

A strategy to face the impact of Covid-19 and technology disruption on higher education in the 2020-2025 lustrum

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Abstract

Technology disruption has been boosted due to the coronavirus outbreak. The world is changing rapidly producing health, social and economic crisis without precedent. Universities must adapt their courses to a new reality maintaining social distancing and offering online and/or blended teaching. The world demands professionals with skills like resilience, adaptability, and creativity mainly on top of the technical skills. Continuing education will be the key but the first step for success is still having a career from the university. At the same time, engagement and motivation are a challenge that needs to be tackled through continuous monitoring and assessment. In this paper, a series of thoughts and strategies are discussed to help the delivery of courses in Civil Engineering and for any technical career in higher education.

Keywords: Covid-19, technology disruption, higher education, engagement, continuous assessment, feedback, communication.



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1. Introduction

Since the outbreak produced by the coronavirus in March 2020, there is no other topic to talk about in the news, TV programs, at work and even during a conversation with family and friends in the social media. The reason is simple, the connected world where we live in generates every day a topic to discuss independently of the relevance the topic has for all of us. Usually, the discussion takes some time, a few days until another topic appears in the news or social media. The difference with the Covid-19 is that this is relevant and impactful in every single individual all around the world and is affecting profoundly in our health, social and economic system (Nicola, 2020). This is mainly the reason why we have been talking about this for months instead of days. However, after a while, new topics come up again diminishing the monopoly of the virus. **For good or for bad, we start learning how to live with it.**

Many people believe that this outbreak will have a profound influence on our lives and will change our world forever. I do not know if this will happen. However, I am sure there will be changes. In higher education, there was an immediate change in the way we deliver the classes generating a truly blended education where the teaching is done in a combination of distance and face-to-face activities keeping the social distancing. This, of course, will produce an impact that could be positive or negative depending on our ability to implement the necessary strategies and changes in the ways we teach and learn.

The move to online teaching was triggered by the Covid-19 but produced because for decades we are ready to change the educational system. However, the inertia and resistance of the systems and people have prevented these changes until now. The only effect of the coronavirus situation is the acceleration of the changes that are inevitable and necessary to survive in the coming world (Bao, 2020).

1.1. Covid-19 and the future of higher education under technology disruption

Education is suffering for decades an uncertainty because of the **technology disruption** and because of the **dynamic of our world** (Rao, 2020). The uncertainty comes from the fact that we know around forty/fifty per cent of the jobs are disappearing. Many other jobs appear but we do not know what are those new jobs that are created every day (Ram, 2020). We do not know then the contents we must deliver in our classes to fulfil the requirements of future generations.

We know for certain that the world will be different in the future. This future is not far from now but close, very close. If this future is a far future, we will have time to react but the truth is, the future we are talking about is coming in a lustrum or even before (Bongomin, 2020).

We all know we must change but we do not know in what direction. We are all aware of the number of technologies we have access today, but we do not know how to use them to provide the education we do not know we have to provide. We know that technology is the key, but we do not know which one for every case and what to do with that technology. **We are living in a world of uncertainties.**

We have lived a situation like this before during the twentieth century, but the difference was the velocity and the implications. In the last twentieth century, calculators made it unnecessary to learn the multiplication tables and to be able to resolve, for example, relatively complex equations and operations as logarithms, roots, etc. Many teachers and lecturers tried to justify, however, the use of our memory to have a good set of skills that history has demonstrated is useless. Computers, social media, internet, and the cloud are producing a similar effect that calculators but with profound implications, in the manner we learn, and we should teach.

The educational paradigm of the twenty-first century is essentially different from the past.

1.2. The main role of Academics

Lecturers and educational institutions were respected in the past because they were the only ones who owned the knowledge and it was a privilege of a few to attend universities and access to the information developing knowledge and skills. Today, everyone has unlimited access to information, so, lecturers and institutions can be challenged in real-time by students with access to google through all sort of devices. On top of this, the central idea of **student satisfaction** is producing a lack of respect for the lecturers and institutions that must satisfy students and are pointed as responsible for their progression. Sometimes, this produces **grade inflation** (Collins, 2020). Every year, academics are involved in a complex exercise to **adapt the teaching and assessment to ensure the retention and progression of students**.

However, lecturers are a source of motivation and constant human contact during a career. Lecturers guide, teach and demonstrate how to deal with a world where the information is superabundant and overwhelming (Zavyalova, 2020).

