Teaching Large Groups

**Report on Teaching Large Groups
4TU. Centre for Engineering Education**

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Education and Learning Sciences, Wageningen University & Research

WAGENINGEN
UNIVERSITY & RESEARCH

Contents

1   Rationale for this overview study

In recent years, there has been an increasing trend in the number of students entering Dutch Universities. According to the Dutch Association of Universities (VSNU), student numbers in Dutch Universities have been on a steady increase. Overall, for the whole of the Netherlands since the 2013 there has been a 17% increase in student registrations for Bachelors, Masters and Doctoral programs (Figure 1). This increase has been brought about by the influx of international students, with many coming from other neighboring European countries, but also from Asia and the Americas[1].
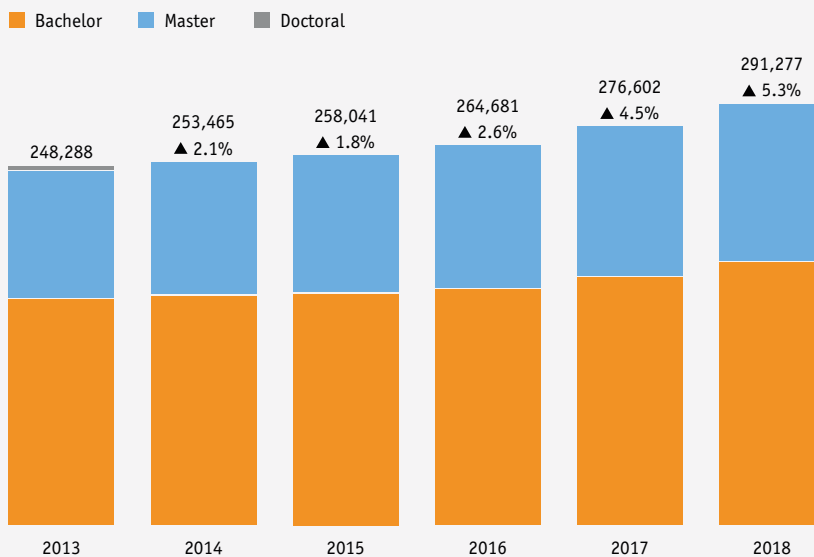

Figure 1: Total number of students registered in Universities Netherlands between 2013 and 2018[2]

Wageningen University (WU) is one of such university that has seen an increase in student numbers in recent years. According to the VSNU, there has been 43% increase in student numbers between 2013 and 2018 (Figure 2). These numbers are expected to continue to increase, especially with the internationalisation of some Bachelor programs – where the programs are taught in English and are thus open for international students to sign up for as well. While this increase in numbers has resulted in more income, recognition and opportunities, there is also the concern and challenge of ensuring that the quality of education that WU provides is maintained and consistent given that the other factors (e.g. number of teachers, infrastructure etc.) remains largely ceteris paribas.

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[1] Record number of international students come to the Netherlands. (2017, March 4). Retrieved October 4, 2019, from https://www.dub.uu.nl/en/figures-and-numbers/record-number-international-students-come-netherlands.
[2] Figure taken from the Dutch Association of Universities (VSNU) Retrieved October 2, 2019, from Retrieved October 2, 2019, from https://www.vsnu.nl/en_GB/f_c_ingeschreven_studenten.html.
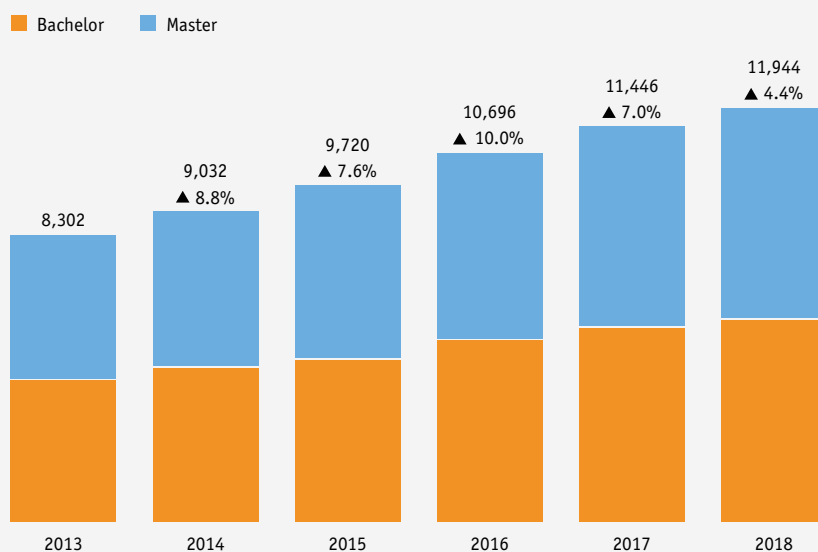
Figure 2: Number of students registered in Wageningen University (WU) between 2013 and 2018[3]

The increase in student numbers brings about much benefits. For one, the influx of international students bring in more income for the respective institutions that they enrol in and they also contribute to the state treasury. International students also contribute to the international classroom in Dutch higher education institutions – they bring in knowledge, experience and networks from their own countries and contribute to the diversity in classrooms[4].

However, while there are benefits, there are also challenges that are associated with the increase in students in higher education institutions. Some of these challenges also include a housing shortage for students, as student numbers continue to grow faster than the number of accommodations being freed up or built to accommodate the growing numbers. But a more pressing concern for universities and the management of higher education institution is the impact that this growth will have on the workload and quality of education and research.[5] With growing student numbers, the result will be larger classes (i.e. more students) in the short run if there are insufficient resources to deal with it immediately. This might result in a few challenges for teaching staff, such as keeping students engaged as well as assessing and providing timely feedback to students if they are not used to handling large groups.

Wageningen University & Research (WUR) is a leading international university that has a focus in the domain of life sciences. Students all over the world are attracted and choose to come to WUR because of the world-class education. The programs in WUR are multi-disciplinary, with a focus on providing sustainable solutions for complex societal issues.

[3] Figure taken from the Dutch Association of Universities (VSNU) Retrieved October 2, 2019, from https://www.vsnu.nl/en_GB/f_c_ingeschreven_studenten.html.

[4] Dutch education more popular than ever. (2017, June 1). Retrieved October 4, 2019, from https://www.netherlandsandyou.nl/latest-news/news/2017/03/31/dutch-education-more-popular-than-ever.

[5] Smaling, E. (2018, October 23). Workload concerns due to increase in student numbers at EUR. Retrieved October 4, 2019, from https://www.erasmusmagazine.nl/en/2018/10/23/workload-concerns-due-to-increase-in-student-numbers-at-eur/.

