

Effect of COVID-19 pandemic situation on the teaching of Graduation Projects and Internship type courses in undergraduate degree programs

Hemanatha P. W. Jayasuriya

تأثير حالة جائحة COVID-19 على تدريس مشاريع التخرج والتدريب الميداني في برامج درجة البكالوريوس

هيمنانثا جاياسيريا

ABSTRACT. The COVID-19 pandemic has negatively impacted all aspects of social life all over the world. It has also significantly affected the global education system from primary to tertiary levels. The effect on college education has likely to be substantial, as some specializations and academic activities have undergone severe setbacks by virtue of the need for the presence of dynamic, face to face student-teacher interactions to provide effective teaching delivery. This article pinpoints the evident setbacks from a quality assurance perspective, when considering selected components such as graduation projects, internships, laboratory and field work in certain degree programs.

KEYWORDS: COVID-19 pandemic, accreditation criteria, student learning outcomes, teaching delivery, graduation projects, internships

المستخلص: أثرت جائحة COVID-19 سلبيًا على جميع جوانب ومناحي الحياة الاجتماعية في جميع أنحاء العالم لكل من البلدان المتقدمة والنامية. كما أثرت بشكل كبير على نظام التعليم العالمي من المرحلة الابتدائية إلى المراحل الجامعية المتقدمة. ولقد كان التأثير على مرحلة التعليم الجامعي كبيرًا، حيث تعرضت بعض التخصصات والأنشطة الأكاديمية لانتكاسات شديدة بسبب الحاجة إلى وجود تفاعل ديناميكي وجهًا لوجه بين الطلاب والمحاضرين لتقديم تعليم فعال. تحدد هذه المقالة النكسات الواضحة من منظور ضمان الجودة من خلال اختيار عناصر للتقييم مثل مشاريع التخرج، والتدريب الميداني، والعمل المخبري والميداني لعدد من البرامج الأكاديمية.

الكلمات المفتاحية: جائحة كوفيد-19، معايير الاعتماد، مخرجات التعليم، طرق التدريس، مشاريع التخرج، التدريب العملي.

Perspectives

The COVID-19 pandemic has been denominated as a public health crisis by the World Health Organization (WHO) (WHO COVID-19, 2019). Without discrimination, the virus has affected all countries, developed and developing, including the span of different societal levels. The pandemic has had a monumental effect on the livelihood of people resulting in all gatherings being prohibited including the sectors pertaining to education. The effect on education at all levels has become one of the main concerns for academic institutions at primary, secondary and tertiary levels. One positive is various new technological developments

emerged with online or distance teaching, however there are significant components such as; laboratory practicals, field work, field visits, projects, internships, and co-op type training coming under secondary and tertiary education that must not be compromised in order to avoid any detriment to the students education. The impediments due to the pandemic on tertiary education may have an adverse effect as some of the online teaching and evaluation techniques utilized are grossly violating the stipulated accreditation requirements in some college degree programs.

Identification of effective teaching methods in light of the COVID-19 pandemic is in continuous discussion amongst academics and educational institutions. The uses of e-learning techniques and computer-based innovations have largely answered some of the prevailing areas of concern (Hetsevich, 2017; Parashchenko, 2020; Rosel, 2020). However, there are obstacles to be met for

Hemantha P. W. Jayasuriya ✉ hemjay@squ.edu.om, Department of Soils, Water and Agricultural Engineering, College of Agricultural and Marine Sciences, Sultan Qaboos University, Muscat, Oman



courses with a specific nature that relies on active interactions to meet particular teaching objectives such as courses with projects, fieldwork and, laboratory components. In addition to that, the execution of internships widely used in engineering, science and technology education at college level that needs hands-on experiences were notably affected.

This article has taken a few examples to provide an overview of the challenges encountered due to the pandemic in the teaching delivery of capstone courses, graduation projects and the execution of internship programs embedded in the study plan of the Agricultural Engineering degree program at Sultan Qaboos University, Oman. The course outlines of these courses are adhered to the ABET (Accreditation Board for Engineering and Technology) accreditation criteria and the teaching objectives, continuous and final assessments are aligned with ABET specified Student Learning Outcomes (SLOs).

During the course teaching delivery in capstone-graduation projects, students are expected to engage with real-world, meaningful projects that are low-cost and use appropriate-technology. As a part of creative thinking process with direct interactions by the instructor, the project topic identification is given as a prominent brain-storming task and follows an area of national or regional importance that is feasible for a small group of students to carry out. In capstone project type courses, students are required to select a project, design and develop, prototype fabrication, performance evaluation, and provide reports and oral presentations defending the outcomes of their project for assessment. Consequently, evaluations are based on the accomplishment of SLOs; such as the application of engineering principles, use of a creative thinking approach, and adoption of appropriate strategies and standard procedures for solving design problems, engagement in life-long learning, team work for interpretation and presentation of project outcomes are also of significance (ABET Criterion 3, 2019). Before this pandemic situation, student teaching evaluations were on the high end (above 3.5/4.0) and with highly positive comments under open-ended questions, such as “satisfaction on achievements of making something workable solving a identified problem”, “success due to teamwork and continuous instructor interaction” etc. Some of the prototypes developed by student groups won competitions (TRC/OCC Awards, 2019; Al Watan, 2019), and were submitted for patents and commercialization programs, and some extended for postgraduate research studies (Al-Hinai and Jayasuriya, 2020; Al-Hinai et al., 2019; Jayasuriya et al., 2018). Before COVID-19, the teaching delivery of these courses could be considered as high-impact teaching practice making it a captivating learning approach for students. However, under the influence of this pandemic, teaching delivery of these courses has become a serious challenge along with the need to satisfy the accreditation and quality as-

surance requirements. Considering the importance of not delaying the graduation of students, alternative online teaching and assessment methods have been identified by academic institutions and relevant authorities around the globe.