In a world where technology provides the most powerful tools to be in touch, students find more and more difficult to share learning experiences with their classmates and demand everything from their lecturers (Zhu, 2020).

Today, the central task of a lecturer in higher education is to keep students interested in a topic and show how to solve problems with methods. The engagement and retention are every year more difficult to achieve and now with a sudden move to online teaching, it will be probably more difficult unless strategies are implemented correctly (Tight, 2019).

1.3. The professional profile that fit for the future

The idea of developing skills choosing a career to work the whole life is obsolete and is replaced by the necessity of having the background to allow a quick turn to the needs of a very dynamic market. The present Covid-19 situation and the move to online teaching as well as the disruption produced in many sectors (construction, automotive, tourism, gastronomy, etc.) are clear examples of that.

This is a time for a revolution. Soft changes are not going to tackle future challenges. We have to change radically our approach and provide a useful education for our students to be competitive in a new world and to **fit for the future** (Mills, 2011).

Covid-19 has shown that we are forcing everything to keep our old ways. We are desperate to **go back to normal**. It is clear today that other ways are possible and necessary to face the new challenges of the new world. That is not because of the **Covid-19** but because of the **technology disruption** and the overpopulation of the planet that produce several global problems like contamination, global warming, species extinction and others.

Technology is just a tool; we will decide the way to use it for good or for bad as we did during our human history.

2. What do academics need to face their future profession?

For many years, continuing education is key to the productive system (Bergman, 2018). The best companies and institutions in the world are the ones who constantly train their workers and allow them to make careers and progress. Every day, we hear about people losing jobs because companies decide to move to other countries or close for economic/political reasons or simply are not profitable anymore. In the context of the Covid-19, we will see this multiplied several times in a historical recession. The implementation of Artificial Intelligence and robotics in the industry will make this situation worse and worse in what we call **technology disruption**. Workers with ultra-specific skills are suddenly unemployed and claim for solutions via governments or unions. Technology disruption plus the pandemic is a current issue in construction, automotive, metal, and almost in every industry with a special impact in the tourism industry.

2.1. Continuous education, flexibility, adaptability, and resilience

Today, professionals and workers need to be flexible and reshape their profiles several times during their lifetime to fit in the most dynamic market of our history. Governments are not able to cope with the situation giving only benefits and economic relief. They must help people to change and adapt. **Educational institutions play one of the most important roles to face this new paradigm**. More than ever, education is a crucial investment if we want to succeed in the future.

Specific skills are not valuable any more in the sense that workers should be able to learn new skills quickly to adapt their selves to the new requirements of their current job or to find a new one. However, **flexibility and adaptability** are not enough. It is necessary to be **resilient** to the constant changes that will imply sometimes failure. These skills do not relate to any specific technical knowledge, for example, in an area of Civil Engineering but they are key for any profession or job.

In the case of universities, the Covid-19 has pushed all the academics to move from traditional face-to-face teaching to Online provision. This sudden change has shown how profound are the usual problems we face as teachers. For example, the problem with engagement, attendance, and commitment when following a course. In this case, a **personalised approach** is the only strategy that has shown effectivity when students do not engage in their face-to-face courses. Clearly, for Online courses, the issues will be the same or even worse if the lecturers do not act taking a close look at the behaviour and performance of their students. Now, the uncertainty about when we will be back to normal makes us think in a strategy that has to cover two scenarios at the same time: **face-to-face teaching with social distancing** and **online teaching**.

On the other hand, due to the need for being flexible and adaptable, specific methods or strategies to solve problems classically are not valuable anymore. Today, what matters is **the knowledge of the principles and the understanding of the phenomena** to be able to choose between the immense numbers of tools available to solve the problems effectively when not efficiently. Then, the **willingness and ability to learn new tools** using the knowledge of engineering principles is essential. **This is again resilience**.

Methods to solve problems are still valid as examples but they have no value if the principles on which the methods are based are not understood. Knowing and understanding the principles give us the baseline to be able to **develop new skills quickly when necessary**.

This new dynamic world has made the traditional structure and strategies of the educational system obsolete and it is necessary a profound change. Educational institutions are suffering as any other industry the impact of technology disruption and the impact will be even deeper in the coming years.