Wageningen University prides itself on being able to provide education that is of high academic quality as well as personal contact between students and lecturers as one of its core strengths. In the WU Vision for Education, published in 2017, it was mentioned that there was a "*want to maintain the important characteristics contributing to our success, including the small scale of our education, the accessibility of our staff, our international and multidisciplinary character, our cutting-edge research facilities and our focus on sustainable solutions for complex problems.*"[6] The 2019-2022 Strategic Plan[7] also mentioned that WU offers students "*a personal and small-scale approach combined with more large-scale teaching methods*".

Education at Wageningen University & Research is highly valued by students, staff and experts alike. The past fourteen years, Wageningen University was ranked as the best university in the Reference Guide for Higher Education in the Netherlands.[8] This increased recognition from rankings as well as being renowned on the international level for many of its programs, has no doubt led to the increase in the number of qualified students applying and enrolling in WU. In fact, student numbers have doubled in the last years and it is expected to reach 15,000 students by 2023.

While this increase in student numbers brings some benefits with it (i.e. more funds, more recognition etc), maintaining the high quality of education with growing student numbers is fast becoming a concern for the Board of Education. This is so as the number of teaching staff is not increasing fast enough to deal with the growing numbers, and existing facilities might not be able to handle the growing student numbers. The Board of Education acknowledges this growing concern and has indicated in the Strategic Plan 2019-2022 that they will look into recruiting more staff, investing in facilities such as buildings, classrooms and digital tools, deploying WR staff in education as well as providing educational support to tackle this problem and maintain the education standards WU promises.

However, all these measures will take time to be implemented. Thus there is a need for a solution for the current situation – which is to look for way to handle large groups of students without compromising on the quality of education that is promised. As such, the Dean of Education has requested an inquiry to look into what is currently known about teaching and assessing large groups of students, which is the overall objective of this report.

The question that we aim to answer is "*How to deal with large student groups (in terms of teaching and assessment?*" What inspiration can be given to teachers and management for this? In this report, we will start by discussing research into the benefits and challenges of large-group teaching, followed by evidence-informed suggestions on how to deal with the challenges posed by large group teaching. At the end of this report, we will provide an inspiration list of links (see appendix) that provides more details and ideas on teaching and managing large groups of students.

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[6] Vision for Education. (2017). Wageningen University & Research. Retrieved October 11, 2019 from https://www.wur.nl/upload_mm/c/9/8/824e2e07-5d7b-4fa2-800d-5b0cd90b6a02_WU Vision for Education 2017.pdf.

[7] Finding answers together | Strategic Plan 2019-2022. (2019). Wageningen University & Research. Retrieved from https://www.wur.nl/upload_mm/2/b/b/ddcb7cf6-5d75-4cd0-91b5-9138cf3808aa_8412103815_CC_SP_compleet_UK_LR.pdf.

[8] About Wageningen University. (n.d.). Retrieved October 11, 2019, from https://www.wur.nl/en/wageningen-university/About-Wageningen-University.htm.

2   Method

In order to suggest recommendations for dealing with large groups, there was first a need to look into the benefits and challenges that come with teaching large groups. Knowing the benefits can help in communication with educators (and perhaps also students), to get them to see the positive sides of being in a large groups. On the other hand, knowing the challenges associated with teaching large groups can help educators find or adopt (new) ways to deal with teaching large groups whilst not putting even more work on themselves.

As part of this research, we have defined "teaching large groups" to include aspects of teaching like the actual teaching in class, assessment of students as well as other logistical aspects of dealing with large student numbers for classes. Additionally, the term "large groups" is subjective – one teacher's definition of 'large' group may be very different from another's. The definition of "Large groups" could also differ depending on the type of class being conducted (e.g. lecture, tutorials or lab practical etc) As such, we suggest that in this paper, "large groups/classes" is one that *feels* large to the teacher. Some signs that might lead a teacher to feel that the class is large could be when the class is much bigger than what the teacher is normally used to; and when there is insufficient resources to cope with the total enrollment if the teacher desires individual attention for the students.[9]

We searched for information that is shared, by teachers or schools that have dealt with teaching large groups, to see what are the benefits and challenges of teaching large groups, as well as how they have managed to deal with teaching large groups. In order to gather information needed to give us a better picture on the options available for dealing with 'Teaching large groups', there were two main channels being used. The first channel used was Google, to get a general and brief overview into what was available on the internet about teaching large groups. This was done through a simple Google search for "teaching large groups". The second channel used was the WUR Library to search if there would be scientific papers on research into "teaching large groups". Both searches resulted in much information and suggestions for various methods for dealing with teaching large groups and this will be elaborated in the next sections. Finally, some input was obtained via experts in the 4TU.CEE network, that provided us with links to websites or other useful information from their own contexts.

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[9] Effective Teaching and Learning in Large Classes. (n.d.). Retrieved October 11, 2019, from http://breda-guide.tripod.com/New-5.htm.

3   Benefits and Challenges of Teaching Large Groups

From the online searches and papers that we have found and read, we found that there are many benefits and challenges linked with teaching large groups of students. The benefits and challenges will be elaborated in this section and provide the basis for the strategies that will be discussed in the next chapter.

3.1 Benefits of Teaching Large Groups

Giving a class to a large group of students is often associated with the word "lecture". Lecturing is one of the oldest methods of teaching and it was introduced in the part because books were expensive and rare, thus reading to others in a form of a lecture, was most efficient to transfer knowledge. In today's context, lecturing is still very much effective for introducing new content or knowledge to large groups of students.[10] As such there are many benefits associated with giving lectures to a large group. For example, lectures are beneficial when teachers need to *convey basic and necessary information to students*.[11] This makes it more *efficient* and *effective* for teachers as it ensures that they *give the same information to all students*, and students can also benefit when other students ask relevant questions that they themselves might not have thought about, and the teacher is able to address it directly in class for all to hear.

Another benefit of teaching large groups would be that students have the opportunity *to meet, mix and network with peers*. This provides the opportunity for teachers to implement projects for students to work in groups, to enable students to learn to work with their peers as well as learn with and from their classmates.[12] With more students, there will be a larger *diversity of learning and working styles*, as well as *more opinions and ideas* and this presents a learning opportunity for students as well as developing their boundary crossing competences.

3.2 Challenges of Teaching Large Groups

There are many challenges that are associated with teaching large groups of students. From the research that was conducted, we derived three main challenges that arise from of teaching large groups. The challenges are (1) student disengagement, (2) tracking and assessing students' learning and progress as well as (3) the logistics and administration of dealing with large groups.

Disengagement and reduced participation of students in large classes
In a teaching guide by Adam Wilsman, a Graduate Teaching Fellow at Vanderbilt University, he mentioned that large student numbers in a class can result in "student disengagement and feelings of alienation"[13]. Encouraging participation in any class is challenging, but it can be especially difficult in larger classes. A study by Weaver and Qi (2005), found that

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[10] Lectures. (n.d.). UNSW Sydney. Retrieved October 11, 2019, from https://teaching.unsw.edu.au/lectures.