Having stated the possibilities of online teaching with new technologies, there are components of teaching that cannot be compromised and compensated by this online approach, illustrating the harsh effects of the COVID-19 pandemic. Two such areas in undergraduate programs are Internships and Graduation Projects (shown in Figure 1); both are considered essential components of any undergraduate curriculum. When it comes to the internship component, undergraduate students are supposed to undergo training with career-guidance professionals at relevant work establishments where they are given status as trainee employees. Due to the pandemic, some institutions and programs have initiated online internship programs; however, the success of these approaches will be program-specific or depend on the nature of the degree program, but would not be properly replicated.

Similarly, for the Graduation Project component, undergraduate students individually, or in small groups should engage in realistic projects relevant to their field of study under the supervision of an academic or professional in the same specialization. These projects enable them to accomplish some of the SLOs stipulated by the degree program objectives under the accreditation process. Such SLOs include the; application of scientific or engineering principles, a creative thinking approach, the use of appropriate strategies and standard procedures for solving realistic problems, engagement in life-long learning, team work and brain-storming for acquiring solutions, and finally the successful interpretation and presentation of the project outcomes. The above-mentioned learning outcomes are specified as requirements by ABET (ABET Criterion 3, 2019).

Project Based Learning (PBL) method (PBL, 2020) is currently one of the recommended approaches that facilitates online delivery of teaching and instructions for successful completion of specific project type tasks such as graduation projects to some extent. However, the projects of development and validation nature that fall under engineering and technology areas will not be completely successful without having the necessary student-teacher interactions and hands-on activities.

Conclusion

As the pandemic seems to continue for the present and until uncertain future, there are major challenges for the academics in these specific areas to find alternative active teaching delivery methods to overcome possible learning deficiencies that may impact their graduates during the pandemic period. As a short-term alternative, degrees can be awarded pending completion of such components once the cessation of the pandemic situation.



Figure 1. Examples of graduation projects (a and b) and internship activities (c) with essential hands-on practice needed for creative thinking and skills development in undergraduate studies

Unfortunately, an enormous level of uncertainty lies ahead due to uncontrollable fluctuations in COVID-19 infections with multiple waves appearing in some countries. It is time for academic institutions and potential employers around the globe to create internationally acceptable guidelines on accreditation and quality assurance standards for the graduates completing their degrees during the COVID-19 global pandemic. Moreover, there is a dire need for innovating and developing new teaching delivery methods to mitigate abovementioned deficiencies as long-term solutions, not only for COVID-19, but also for any future pandemic situation.

References

- ABET Criterion 3. (2019). <https://www.abet.org/accreditation/accreditation-criteria/criteria-for-accrediting-engineering-programs-2019-2020/#GC3>
- Al-Hinai A, Jayasuriya H, Al-Adawi S, Al-Mahdouri A. (2019). Ergonomic Performance Evaluation of Date Stripping Process, *Advances in Intelligent Systems and Computing, SpringerBook Series (AISC)*, volume 789, p. 74-84.
- Al-Hinai A, Jayasuriya, H. (2020). Development of a stripper machine for Al-Mabsili dates and evaluation of human interactions and performances, *Advances in Intelligent Systems and Computing, Springer Book Series (AISC)*, Volume 1018, p. 737-742.
- TRC/OCC Awards. (2019). Sawsan Al-Khanbashi won the best project idea in the first phase of the Innovation Room Award for a project “designing a dried lime pulp extraction machine” The Research Council and Oman Chamber of Commerce awards 2019, Oman TV, September 16, 2019.
- Al Watan. (2019). “Anfal Al Hamdani wins a project related to a dried lime extraction machine at Qatar foundation competition”, Al Watan Newspaper, Oman, November 11, 2019.
- Jayasuriya HPW, Al-Hinai, A, Al-Adawi S, Al-Mahdouri, A. (2018). Comparison of ergonomic performance evaluation in mechanized and traditional date stripping processes, *ASABE Library paper No. 1800790, ASABE Annual International Meeting 2018* (doi:10.13031/aim.201800790..
- Hetsevich I. (2017). Advantages and disadvantages of E-learning technologies for students. <https://www.joomlams.com/blog/guest-posts/elearning-advantages-disadvantages.html> (accessed 20 October, 2020)
- Parashchenko T. (2020). The undeniable benefits of E-learning in the education industry. <https://husky-jam.com/blog/what-are-the-benefits-of-e-learning/> (accessed 18 October, 2020)
- PBL (2020). PBL works. <https://www.pblworks.org/what-is-pbl> (accessed 15 October, 2020)

Rosel, C. D. (2020). Advantage of e-learning. Blog CAE.
<https://www.cae.net/advantage-of-elearning/> (ac-
cessed 15 October,2020)

WHOCVID-19.(2019).Coronavirusdisease(Covid-19)
[https://www.who.int/emergencies/diseases/nov-
el-coronavirus-2019](https://www.who.int/emergencies/diseases/novel-coronavirus-2019) (accessed 10 October, 2020).