The good news for the engineers of the future is that today, better than ever, creating a company or entrepreneurship is not only possible but relatively simple. The market available to offer our products and services is global. At the same time, access to knowledge through online courses

from everywhere is possible just having a personal device and access to the internet. **The problem today is what to learn and when.**

For academics, the question is **how the necessary courses are designed and implemented to teach the engineers of the coming future?** The truth is we are in an unknown territory, so, we must be creative to develop in our students the flexibility, adaptability, resilience, and the willingness to learn quickly when necessary. I am afraid this is not an easy task.

Academics must be flexible, adaptable, resilient, and creative too.

Lecturers and lectures are still very useful, and they are appreciated by students at universities. For blended and online education, it looks like natural to think that pre-recorded lessons are powerful and even better than face-to-face lessons. Online access to a lecture anytime avoids problems like lack of attention, disruption, latecomers, early leavers, misbehaviour, etc. However, engagement is even more challenging since there is no direct monitoring and interaction with the students.

Monitoring attendance of online classes can be a good strategy. Making a live introduction to the topic of the day and live conclusions and questions and answers sessions after watching the lecture could help to engage students. Continuous assessments could help as well to keep the engagement of the students if the assessments are used to progress to the next lessons and activities.

Personalised monitoring of the learning process of individual students is a task that will be very difficult to replace by artificial intelligence and robotics since humans have empathy, robots not yet. Our empathy and preoccupation for our students is a value we should cultivate and use to improve the quality and results of our modules and courses.

Technology allows us to identify and reach every single student in the different cohorts when a lack of engagement or performance is detected. We should use technology to help students anytime a lack of progression is detected. Continuous assessment can help to act early.

So, be flexible, adaptable, resilient, and pay special attention to the engineering principles in any course you deliver. Be creative and develop your empathy to connect with your students.

3. How to teach a module with engagement?

3.1. Tips for implementing continuous assessment and achieve engagement

Lack of engagement is one of the issues higher education faces daily and it is difficult to tackle. We have to recognise, in the first place, that self-motivated students that want to learn are not the most common ones. Several committed students attend courses to learn but in general, they attend courses for many reasons. One of the reasons is to achieve a qualification that will improve their lives but not necessarily learning but passing the assessments. In fact, this is what academics and institutions ask for getting the qualification. Academics do not measure commitment, motivation, or desire to learn but assessments.

In terms of assessments, what usually happens at universities is that **external examiners and institutions** encourage the use of more open assessments to ensure the students can apply the skills they learn when solving **problems with an open solution that cannot be found on the web or their notes**. On the other hand, **student satisfaction and progression** demand the use of **step by step guides** that allow the students easily to complete their assessments. So, there is a conflict between the **student voice** that usually ask for more step by step guides and self-contained notes and the **external voice** that asks for more open examinations. Academics who are in the middle of these two points of view must find the right balance between these two extremes. Academics are aimed to hear the voice of the students and the external examiners and institutions to improve their modules modifying contents and strategies.

When talking about modules, students are generally interested in passing the module with good marks spending minimum time and effort. This is, in fact, an engineering approach, so, the right one when studying Civil Engineering courses for example. When students pay expensive fees, they want to be taught and guided step by step by their lecturers. A great lecturer is the one who produces a material that is easy to read and provides all the information for exams. Students like to cover the material with the lecturer chapter by chapter and week by week. However, this approach does not produce resilient, adaptable, and creative professional but engineers that need precise instructions and training to work on a problem every time. Unfortunately, this is not what the industry needs as it was discussed in the previous section.

Considering an academic year, students are more motivated during the examination period at the end of semesters and find it difficult to engage during the lectures period at the beginning of the courses. Ideally, students should study and engage during the whole semester of the academic year but generally, most of them study only weeks or days before the exams. Traditionally, there is a period of lectures and demonstrations that students find difficult to follow since the motivation produced for the exams are far yet. Academics are frustrated because of the lack of attendance, engagement and commitment at the same time students are frustrated because they do not see the point of learning the contents covered.

One strategy to solve this problem is the implementation of continuous assessment. In the context of Online teaching, the strategy should be delivering online classes recording videos of every topic in the first place. To guarantee that students watch the session, a multiple-choice or questionnaire must be completed before watching the next class.