[11] Large Group Teaching. (n.d.). UNSW Sydney. Retrieved October 11, 2019, from https://teaching.unsw.edu.au/large-group-teaching.

[12] Teaching Large ESL Classes: Problems and Advantages. (2012). Retrieved October 11, 2019, from https://how-to-teach-english.ontesol.com/teaching-large-groups/.

[13] Wilsman, A. (2018, May 7). Teaching Large Classes. Retrieved October 11, 2019, from https://cft.vanderbilt.edu/guides-sub-pages/teaching-large-classes/.

there are multitude of issues that affect student participation levels and a few are especially important as they are related with larger class sizes. The issues that are mentioned include more negative student perceptions of faculty authority and of the instructor, and students' fears of peer judgment.

Firstly, students' perception of faculty authority will affect their participation in class. This is especially so in first year students if they are from the start being introduced to large classes. In such classes, students might feel that the teachers are the "arbiters of knowledge" and are always right and thus, they might not feel as comfortable to challenge or question the ideas or information that the lecturer disseminates to them. Lecturers might also appear more "impersonal, remote and inaccessible" to students.[14] This will result in students *being passive learners* in class – sitting silently and absorbing the information given by the teachers. Secondly, a large class can affect students' perceptions of the teacher and result in *lower participation levels*. In large classes, it is often difficult for teachers to learn students' names and get to know each student, or at least have personal contact or meaningful exchanges with every student. This, coupled with the *large space* in the classroom, creates distance between the teacher and students. As such this might contribute towards students' feeling like the teachers are distant and be less likely to approach the teachers. Thirdly, students' fear of peer judgement contributes to their lack of participation. This is especially so in large classes, as students might be *afraid of speaking up*, in front of many of their peers, for fear that they might potentially say something wrong or ask a silly question. As such, this will lead to reduced participation of students in large classes (Weaver & Qi, 2005). Consequently, the above reasons behind the lack of student participation can eventually lead to the erosion of student's sense of responsibility towards their own learning.

Assessing large groups of students

Another challenge that comes with teaching large groups, is the assessment of large groups. This has an effect on both teachers (i.e. *workload as well as fair assessments*) and students (i.e. whether or not they can get personalised and timely feedback on their learning progress). In cases where student numbers in a class have increased, but the number of teachers has remained consistent (or even reduced), it automatically results in the teacher having more students to grade, and depending on how many assignments the teacher sets in his/her course, this number of assignments to grade can increase exponentially, thus creating a heavier workload on the teacher. In addition, teachers who are used to giving timely and personalised feedback to their students, would find that it will be near impossible to do so with a larger class, especially with the increase in diversity of students and learning styles. This thus makes it difficult for teachers to track individual students' learning. In other cases where there are more teachers or teaching assistants available (and thus assessors) to handle the large class together, there will be the added challenge of *ensuring fair assessment in terms of marker consistency and reliability*.[15] Other challenges that are associated with assessing large groups includes *avoiding assessment that encourages shallow learning, avoiding plagiarism as well as coordinating the staff or teaching assistants* involved in the marking.[16]

[14] Strategies for Teaching Large Undergraduate Classes. (n.d.). Strategies for Teaching Large Undergraduate Classes. Retrieved from https://www.baruch.cuny.edu/facultyhandbook/documents/LargeClasses_StrategiesforTeaching.pdf.

[15] University of Reading. (n.d.). Assessing large numbers of students. Retrieved October 11, 2019, from https://www.reading.ac.uk/engageinassessment/assessing-large-groups/eia-assessing-large-groups.aspx.

[16] Assessing and providing feedback to large groups. (n.d.). Retrieved October 11, 2019 from https://www.dcu.ie/sites/default/files/ovpli/Assessment and Feedback to Large Groups.pdf.

Logistics of dealing with large groups

While there is much focus on how the education that is being given to the students will be affected with a larger class, there might be a tendency to overlook logistical issues that come with managing a class. This should not be taken lightly, as the logistics of managing and planning a course is as important as the class itself. One such logistical challenge is scheduling and classroom allocations. With more students, there is a need to look for classrooms big enough to accommodate the entire class or enough classrooms to conduct numerous tutorial/lab groups at the same or different time slot. It is also a challenge for teachers if they have to find enough tutors or teaching assistants to help out with tutorials, laboratory sessions or even fieldtrips. Next, there is the challenge of taking attendance for classes that require students' presence – students might feel anonymous and decide not to attend the class as they think that they will not be missed, and therefore it makes it difficult to track students' especially since the teacher might not know everyone by face and name. Another challenge that comes with a larger class is managing emails from students – teachers might receive dozens of emails from students and some of it might even be the same questions.

4   Strategies for dealing with large groups

As seen in the previous chapter, there are many challenges associated with dealing with large groups, mainly in teaching, assessing as well as managing the logistics of a large group. These challenges were reported and encountered in many Higher Education Institutions around the world that had to deal with teaching large groups. These challenges are likely to be faced by staff and teachers of WU as well when dealing with large groups of students. As such, in this chapter, we would like to propose some strategies to cope with these challenges. However, as there is a plethora of suggestions available on the internet with regards to dealing with a large group, we have decided to group the strategies into four main over-arching themes, namely, (i) strategies for reducing anonymity and improving student engagement, (ii) strategies for managing large groups, (iii) strategies for assessing and providing feedback for large groups of students, and (iv) strategies for dealing with the logistics of teaching large groups. In addition to the strategies mentioned in this chapter, we have prepared an inspiration list of links to teaching resources as well as websites (see appendix) that offer various strategies that teachers can peruse to see what might be useful for them to implement in their own classes.

4.1 Strategies for reducing anonymity and improving student participation

In a longitudinal study conducted by Astin (1993), it was found that *high-quality* interactions between student and faculty strongly and positively affected students' learning outcomes and their attitudes regarding their college experience. Students are more comfortable to seek help or ask questions when they have strong positive interactions with teachers. This also motivates students to learn from teachers whom they have positive interactions with and motivation strongly correlates with adult learning (Wlodkowski & Ginsberg, 2017). A study by Komarraju, Musulkin, & Bhattacharya (2010), also found that students were motivated to learn and were confident about their academic skills when they perceived their teachers as being approachable and available for interactions in and out of class.

As such, in order to continue to deliver the promise that WU provides quality education and personal contact between student and lecturers even if class sizes were to increase, while simultaneously reducing anonymity and disengagement in large classes, teachers just have to find a way to communicate that they care. There are many simple ways that teachers can adopt to communicate that they care and some examples from Rebecca Brent and Richard Felder's website on Resources for Teaching and Learning STEM[17] are elaborated in below.

