish universities. *University teaching and learning* (1st, pp. 17–41). Samfunds Litteratur.

Christiansen, F., & Olsen, L. (2006). Analyse og design af didaktiske situationer [analysis and design of didactic situations: A pharmaceutical example. *MONA*, *3*, 7–23.

Dogan, H., Norman, H., Alrobai, A., Jiang, N., Nordin, N., & Adnan, A. (2019). A web-based intervention for social media addiction disorder management in higher education: Quantitative survey study. *Journal of Medical Internet Research*, *21*(10), 14834. https://doi.org/10.2196/14834

Entwistle, N. (2009). *How students learn and study in teaching for understanding at university*. Palgrave Macmillan.

Faber, I., Castellanos-Feijoó, N., Sompel, L., Davydova, A., & Perez-Cueto, F. (2020). Attitudes and knowledge towards plant-based diets of young adults across four european countries. *Exploratory survey. Appetite*, *145*, 104498. https://doi.org/10.1016/j.appet.2019.104498

Fleming-Milici, F., & Harris, J. (2019). Adolescents' engagement with unhealthy food and beverage brands on social media. *Appetite*, *104501*. https://doi.org/10.1016/j.appet.2019.104501

Florenthal, B. (2018). Student perceptions of and satisfaction with mobile polling technology: An exploratory study. *Journal for Advancement of Marketing Education*, *26*(2), 44–57.

Florenthal, B. (2019). Students' motivation to participate via mobile technology in the classroom: A uses and gratifications approach (N. Giménez-Legarre, A. Santaliestra-Pasías, L. Beghin, J. Dallongeville, O, & G. A., Eds.). *Journal of Marketing Education*, *41*(3), 234–253. https://doi.org/10.1177/0273475318784105

Giménez-Legarre, N., Santaliestra-Pasías, A. M., Beghin, L., Dallongeville, J., de la O, A., Gilbert, C., González-Gross, M., De Henauw, S., Kafatos, A., Kersting, M., et al. (2019). Dietary patterns and their relationship with the perceptions of healthy eating in european adolescents: The helena study. *Journal of the American College of Nutrition*, *38*(8), 703–713.

Grzych, G., & Schraen-Maschke, S. (2019). Interactive pedagogic tools: Evaluation of three assessment systems in medical education. *Annales de Biologie Clinique*, *77*(4), 429–435. https://doi.org/10.1684/abc.2019.1464

Horst, M. (2008). In search of dialogue: Staging science communication in consensus conferences. *Communicating science in social contexts* (p. 274). https://doi.org/10.1007/978-1-4020-8598-7

Hsu, M., Rouf, A., & Allman-Farinelli, M. (2018). Effectiveness and behavioral mechanisms of social media interventions for positive nutrition behaviors in adolescents: A systematic review. *Journal of Adolescent Health*, *63*(5), 531–545. https://doi.org/10.1016/j.jadohealth.2018.06.009

Ingalls, V. (2018). Students vote: A comparative study of student perceptions of three popular web-based student response systems. *Technology, Knowledge and Learning*, 1–11. https://doi.org/10.1007/s10758-018-9365-0

Krogh, L., Stentoft, D., Emmersen, J., & Musaeus, P. (2015). Case-based learning. *University teaching and learning (1st* (pp. 201–2014). Samfunds Litteratur.

Latif, M., Hussain, I., Saeed, R., Qureshi, M., & Maqsood, U. (2019). Use of smart phones and social media in medical education: Trends, advantages, challenges and barriers [S., De Moraes, A. C. F., ... Navarro,]. *Acta Informatica Medica : AIM : Journal of the Society for Medical Informatics of Bosnia and Herzegovina : Casopis*

Drustva Za Medicinsku Informatiku BiH, *27*(2), 133–138. https://doi.org/10.5455/aim.2019.27.133-138

Lin, Y., Mouratidou, T., Vereecken, C., Kersting, M., Bolca, S., De Moraes, A. C. F., Cuenca-García, M., Moreno, L. A., González-Gross, M., Valtueña, J., et al. (2015). Dietary animal and plant protein intakes and their associations with obesity and cardio-metabolic indicators in european adolescents: The helena cross-sectional study. *Nutrition journal*, *14*(1), 10.