An opportunity for asking questions before the continuous assessment is important and is easily implemented for example creating Channels in MS Teams to ask questions. At the same time, this creates an opportunity to engage students. When setting these question sessions, most of the students will be interested exclusively in the mechanics of the exam and not in the knowledge or contents of the text. This is normal and demonstrates that the interest is on passing the tests or exams more than learning. **In any case, students engage, learn and progress.** At the same time, committed students could learn more and ask questions.

Ideally, online classes should be live sessions. However, online pre-recorded classes can be much more effective and professional if the lecturer opens every session with a live talk to introduce the topic to cover every session. The lecturer should invite students to attend the session on a day and time (Timetabled). Monitoring the attendance will help too as it is usually done with face-to-face teaching. In this way, engagement reinforces, and motivation strategies can be implemented.

The first session of an Online Module explains the organisation and the learning outcomes of the subject. For example, a video lecture explaining the module guide could be useful to make students aware of the expectations of the module leader. Every session, a reminder of this structure and the expectations of the lecturer should be provided too. Coursework briefs and exams instructions should be explained and recorded to have a video as well that can be studied at any time before deadlines.

Since the cohorts are usually diverse, there are students more motivated than others. There are students with more or fewer family commitments. In times of pandemic, this issue is even more problematic. Every person has circumstances we should attend. For this reason, it is important to give access to the material online as soon as possible to ensure that every student can study it and make questions when the time arises during the live sessions.

Open several channels of communication is another good practice. Questions can be asked by email, in MS Teams, during a video conference, during Q&A questions, etc. Restricting the means to ask questions could produce a lack of communication.

In our task as lecturers, we face the same technological disruption as our students will suffer in their studies and the near future in their professional lives. We must share the experience and reshape our work to give them the best chances to be able to tackle this disruption.

Showing excellence, professionalism, integrity, inclusivity, and creativity, we will be able to educate motivated engineers with flexibility, adaptability, resilience, and willingness to learn and be an outstanding professional.

4. What are the tools to survive the Covid-19 pandemic?

At universities all around the world, Covid-19 has forced us to move to blended teaching delivery and with a big component of online teaching and assessments. Before the outbreak, communication was already a key point that presented many issues. Even in this era of technological disruption and with access to systems like emails, Moodle, MS Teams, Panopto, Zoom, Google Meet, Skype, WhatsApp, Instagram, Facebook, etc., communication is still being difficult and ineffective sometimes. This is maybe because as information, the number of tools is overwhelming.

For managing the information and communication with the students successfully, the module leaders must take charge and design professionally every module of the course. Additionally, the course director must coordinate the modules to create professional courses implementing effective communication with the students, for example, via announcements, emails, videos, etc.

4.1. Technology provides tools, no more, no less

Even when a module is professionally designed and professional material is accessible, let say, in **Moodle**, this is not a warranty of a successful Module (Dommett, 2020). Monitoring and communicating with the students, week by week, is still necessary. Identification of technical problems, personal issues, misunderstanding, and the implementation of their solutions is fundamental. **The preoccupation of the module leader is crucial to reach the maximum progression possible for a module and for all the students to reach their potential.** Preoccupation is a skill that Artificial Intelligence systems cannot develop yet, so, it is a valuable skill in times of technology disruption.

With online teaching, there is an opportunity since these days young people prefer to use virtual communication instead of personal communication in many cases. MS Teams is a powerful tool to interact, monitor and support our students. However, the personal face-to-face interaction is irreplaceable and then the blended approach fundamental to succeed. This is especially important for students with disabilities or personal circumstances that require personalised support.

In the end, it is not about having the best or more recent version of the software or system but the way we use them to face what students need.

In the next paragraphs, some tips for using Moodle, MS Teams and Panopto are summarised. These are the tools we are going to use the next semester starting in September 2020 to face the pandemic and to be as effective as at times of face-to-face teaching. The tips are valid as well for other alternative systems used in other universities.

Moodle

This is an excellent virtual environment to keep all the material produced by the module leader and lecturers in a very professional way. An organisation implemented in folders help to have consistency and be easy to use by students. **It will be a good practice for all the academics to follow the same organisation.** (See example in appendix A.1).

There are many ways of organising the material on Moodle, but one could be organising the material in four folders covering:

- **Module Administration:** Module guides, regulations, student charter, etc.
- **Learning & teaching activities and resources:** notes, exercises, problems, tutorials, video-lectures, link to videos, video feedback, etc.
- **Assessment and feedback:** submission points, tests, questionnaires, etc.
- **Learner support information:** forums, Q&A, etc.