> **Take time to introduce yourself early in the course -** The first day of the course is a good time to allow students to get to know you and perceive your enthusiasm for teaching them. In your introduction, you can include some personal details (family, pets, travels) along with information about your research interests, what excites you and about what you'll be teaching. If you are teaching an online course, you can post a short video to introduce yourself.
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[17] Brent, R. (2019, August 20). Making connections with students to enhance learning. Retrieved October 22, 2019, from https://educationdesignsinc.com/making-connections/.

Learn student names - Students appreciate it when you address them by name in class. This shows them that you care enough about them to make the effort to learn who they are, and research has shown that your knowing their names has a strong impact on their motivation to work hard in your class (Cooper, Haney, Krieg, & Brownell, 2017). For large classes, you can learn most names if you use strategies like making a seating chart and using it to call on students, or having the students make name cards with what they want to be called and display the cards (in front of them) in each class session until you've learned most of the names.

Give an autobiography assignment - During the first week of class, ask students to write brief (½–1 page) introductions including anything they'd like you to know about them. Use these "autobiographies" to help you learn their names. Try to connect course content to some of their interests.

Schedule meetings with groups of students - From these meetings, find out where they're from and what interests them. It will help you learn their names and more about them, and it will also help them find your office and discover that you want to help them be successful. They will then be much more likely to come during your office hours and seek out your help when they need it. If you teach an online class, schedule a chat or online call to accomplish the same goal.

In face-to-face classes, come to class early and stay late - Those informal moments before and after class are when many students will come up and ask a question, and in the pre-class conversations you may discover something on their minds that you can integrate into the class. You can also find out about how they are doing and listen when they tell you.

Be proactive when you think there may be a problem - Reach out to students, via email or text message, if you notice students are doing poorly on an assignment or exam or stop coming to class. This shows them that you are concerned and want to help.

4.2 Strategies for managing large groups

When teaching a large group, it usually means that there are many students and the classroom is large, thus creating a distance between teachers and the students. This will often result in some students not paying full attention in class, either they are distracted by looking at their laptops or mobile phones, or they are distracted by their peers beside them. This poses as a challenge for teachers as it will lead to the teacher wondering if the students are understanding what is being said, and students talking amongst themselves can also be distracting for the teacher giving the class. As such this section will suggest some strategies that teachers can implement in their courses to deal with teaching large groups and ensuring that students are kept engaged during the lesson.

4.2.1 Keeping students engaged in class

When in a large class, it can be difficult to know whether students are paying attention and actively learning. Furthermore in large classes, students are usually passive, just sitting and adsorbing the information that the teacher conveys. This can also cause the students to lose their attention quite quickly (usually after 15 minutes) in such classes. As such, to keep the class engaged and ensure that students are more active in their in-class learning, teachers *should make their lessons more active and student-centred*.

There are many strategies that a teacher can implement in their classrooms and some of these suggestions (found in help sheets online by UCL[18] and UNSW[19]) include:

Keep lecturing to a maximum of 20 mins at a time;

Break the sessions up into smaller parts, each with a different activity (if possible);

Allow time for students to reflect on lecture material (e.g. asking students to discuss a question in pairs or groups and then reporting it back to the class);

Do things differently in class from time to time (e.g. using different props in class or lecturing from different places in the class/hall);

Create notes or handouts with blanks, so that students have to pay attention in class in order to complete their notes;

Have students exchange notes with another student, to see what they wrote about and students can learn from each other through that;

Make a short test or (digital) quiz to test students' understanding of the lecture, give them time to write their answers and then get them to exchange their papers with another student. Ask students to correct and comment on the answers in front of them while the teacher explains the answers.

4.2.2 Use of Information and Communication Technologies (ICT)

Over the years there has been major developments in technology and particularly information and communication technologies. ICT for classroom use has also developed beyond just using presentation software (like PowerPoint) and online learning environments. There are now much more resources available for teachers and educators alike to use in their classrooms to engage and enhance students' learning. There are *online learning environments* (e.g. Blackboard, BrightSpace, Moodle etc) that teachers can use to upload documents and announcements for the students, and also to put online tests and quizzes that can test students' understanding and learning. Teachers can also make use of *clickers or programs like "Kahoot!"* to survey and engage students in class and test their learning and understanding on the spot. There are many examples of ICT that teachers can use and incorporate into their teaching in large group settings and some strategies as suggested by The Centre for Teaching and Learning at the University of Washington[20] are elaborated on the following page.

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[18] Large Group Teaching. (2016). Large Group Teaching. Retrieved October 10, 2019 from https://www.ucl.ac.uk/teaching-learning/sites/teaching-learning/files/20161207-ucl-large-group-teaching-v5.pdf.

[19] Learning & Teaching @ UNSW. (n.d.). Ideas for effective large-group learning and teaching. Ideas for effective large-group learning and teaching. Retrieved October 11, 2019, from https://teaching.unsw.edu.au/sites/default/files/upload-files/large_group_ideas.pdf.

[20] Teaching with technology. (n.d.). Retrieved October 11, 2019, from https://www.washington.edu/teaching/topics/engaging-students-in-learning/teaching-with-technology-2/.

Online collaboration tools, such as those in OneDrive and Google Apps, allows for online filesharing between students and instructors, as well as be able to edit in the documents in real time and project them on a screen. This gives students a collaborative platform to brainstorm ideas and document their work using text and images.

Presentation software, such as PowerPoint, enable instructors to embed high-resolution photographs, diagrams, videos and sound files to augment text and verbal lecture content.

Tablets can be linked to computers, projectors and the cloud so that students and instructors can communicate through text, drawings and diagrams.

Clickers and smartphones are a quick and easy way to survey students during class. This is great for instant polling, which can quickly assess students' understanding and help instructors adjust pace and content.

Lecture-capture tools, such as Panopto, allow instructors to record lectures directly from their computer, without elaborate or additional classroom equipment. Consider recording your lectures as you give them and then uploading them for students to re-watch. Studies show that posting recorded lectures does not diminish attendance and students really appreciate the opportunity to review lectures at their own pace.

Digital tools and apps, such as ClassKick, Crowdsignal, Kahoot, are some examples of online tools and apps that teachers can use in class to engage students in and out of class as well as provide feedback to students. This could be in a quiz during class or an online test outside class, for both students and teachers to check on their understanding/teaching of the topics.

4.3 Strategies for assessing and providing feedback for large groups

As mentioned in the previous chapter, there are many challenges associated with assessment for and providing feedback to students in a large-group teaching setting. However, there are many suggestions and options available for teachers to consider implementing in their courses in order to help them with the workload as well as to ensure that students still get timely and quality feedback.

4.3.1 Having teaching assistants

There are some types of classes where students might require more individual attention (e.g. skills competences courses, personal development courses), or when there needs to be more eyes to oversee lessons (e.g. lab practical, fieldwork, fieldtrips), or simply when there are too many students and there is a need to divide students into smaller groups for tutorials or group projects to work on their understanding and application of content. For such situations, it might be all too much for a teacher to handle the class by him/herself. One potential solution for teachers to consider is to have *teaching assistants* (TAs). These teaching assistants could be other staff members in the department that are knowledgeable in the topic, PhD students in the department, or MSc and BSc students who might have themselves undergone the class and are familiar with the content and topics or just students that want to try out with facilitating feedback and being a teaching assistant.