Munusamy, S., Osman, A., Riaz, S., Ali, S., & Mraiche, F. (2019). The use of socrative and yammer online tools to promote interactive learning in pharmacy education [and Pérez-Domínguez,]. *Currents in Pharmacy Teaching and Learning*, *11*(1), 76–80. https://doi.org/10.1016/j.cptl.2018.09.021

Parra-Santos, T., Molina-Jordá, J. M., Maiorano-Lauria, L.-P., Milanovic, I., & Pérez-Domínguez, J. R. (2019). Review tasks of the course's contents. *Proceedings of the Seventh International Conference on Technological Ecosystems for Enhancing Multiculturality*, 658–662.

Prudencio, J. (2019). Pharmacy students' perspectives of social media usage in education. *Hawai'i Journal of Health and Social Welfare*, *78*(9), 297–301.

Qian, F., Liu, G., Hu, F., Bhupathiraju, S., & Sun, Q. (2019). Association between plantbased dietary patterns and risk of type 2 diabetes. *JAMA Internal Medicine*, *02115*, 1–10. https://doi.org/10.1001/jamainternmed.2019.2195

Reipurth, M. F., Hørby, L., Gregersen, C. G., Bonke, A., & Cueto, F. J. P. (2019). Barriers and facilitators towards adopting a more plant-based diet in a sample of danish consumers. *Food quality and preference*, *73*, 288–292.

Salha, A., Abbass, A., & Islam, S. (2019). Medical student perspectives on the application of social media in higher education [letter (F. Santeramo, D. Carlucci, B. De Devitiis, A. Seccia, A. Stasi, R. Viscecchia, & G. Nardone, Eds.). *Psychology Research and Behavior Management*, *12*, 725–726. https://doi.org/10.2147/PRBM.S226626

Santeramo, F. G., Carlucci, D., De Devitiis, B., Seccia, A., Stasi, A., Viscecchia, R., & Nardone, G. (2018). Emerging trends in european food, diets and food industry. *Food Research International*, *104*, 39–47.

Satija, A., & Hu, F. (2018). Plant-based diets and cardiovascular health. *Trends in Cardiovascular Medicine*, *28*(7), 437–441. https://doi.org/10.1016/j.tcm.2018.02.004

Stamer, N., Hoff, H., Dich, I., Westergaard, K., Hypolit, A., & Jakobsen, G. (2019). https://www.madkulturen.dk/wpcontent/uploads/2019/12/MADKULTUR19.pdf

Swinburn, B. A., Kraak, V. I., Allender, S., Atkins, V. J., Baker, P. I., Bogard, J. R., Brinsden, H., Calvillo, A., De Schutter, O., Devarajan, R., et al. (2019). The global syndemic of obesity, undernutrition, and climate change: The lancet commission report. *The Lancet*, *393*(10173), 791–846.

Tunyova, N. (2019). Integration of mobile voting services into mining engineers training for mineral and resource sector. *E3S Web of Conferences*, *105*. https://doi.org/10.1051/e3sconf/201910504041

Wilkinson, A., & Ashcroft, J. (2019). Opportunities and obstacles for providing medical education through social media. *JMIR Medical Education*, *5*(2). https://doi.org/10.2196/15297

Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., Garnett, T., Tilman, D., DeClerck, F., Wood, A., et al. (2019). Food in the anthropocene: The eat–lancet commission on healthy diets from sustainable food systems. *The Lancet*, *393*(10170), 447–492.

Wong, A., Capel, I., & Malbrain, M. (2019). Social media in critical care: Fad or a new standard in medical education? an analysis of international critical care conferences between 2014 and 2017. *Journal of the Intensive Care Society*, *20*(4), 341–346. https://doi.org/10.1177/1751143719846432

Zainuddin, Z., Shujahat, M., Haruna, H., & Chu, S. (2020). The role of gamified e-quizzes on student learning and engagement: An interactive gamification solution for a formative assessment system. *Computers and Education*. https://doi.org/10.1016/j.compedu.2019.103729

Part IV

Rethinking lectures