We must upload only the strictly necessary material to cover the module in the folders written and video material not to overwhelm the students with information. The video material produced should follow the structure of the writing material, then students can follow the classes reading the material at the same time.

The extra support folder is to add all the complementary material for those students who need more or want more.

MS Teams

MS Teams is for communication like live lectures, live introduction to videos, Q&A sessions, demonstrations, etc. I would not recommend using MS Teams to share documents at the same time with Moodle to avoid misunderstandings.

For every module, a channel where every question made by students and the answers of the academics should be created to share with every student. This will be a very powerful communication between students and lecturers.

Panopto

Panopto allows us to develop professional video lectures without disruption or lack of attendance from students. It was argued that students are not able to pay attention to videos of more than 15-20 minutes. Even when I think this is a lack of professionalism from students, I believe that organising the contents of our lectures in videos of no more than 20 minutes is a good practice. A questionnaire or any other type of assessment should be included at the end of the **video or set of videos** to reinforce the learning process. This assessment could be formative or summative.

Formative assessments can be used to decide borderline cases at the end of the course when the marks are being checked.

Both academics and students must use the available technology to reach the most of it. Technology only provides tools, no more, no less. Humans provide the wiliness, professionalism, and results to achieve their goals.

5. What are the issues with Feedback and communication?

Feedback is the main process of communication between students and lecturers (Agricola, 2019). Feedback is from academics to students and from students to academics. There are two important reasons why the feedback is difficult to articulate in higher education.

The first reason is providing feedback takes time and time is scarce since academics have research, administration and teaching responsibilities at the same time and students have several modules, sometimes work and family commitments. For academics, when dealing with small groups of students, it is relatively simple to manage personal feedback during classes and after marking assessments. In small groups, the personal relationship developed between lecturers and students gives confidence to the students to communicate openly with the lecturers. However, when a cohort is made of hundreds of students, it is almost impossible even remember the names of all them. Providing personalised feedback is simply impossible and students feel they are one more of many having lack of confidence contacting lecturers.

The second reason is students or academics reject negative feedback, but both sometimes use feedback to canalise their frustration being extremely negative when providing comments. This is more remarkable when the feedback is anonymous as in the Module Evaluation Questionnaires (MEQ).

5.1. Continuing communication

As discussed before, in the context of blended teaching with an online provision, **continuous assessment** can be a tool to keep engagement. Having continuous assessments open the possibility of providing **continuous feedback** too. The use of technology makes it possible to set up automatic feedback when assessments run using multiple choices or questionnaires. Moodle becomes a powerful tool when using this type of assessments. Automatic feedback is not personalised, but it is better than nothing.

For dealing with the first issue, time, general feedback can be provided instead of personalised feedback to the cohort based on the results of the assessment and the engagement and behaviour. For online teaching, monitoring the attendance will help to provide feedback too to prevent avoidable failure in the assessments because of lack of engagement.

The second issue, frustration, can be canalised providing positive feedback instead of negative comments generating an environment of open communication and avoiding anonymity. Creating discussion groups online could help; however, students tend not to engage too much. Strategies must be explored to improve the engagement on these groups, for example, giving marks for the most helpful contributions in these forums. Without rewards, students tend not to engage.

Giving only positive feedback is not possible, there are always errors and mistakes in assessments, but it is possible to find positive things to comments and after focusing the attention to negative things. Creating a culture to demystify errors and mistakes could contribute to increasing the effect of the feedback.

A good strategy could be giving second and third opportunities to amend errors and mistakes in part of the assessments. Typically, students must submit coursework that can be redone to improve marks and can reflect the learning from the feedback. If the feedback is provided only at the end of the year without the possibility of improvements, students get frustrated.

Consistency for every module structure and methods of assessments could be a good idea but the price to pay for consistency is losing a personal touch. However, some things could be better if consistency is applied. This must be discussed for the academic team until reaching the

optimum way of organising Modules and Courses. It must be remembered that collaboration within the team is crucial.

Consistency in the way feedback is provided will be beneficial for general feedback. It must be easy to read and understand.

Personalised feedback (one-to-one) can be a powerful tool but must be used only for students who need extra support, students who cannot manage by their self, the resources provided for learning. This type of feedback needs to be inconsistent since the lecturer or the personal tutor will find the best way to provide support to the student.