However, teachers should also take note that while teaching assistants are useful and can provide a lot of help especially with large classes, there can also be some challenges. Some of these challenges include having to train inexperienced TAs; TAs might be reluctant or

terrified to instruct students; some TAs might be less confident, while others overconfident; some TAs might challenge the teacher's authority while others might be less likely to take initiative; some TAs might be more serious than others. While it might seem like there are many challenges involved with having TAs, there are many universities that work with having TAs in classes and have written guides on how to effectively work with TAs. A list of some of these strategies and guides are included in the inspiration list of strategies in the Appendix.

4.3.2 Adopting a mixture of formative and summative assessments

Assessment and its associated feedback are essential to student learning. There are many ways that teachers can choose to assess their students. However, with the increasing student numbers, it would be wise for teaching staff to consider the time and resources that they have at hand and pick various methods of assessment that can measure students' progress effectively and efficiently while not compromising on supporting students' active learning as well as overloading themselves with tons of assignments to look through. In general, there are two different types of assessments that teachers can choose to incorporate in their classes – formative and summative assessments. This section will elaborate more on the different types of assessment as well as the various strategies available for each type of assessment.

I. Formative assessments

Formative assessments are assessments that help teachers to monitor student learning in order to provide ongoing feedback for teachers to improve their teaching and for students to improve their learning. Formative assessments are generally low in stake, meaning that they have low or no point value. According to the Centre for Teaching and Learning at Western University, it is mentioned that if teachers want students to get timely feedback during the course of the period or semester, teachers can consider incorporating more formative assessments in their classes. This will give students and instructors the critical feedback that they need while at the same time ensuring that teachers' workload does not increase significantly. Some examples of formative assessments as suggested by the Centre for Teaching and Learning at Western University[21] are elaborated below.

Drawing a concept map in class to represent their learning of a topic;

Submitting one or two sentences identifying a main point of a lecture (e.g. the 'one minute paper');

Incorporating discussion-oriented activities in class that enable students to practice course-related skills and demonstrate comprehension of the material;

Through formative assessments like these, students can receive verbal feedback from teachers, teaching assistants and/or other students. Teachers can also consider making use of ICT and construct formative types of assessments. For example, the teacher can use make use of online learning environments to make online quizzes or tests for students to do, and students can immediately get feedback and explanation on answers upon completion of the quiz or test. However it should be noted that such quizzes and tests are

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[21] Grading Strategies. (n.d.). Retrieved October 22, 2019, from https://teaching.uwo.ca/teaching/assessing/grading-strategies.html.

more appropriate for subjects or topics that have a specific answer e.g. hard sciences.

II. Summative Assessments

Summative assessments are used to evaluate students' overall learning at the end of a course, by comparing it against some standard or benchmark.[22] Summative assessments are often high in stake. This form of assessment is quite common in a lot of courses that are theory-based and can result in quite a heavy workload for the teachers when they have the manually read through and grade the students' papers. Some alternative assessments to summative assessments include incorporating group projects, where students can work on homework assignments or on a group project together. This way it reduces teachers' grading load but also gives students the opportunity to work with their peers as well as learn from one another. This also helps in developing the soft skills of students such as team work, communication as well as students' boundary crossing competences.

4.3.3 Grading assignments and assessments

Besides considering the type of assessments that teachers want to incorporate in their courses, there is also the part about grading that teachers have to consider. There are many aspects of grading that a teacher has to consider about. For one, there is the part about having too much assignments to grade; another is how to ensure *fair grading for students if there are other teachers or teaching assistants* helping with the grading.

In order to tackle the part about having too much assignments to grade, teachers should consider the type of assessments that they would like to implement in the course. Examples of the various types of assessments can be found in Section 4.3.2.

In addition to this, teachers can choose and set precedence on how they would like to grade students based on these assessments. The examples elaborated below, by Western University[23] (else otherwise mentioned), are suggestions for teachers to consider or rethink about summative assessment when they are deciding how to devise their grading system for the various assessments.

Implement a gateway requirement – Walvoord & Anderson (2011) suggest that instructors often waste valuable time reading through papers or assignments that have not even met the basic requirements of the assignment. To stop wasting time on such frustrating and unnecessary work, the authors recommend instituting a gateway requirement, whereby an assignment will be returned to the student if it failed to meet the basic requirements. The authors further remarked that "you can give it an F, or hand it back with instructions to revise and resubmit, perhaps with a grade cap or penalty for the resubmission. But you need not spend time on careless student work".

Manage instructor comments – Giving feedback and comments is one of the most time-consuming aspects of grading for any course. On one hand, you want to give feedback on both great work and any noticeable problems/issues, but too many negative comments is also discouraging for the student and might actually work against learning. Thus some strategies include: using shorthand comments, developing a short comments thesaurus; limit comments on grammar and punctuation; develop grading rubrics.

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[22] Eberly Center for Teaching Excellence and Educational Innovation, Carnegie Mellon University. (2018). What is the difference between formative and summative assessment? Accessed on June 20, 2018
[23] Grading Strategies. (n.d.). Retrieved October 22, 2019, from https://teaching.uwo.ca/teaching/assessing/grading-strategies.html.

Limit the basis for grading - There is no rule that says you need to grade, or comment on, everything the student writes or produces for a certain assignment. Your assignment learning outcomes are your guide here. Once you have decided what you want the students to demonstrate, you have the option to limit most of your comments to just those elements, and grade accordingly. Walvoord & Anderson (2011) suggest that save your comments only for "teachable moments" (i.e. those instances where the student could make an improvement for the next essay etc.). Commenting extensively on a final product when there is no further chance to improve does little for the student and even less for you.

Do light grading on short assignments - Another way to build a steadier stream of graded feedback into your course without making grading a full-time job is to maintain a simple grading system for short assignments. For example, you can grade papers on a three-to-five point scale, with specific pieces of information required for each point. For example, on a short paper, you could assign points for a clearly stated thesis or goal, a well-structured and coherent argument, appropriate coverage of the topic, good use of citations, a range of readings etc. etc. A five-point scale can also be used numerically, such that 5 = 90-100%, 4 = 80-90%, 3 = 70=80%, 2 = 60-70% and 1 is basically inadequate. Not only is grading faster with a limited scale, but it also reduces student grumbling about small percentage differences on papers (i.e. my friend got 85% but I only got 82%). This suggestion could go hand-in-hand with the use of assessment rubrics.

Provide an overview of most commonly made mistakes – To help with reducing the need to provide feedback to all students for intermediate assignments, teachers can consider providing an overview of common mistakes (including examples/excerpts) that they see while reading through the papers. This allows students to read (both the good and bad) what other students have done, and also in an indirect way, receive feedback on their assignments so that they know how to improve it.

Use of assessment rubrics – The use of assessment rubrics will help to reduce teachers' workload on giving detailed comments for each and every student's assignment. The assessment rubric will give students the information they need about how they did with the assignment. The teacher can also choose to provide one or two lines of comments if they think that there is something that the students really need to work on.

On the other hand, teachers might have the option of having teaching assistants to help with the grading or might even be co-teaching the course with other teachers. In such cases, there might be the concern of ensuring consistency in the grading by teaching assistants. Some suggestions to ensure grading consistency as well as mitigating complaints of unfairness as suggested by Western University[24] can be found in the following table.

[24] Grading Strategies. (n.d.). Retrieved October 22, 2019, from https://teaching.uwo.ca/teaching/assessing/grading-strategies.html.

Have regular grading meetings with co-teachers/teaching assistants – The best way to promote grading consistency among your co-teachers and TAs is to meet as a group soon after collecting an exam or paper. If you are grading essays, identify and photocopy an exemplary essay, a few mediocre essays, and a poor essay and distribute these examples to each member of the group. Before the meeting, have each teacher/TA grade and comment on these essays. At the meeting, go through each essay one-by-one. Ask each person what grade they gave to each essay and why. Ask them about the best and worst aspects of each piece of writing. Such a meeting provides an opportunity for your graders, especially inexperienced graders, to think about how they're approaching their grading. The meeting also serves as a platform for you to explain your expectations for exams or papers. It is unfair to assume that your TAs will simply know what you're looking for on any given exam question or paper topic.

Using a grading rubric - A carefully designed grading rubric can both minimize the amount of time spent grading, an important consideration in large classes, and serve as a common standard for your co-teachers/ TAs. Perhaps you can even enlist TA support in constructing a grading rubric. Such an exercise can be valuable to TAs as it facilitates the grading process, but it also gives them an opportunity to play an even bigger role in student assessment – this will definitely be a valuable experience for those TAs who aspire to one day teach a course of their own. This exercise can also provide you with a new and unique perspective on class exams, papers, and assignments that may ultimately enrich the course. (Creating and using a grading rubric can also be used if teachers do not have teaching assistants.)

Dividing up grading sections – Another way to ensure consistency is to assign different sections for different co-teachers/TAs to grade. While this might be more challenging with essays, it is a common approach for exam-grading. What this technique entails specifically depends on the design of your exam, but for example, perhaps one TA grades the short-answer section, a second TA grades the first essay, and a third TA grades the second essay. While there still may be some inconsistency in the "harshness" of grading between sections, with this method, students can hardly argue that their particular grader is tougher: everyone's exam is graded by the same graders!

Grading together - If you have co-teachers/TAs who also help with grading, consider having an informal grading session where everyone grades together. This approach is particularly effective with exams, where issues that arise with exam answers can be discussed and dealt with together on the spot. You can consider adding a lunch or dinner as a value-added element for the group. Besides exams, grading papers and other written assignments together also can be beneficial. It's not necessary to grade all the papers together, but you can ask your co-teachers/TAs to spend two hours with you grading together to see what issues arise, and then finish the rest of the grading individually. This can be very helpful for inexperienced TAs, and also helps to promote consistency in grading across all the graders, particularly if a rubric or checklist is being used

4.4 Strategies for dealing with the logistics of a large group

When managing a course, there are many aspects that teachers have to consider. Besides having to teach the course, more often than not, the teachers responsible for the course are also coordinating the back-end administrative procedures like uploading grades of students, taking attendance of students as well as managing students emails and office hours. For some teachers, they might have a separate coordinator person dealing with the administrative work, but for others, they might not have the luxury of having someone else to deal with the administrative work. In such cases, these teachers would also have to deal with managing logistical issues.

4.4.1 Taking class attendance
While many teachers do not take class attendance in their large classes, there are some courses where the teachers would like to do so. But when the class is so large, this could be a challenge. The usual method of taking class attendance could be handing out an attendance sheet that is passed around the room, but this is usually not very reliable as the sheet is often lost or some students might not get to sign it if they are late. As such, some teachers make use of other strategies to take class attendance.

Use of clickers – the use of clickers in class could serve as a way to indicate a student's presence in the class;

In-class assignments – some teachers implement brief in-class assignments or quizzes as a form of taking attendance. Other examples also include requiring students to answer a class day-related prompt on a notecard at the end of the class, and submit it before leaving the class (this notecard can be graded or not);

Pop quizzes – another way to ensure attendance in class is to administer pop quizzes periodically.

4.4.2 Managing student emails & office hours
When dealing with large groups of students, teachers can expect that students will send emails to ask questions or request for consultations, especially about assignments as well as when exams are approaching. While this is manageable in small classes, when managing a large group of students, this can overwhelm teachers' inboxes. An online guide by Adam Wilsman at Vanderbilt University13 provided some suggestions to tackle this issue.

Be upfront about how often you will check and answer student e-mails – Current students have grown up in an age of technology and e-mail and many of them expect immediate responses to their e-mailed questions, no matter how big or small. This might be an unreasonable expectation for teachers not constantly attached to their smart phones, and even for those who are, students need to be made aware of this early on in the course. As teachers, you should also discuss your rules for email contact. For example, "I will read and respond to student e-mails once per day, each morning" or "Please give me 24 hours to respond to each e-mail." Such rules can help avoid rapid-fire e-mails from students, many of which may ask why it's taking so long to get a response. Students will also be more inclined to think ahead with their questions and concerns: the professor will not get back to students immediately just because they waited until the last minute on a given assignment.

Consider placing limits on student e-mails – Some teachers give students a line or word limit for their e-mails. Some suggest that students keep emails to four lines or less, while others have more stringent requirements. Andrew Van Schaack, Assistant Professor of the Practice in Human and Organizational Development at Vanderbilt, limits the body of student emails to 140 characters, the length of a Tweet. Such rules help ensure that student e-mail is clear and concise.

Establish rules about the kinds of questions you will respond to via e-mail – Some questions lend themselves to quick e-mail responses, others don't. It may be valuable to tell students what kinds of questions you will answer via e-mail and which are better left for office hours or in-class Q&As.

Make sure that course guide is up-to-date and comprehensive and inform students to consult course guide before they contact you – Often students like to take the easy way out and just send an email to teachers to prevent them from having to spend time searching for the answer/information about the course. To prevent that, inform your students early on that they should consult the course guide first before they contact you with their questions on the course. You can also consider creating a FAQ page (with all of past questions that you received from students) for your course and put it on the online learning environment for students to refer to. If students send you an email regarding a matter that is already on the FAQ/Course guide, you can easily refer them to consult those. However, for this to be effective, you should ensure that the study guide/FAQ is updated and comprehensive.