To deal with big groups of students, there is an example of general feedback that can be useful. At the end of an assessment, the lecturer will analyse the common hits and misses to provide general feedback to the entire cohort. The assessment can be provided producing a video with the explanations of the most common hits and mistakes made during the examination. Sessions on hits and mistakes during an exam could be extremely beneficial for face-to-face and online courses.

Sharing statistics of the group in terms of performance of the group is another tool that can be used to provide general feedback to the students (See example in appendix).

Again, the issues around feedback are not about systems but the human touch. Preoccupation and commitments are powerful tools to improve the communication and performance of academics and students.

Feedback is not unidirectional but bidirectional, it is communication.

Conclusion

After the analysis of a series of concepts as student satisfaction, progression, student voice, external voice, etc. I conclude that in the context of Covid-19 and the technology disruption, we need to teach, study, and learn faster than ever.

In this era, the most important thing for future engineers is to learn how to learn and develop creativity, resilience, flexibility, adaptability, and critical thinking. These skills will allow engineers to face future problems with confidence and they will be valuable professionals for the construction industry and for any industry where a civil engineering profile is required.

Because we must be more and more efficient, we need to be where students need us and when they need us, not before, no after. For doing this, we must use many channels. Moodle, MS Teams and Panopto are only examples of systems to develop communication between lecturers and students. There are many others to be explored.

It is necessary to teach and learn how to manage access to information and technology to create knowledge to solve practical problems in civil engineering. It is necessary to understand that problems can be resolved in many ways and using different tools.

In universities, the central issue is engagement, which relates to student satisfaction, progression, and assessment.

Feedback is bidirectional from academics to students and from students to academics. Feedback is communication and communication is key to success.

Preoccupation, empathy, and commitment are human features that for the moment artificial intelligence and automation are not able to replicate even remotely. In a competitive world,

these characteristics are valuable to be competitive and efficient when working with technological tools to resolve engineering problems.


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Appendices

A.1. Example of organisation in Folders for a module in Moodle

Welcome to VLE Moodle site for Geotechnical Engineering

 Announcements

1. Module Administration

General information as module guide, student charter, academic regulations, etc.

2. Learning and teaching activities and resources

This section includes presentation slides, presentation links, information from the client, reference materials and library.

3. Assessment and Feedback CW 30% EX 70%

The project brief, deadlines, group names and related materials can be found in the section. Coursework and Exam submission point and feedback is also located in this section.

4. Learner Support Information

This section should help you to successfully complete the module and includes some useful links, a discussion forum where you can post questions or start discussions.

A.2. Example of General Feedback for a module

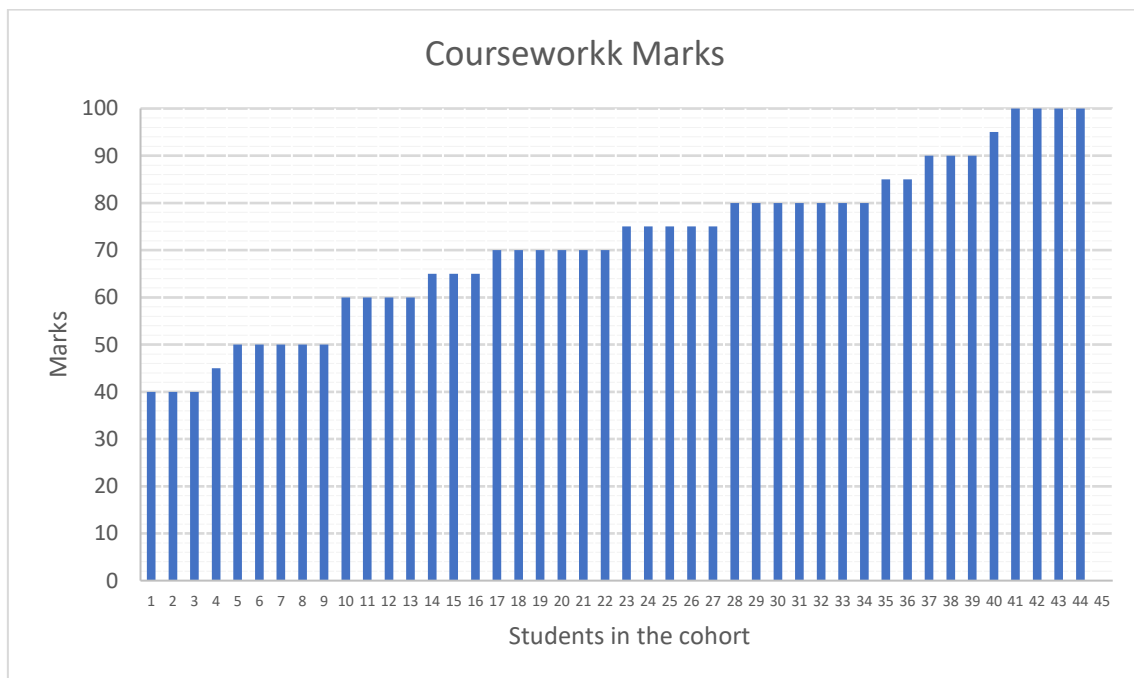
Geotechnical Engineering General FEEDBACK