Avoid the pre-exam e-mail deluge – The 24 hours prior to an exam is often a time when teachers' inboxes are flooded with emails. The same goes for 24 hours prior to an assignment due date, as students often scramble for extensions. Again, clarity with expectations is important. Teachers ought to notify students when they will stop responding to e-mails regarding the exam, whether it's 24 hours, 12 hours, or 2 hours in advance, and how long they require to provide feedback on a rough draft of a paper. Clear and consistent rules may help encourage students to think ahead.

Create an office hour sign-up sheet – This is useful to help manage dozens of eager office hour visitors and avoid having students milling around outside the office or wasting students' time. Implementing a formal scheduling system for teachers' office hours, perhaps one that is publicly available (e.g. Scheduly), will make it more efficient and effective for both students and teachers alike.

Encourage students to utilize their TAs (if applicable) – TAs are capable of handling many student issues and are sometimes more aware of individual students' problems or struggles, and there are some issues for which TAs are actually better suited than instructors (for example, for discussion section questions or lab questions). Encourage students to consult their TAs first, particularly when teachers are unavailable or otherwise too busy.

Lay some ground rules – Sometimes, in the days preceding an exam, in particular, students will visit during office hours expecting to hold an hour-long one-on-one study session. This could certainly be valuable for the student, but teachers might not be able to manage this if every student decides to do the same. To tackle this, teachers can organize a dedicated review session or simply tell students in advance that teachers are not their "study buddy." Other times students may come by to chat. While there is value in cultivating cordial relationships with students, if this is not something that teachers can abide in their schedule, instruct students to only drop by office hours if they have specific questions.

Re-conceptualize our office hours – Office hours tend to be one-on-one meetings with students. However, there are some situations in which meeting with students in a group can be just as effective and a time-saver as well. For example if there are three students that want to meet with the teacher regarding the makeup of the exam, ensure that they're comfortable meeting as a group, and then schedule them together.

Consider holding online office hours – There are times when teachers have a clash in schedule or commitment elsewhere and is unable to fulfill their weekly office hours. Teachers can consider holding remote office hours. With technological advancements, there are always opportunities available for teachers to conduct office hours online (e.g. Brightspace provides a mechanism to do so - the virtual classroom feature lets you live-broadcast and collaborate with students online).

5   Conclusion

While preparing this report to answer the Dean of Education's question on how to deal with large student groups, we came across many articles and online guides about what has currently been tried and test by other teachers and instructors all over the world. We have included many of these suggestions in this report, as well as an information sheet at the end of this report (see appendix) with links to various articles and online guides available for teaching large groups. However, we would like to conclude that there is no one-sized-fits-all solution to this issue at hand. With teaching large groups, there are many variables involved, from the lecturer's style, to the type of class (lab, practical, lecture etc), to even the subject being taught or the students in the classroom. All these aspects can differ from course to course. As such, it is up to the teachers to explore methods they would like to try out and what they would eventually feel comfortable with to implement in their course. This will undoubtedly take time and involve a lot of trial and error, but investing time into developing a repertoire of active learning techniques to support student learning in large groups will not only benefit the students, but also contribute towards the teachers' own learning and personal development as well.

Additionally, something that teachers and instructors should to take into consideration regardless of the group size, is that the learning environment should provide an opportunity for students to obtain a deep understanding of the material. Biggs (1989) notes that in order to gain a deeper learning the following four components are important:

- *Motivation*: Specifically, intrinsic motivation. Students need to see both learning goals and learning processes as relevant to them, to feel a sense of ownership of the course/subject so that they will take charge of their own learning too;
- *Learner activity*: Students should be active as deep learning is associated with doing rather than merely passively receiving.
- *Interaction with others*: Talking and discussing with peers requires students to explain their thinking to one another, and this can help improve their thinking and enforce their own learning, while at the same time developing students' interactions skills as well.
- *A well-structured knowledge base*: The starting point for new learning should be existing knowledge and experience. Learning programmes should have a clearly displayed structure and should related to other knowledge and not presented in isolation.

While this document serves to provide suggestions and strategies on dealing with teaching large groups, and it might be seen that it is the onus of the teachers/instructors to invest time in preparing and implementing techniques that can help support learning in large groups, it must also be noted that policy-makers and the various program committees should also provide help and support to their teachers. It is perhaps also an idea to create platforms for teachers and various management to come together to share their own experiences, best practices and provide support to one another. This creates a community of practice within WUR, for all teaching and support staff to interact as well as learn from one another. As this is an educational ecosystem, everyone from teaching staff, IT support staff to even the Management has a part to play in ensuring that WUR continues to provide top-notch education for the students.

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Appendix

Inspiration list with links to online guides/reports for teaching large groups

(General) Strategies for teaching large groups

(Online Webpage) Making connections with students to enhance learning (Resources for Teaching and Learning STEM by Rebecca Brent and Richard Felder) – This online webpage provides evidence that students learn better when they feel a sense of connection with teachers. They also provide simple strategies that teachers can adopt in their own classes to build a connection with students.
https://educationdesignsinc.com/making-connections/

(Online Webpage) Teaching students with diverse backgrounds (Resources for Teaching and Learning STEM by Rebecca Brent and Richard Felder) – This online webpage provides some strategies for dealing with a diverse group of students (backgrounds and skills).
https://educationdesignsinc.com/varying-background-post/

(Online Webpage) Good Practice: Active lectures for Large Groups (Centre for Education and learning, Leiden, TU Delft, Erasmus Rotterdam) – This online webpage provides strategies that teachers can adopt to make their large-group lectures more active.
https://www.educationandlearning.nl/news/good-practice-active-lectures-for-large-groups

(Online Report) Strategies for teaching large undergraduate classes (Hanover Research) – This online report provides an overview of good practices (strategies and guidelines) collected from various universities for teaching in large group settings. It also provides an outline of many new technologies that are increasingly being used to teach classes in the United States and around the world.
https://www.baruch.cuny.edu/facultyhandbook/documents/LargeClasses_StrategiesforTeaching.pdf

(Online Information Sheet) Large Group Teaching (University College London) – This online tip sheet provides brief information and strategies for large group teaching.
https://www.ucl.ac.uk/teaching-learning/sites/teaching-learning/files/20161207-ucl-large-group-teaching-v5.pdf

(Online Webpage) Effective Teaching and Learning in Large Classes – This online webpage provides a number of strategies for teachers to deal with large groups of students. It also has a section where they touch upon strategies for teachers/instructors that have to deal with a large class for practical work.
http://breda-guide.tripod.com/New-5.htm

(Online Information Sheet) Ideas for effective large-group learning and teaching (UNSW Sydney) – This online tip sheet provides strategies for enhancing student learning in large classes, ideas for active, student-centered lectures and ideas for assessing large groups.
https://teaching.unsw.edu.au/sites/default/files/upload-files/large_group_ideas.pdf

(Online Webpage) Teaching large groups (Lectures) (Leicester Learning Institute, University of Leicester) – This online webpage provides resources and guidance for teachers/instructors that are new to large group teaching as well as for experienced teachers looking for fresh approaches to try out with the large group classes. It also provides access to online tip sheets (e.g. using handout to enhance learning and a tip sheet for lecturing to large groups).

https://www2.le.ac.uk/offices/lli/developing-learning-and-teaching/enhance/strategies/large-groups

(Article) Problems, solutions and advantages of large classes (Le Phuoc Ky) – This article is about the challenges faced by teachers, how teachers might respond and how teachers can look on the bright side of a very common situation (of teaching large classes).

http://www.nzdl.org/gsdl/collect/literatu/index/assoc/HASH0170.dir/doc.pdf

(Online Webpage) Teaching large classes (Adam Wilsman, CFT Graduate Teaching Fellow) – This online webpage lists some challenges of dealing with large groups (e.g. challenges with grading, working with teaching assistants, logistics, integrating technology) and provides some strategies to help teachers/instructors to deal with these challenges.

https://cft.vanderbilt.edu/guides-sub-pages/teaching-large-classes/

(Online Information Sheet) The Teaching Trick – How to improve student learning without spending more time teaching (Kristina Edström) – This online information sheet is a handout of PowerPoint slides with "tips and tricks" that are suggested by Kristina on how to improve student learning with a given (or reduced) level of teaching resources, without spending more time teaching.

http://www.janleenkloosterman.nl/reports/icab_edstrom_20161109.pdf

(Online Webpage) Large Lecture Instruction (University of Washington) – The "Engaging Students in Large Classes: High Tech and Low Tech Strategies" learning community provides some general principles of developing a large lecture course. Their thoughts took shape in three categories of: preparing, teaching and evaluating.

https://www.washington.edu/teaching/topics/engaging-students-in-learning/large-lecture-instruction/

(Online Webpage) Learning Student Names (Center for Teaching and Learning, Brigham Young University) – This webpage acknowledged that learning students' names is challenging but mentions that it is a powerful way to encourage and motivate students. Strategies are also provided to help teachers learn their students' names.

https://ctl.byu.edu/learning-student-names

(Online Information Sheet) Teaching Toolkit for Large & Small Group Teaching (University College Dublin, Teaching and Learning) - This online information sheet provides techniques and methods for use in both small and large group teaching, as well as strategies for encouraging student participation.

http://www.ucd.ie/teaching/t4media/UCDTLT0021.pdf

(Online Report) Tips for Encouraging Students Participation in Classroom Discussions (Special report by The Teaching Professor) – In this online report, there are many articles that highlight effective strategies for establishing the expectation of participation, facilitating meaningful discussions, using questions appropriately as well creating a supportive learning environment.

https://cdn.vanderbilt.edu/vu-wp0/wp-content/uploads/sites/59/2013/02/06125356/tipsclassparticipation-tp.pdf

Strategies for teaching with technology

(Online Webpage) Top 10 Quiz Makers for Teachers and Educators (Digital Chalk) – This website gives suggestions for various Quiz Makers available online for teachers to use to make quizzes for students. It also lists the pros and cons for each quiz website.

https://www.digitalchalk.com/resources/blog/elearning-tools/top-10-quiz-makers-teachers-educators

(Online Webpage) 75 Digital Tools and Apps Teachers can use to support Formative Assessment in the Classroom (The Education Blog, NWEA) – This website provides a list of online tools and apps (with a short description) that teachers can utilise as a form of formative assessment.

https://www.nwea.org/blog/2019/75-digital-tools-apps-teachers-use-to-support-classroom-formative-assessment/

(Online Webpage) 11 Digital Education Tools for Teachers and Students (eLearning Industry) – This website provides a brief write up as well as the link to 11 tools that facilitate teaching and communication between teachers and students.

https://elearningindustry.com/digital-education-tools-teachers-students

(Online Webpage) Teaching with Technology (University of Washington) – This website gives an introduction about using technology in classrooms as well as provide suggestions and examples of technologies that teachers can use.

https://www.washington.edu/teaching/topics/engaging-students-in-learning/teaching-with-technology-2/

(Online Webpage) Teaching with Technology (The University of Texas at Austin, Faculty Innovation Centre) – This online webpage provides information and tools with teaching with technology, for content delivery, assessment methods and communication with students.

https://facultyinnovate.utexas.edu/teaching-technology

(Online Webpage) Teaching with Technology (University of Michigan, Centre for Research on Learning and Teaching) – This online webpage provides information for teachers on getting started with teaching with technology.

http://www.crlt.umich.edu/teaching-technology

Strategies for assessment and providing feedback to large groups

(Online Webpage) Grading Strategies (Center for Teaching, Vanderbilt University) – This online webpage provides suggestions for choosing grading strategies that could help teachers reduce their grading workload but still ensuring that students get frequent feedback (both graded and ungraded) and also that teachers can keep track of their own teaching.
🔗 https://teaching.uwo.ca/teaching/assessing/grading-strategies.html

(Online Webpage) Teaching - Assessing Large Classes (UNSW Sydney) – This online webpage provides strategies that teachers can use for their large-group classes. It also includes links for further information on the benefits of the strategies as well as when and how to implement the strategies.
🔗 https://teaching.unsw.edu.au/assessing-large-classes

(Online Webpage) Engage in Assessment: How to tackle assessment of large numbers of students (University of Reading) – This online webpage provides a number of ways to make assessment of large groups more effective whilst still supporting effective student learning.
🔗 https://www.reading.ac.uk/engageinassessment/assessing-large-groups/eia-how-to-tackle-large-group-assessment.aspx

Strategies for working with Teaching Assistants (TAs)

(Online Guide) Western Guide to Working with Teaching Assistants (Western University) – This online guide provides teachers with strategies to support and mentor teaching assistants in order to save time, enhance quality of teaching as well as facilitate the development of the next generation of faculty. This is a useful guide for all teachers already working with teaching assistants or those considering to recruit teaching assistants.
🔗 https://ir.lib.uwo.ca/cgi/viewcontent.cgi?article=1000&context=tsc-purple-guides

(Article) Strategies for Training Undergraduate Teaching Assistants To Facilitate Large Active-Learning Classrooms (Suzanne M. Ruder and Courtney Stanford, 2018, Virginia Commonwealth University) – This article shares some successful strategies that have been developed (through an iterative design process) to help prepare undergraduate TAs to facilitate a class (organic chemistry). The tried-and-tested methods helped to ensure that TAs were knowledgeable about the content, could address questions effectively, and could provide formative feedback to students.
🔗 https://pubs.acs.org/doi/pdf/10.1021/acs.jchemed.8b00167?rand=2jxm8vrk