Coursework STB Report

Dear students,

I am glad to say that **44 of 45** students submitted the report. Only, **1 student did not submit the report**. If you did not submit the report for a valid reason, you must apply for extenuating circumstances.

All the students that submitted the report have passed (40/100 marks or more). Remember that this report is 30% of your final mark. In the figure, you see the distribution of the marks obtained for the whole class.



Student vs Grade for the coursework

Feedback

You must remember that a report is a written communication that must be structured and has an aim. In this case, it is to decide if the software STB is suitable for analysing slope stability in a small company as it was stated in the brief.

The software is free; this is a great advantage. Any report has compared the no cost against thousands of pounds of commercial codes like for example GeoSlope or any other commercial software. I did not ask for this analysis, so, I did not reduce marks for the lack of this analysis but remember cost is important.

The theory presented in the introduction was useful to have the basic equations that govern the physical phenomenon and to have a tool to check the software results. You must use the equations to analyse the results of the example you decided to present.

When judging software, the examples must be simple in terms of geometry to eliminate the influence of complex layers or sophisticated patterns. It is always preferable to analyse examples with only one soil as **we did during our sessions**.

We always go from the simplest to the most complex examples and not in the opposite way.

The analysis of the code is necessary to check the equations of the theory that were implemented in the programming code of the software. If not, the software is a “**black box**”.

The analysis of examples must be sensible and systematic. The analysis of simple examples helps to identify the power of the software in term of Geotechnical Analysis of slopes when the main variables change (cohesion, angle of internal friction, water table level, unit weight of soils, the angle of inclination of the slope, etc.).

Remember that a conclusion is not a resume of what we have done. The conclusions are the findings that link theory, programming code and the examples results to make our final decision, our **informed decision as engineers**. A report that just includes all the elements asked in the brief is incomplete without proper analysis and conclusion.

A good report (100/100 marks) is personal and professional. It shows hard work and professional analysis based on knowledge, skills, and common sense.

The effort put in the report for the group is in line with the effort of attending the class, attending on time, and working in class. Around 60% of the group did a very well job and they have first-class marks over 70%.

It is indeed a good group to work with.

*Module Leader
London, 21st December 2018.*

A.3. Example of continuing assessment for a module during a semester

Geotechnical Engineering Teaching & Assessment Plan

WEEK	DATE	LECTURES
1	21 Sep	Seepage (Part 1)
2	28 Sep	Seepage (Part 2) Test or Multiple choice or Report (5%)
3	5 Oct	Consolidation (Part 1)
4	12 Oct	Consolidation (Part 2) ; Ground improvement techniques Test or Multiple choice or Report (5%)
5	19 Oct	Elastic stress distributions & settlement calculations (Part 1)
6	26 Oct	Elastic stress distributions & foundation settlement calculations (Part 2). Sustainability in Geotechnical Engineering Test or Multiple choice or Report (5%)
7	2 Nov	Slope stability (Part 1)
8	9 Nov	Slope stability (Part 2) Test or Multiple choice or Report (5%)
9	16 Nov	Retaining wall design (Part 1)
10	23 Nov	Retaining wall design (Part 2) Test or Multiple choice or Report (5%)
11	30 Nov	Bearing capacity (Part 1)
12	7 Dec	Bearing capacity (Part 2) Test or Multiple choice or Report (5%)
	14 Dec	Christmas Vacation
	21 Dec	
	28 Dec	
13	4 Jan	Revision
14	11 Jan	Final Exam (70%)
15	18 Jan	