Training Tomorrow's Scientists

DAVETLİ KONUŞMACI ÖZETLERİ
[INVITED SPEAKERS ABSTRACTS]IS-01
LECTURE FLIPPING AND THE DIGITAL ENVIRONMENT:
VEHICLES FOR FEEDBACK

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The education landscape is changing and programmes are now expected to deliver transferable skills alongside subject specific knowledge. The role of assessment has come under increasing scrutiny and needs to be both authentic and inclusive. Students are driven by summative assessment and require feedback on this work to improve their future performance. Often these requirements are captured in surveys such as the National Student Survey (NSS) and in the UK feed into league tables and so ultimately competition for students. This talk will introduce two different approaches to address the complex relationship between learning outcomes, assessment and the feedback that facilitates both student performance and satisfaction (Figure 1).

Figure 1

The first of these is a flipped lecture approaching a final year plant biology module. The initial (authentic) context was set out in a national strategy. Students were required to indicate which areas they deemed the most important. Responses were submitted online and class data was ranked to form the basis of the subsequent teaching sessions. For each student-determined sub-topic, session were held with varied delivery including group work, journal clubs, seminars and clicker quizzes. Students worked in groups, often in the virtual environment, to prepare for each flipped session. In parallel, students drafted, refined, and approved an exam question, which formed part of the final module examination. Student feedback was generally good but some students preferred the conventional approach. From this experience it is clear that facilitation of flipped teaching requires transparency, preparation and the need to be reactive. The second approach used formative assessment in a digital environment to deliver feedforward in a first year module. A weekly series of short answer questions similar to the exam were provided. Students answered the question and then ranked those of their peers using the online NoMoreMarking tool. The top answer was annotated and returned to them. This provided revision, reflection, evaluation and feedback in an efficient way for both staff and students. While uptake was initially high it dropped markedly during the semester (Figure 2), questioning how students perceive formative assessment in a largely summative environment.

Figure 2

Overall, student engagement with online material did not correlate with exam performance, questioning the value of this approach to supporting students. However, the analytics around online engagement and performance allowed identification of differently behaving students groups and facilitates differential intervention to support them. In summary, lecture flipping and online assessments are vehicles for provision of formative feedback/feedforward on summative assessment. Currently students are driven by summative assessment and clarity and transparency on assessment strategies is needed to ensure full engagement from them.

Status of UK plant science report (2014)
https://www.rsb.org.uk/images/pdf/UK_Plant_Science-Current_status_and_future_challenges.pdf

IS-02
TEAM BASED LEARNING: WHERE THE MAGIC HAPPENS WITH
GROUP WORK THAT WORKS!

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Large group lectures are mostly ineffective in motivating students to engage and immerse themselves in higher-level problem solving. Thus, we need new instructional designs which emphasize the mastery of content in order to apply it rather than the traditional lectures which emphasize simple content covering. This transformation, from knowledge-focused curricula to a one in which the main goal becomes significant learning, requires the faculty to design and orchestrate learning activities and assessments that enable students first to master the knowledge and then apply it to complex problems. Team-Based Learning™ (TBL) is an active learning strategy that focuses on application of knowledge through a structured sequence of events (pre-class individual work, individual and team readiness assurance tests, application exercises and immediate feedback all through). This form of small-group learning that emphasizes student preparation out of class and application of knowledge in class can be used in large classes without requiring additional faculty or other resources. As an educational strategy, TBL has 4 essential elements – readiness assurance, design of application exercises, permanent teams, peer evaluation. In this sense, it is different from regular group work. By the successful application of these essential elements, TBL replaces or reduces lecture time, but at the same time ensures students are prepared for class, enhances higher order thinking and problem solving skills, develops effective teamwork and creates energy in the classroom.

IS-03
ENGAGING STUDENTS IN LARGE CLASSES

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Many of us are confronted typically with large cohorts of students; essentially at the undergraduate level (bachelors), that are handled as large classes. This is an increasingly main challenge in higher education and namely in universities today.

Though over many years ample assessment of teaching methodologies have put traditional classroom lecturing at the end of the list in terms of quantity and quality of

the student's learning process, this approach remains the foremost method of teaching.

This is essentially due to, in most cases for "historical", lack of authority incentive and will to change and finally often because of lack of sufficient resources (staff, materials, equipment and space). Consequently, there is no breakdown of these cohorts that remain "Large", into smaller groups, allowing to kindle the interest of the students, engage them to be proactive and interactive participation before and during the lectures and promote collaborative work amongst the students.

Though other alternatives to lecture based classroom teaching do exist, and are actively used, such as Problem based Learning (PBL), Team-Based Learning (TBL), Flipped classroom or e-learning, etc. ... the universities engaged in such innovative teaching approaches still remain a minority.

Change will no doubt come over time from the outgrowth of these alternative methods, seeded by those universities already engaged in these alternative teaching approaches and the recognition of failure of current teaching methods to adequately prepare our young scientists. However until then, we must try to move on and improve the learning process within the current framework and especially when confronted with large classes.

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Each of the above mentioned aspects of the learning process (interest, proactiveness, interactive participation during classes and collaboration between students), may be addressed and tailored for the large class constraint, i.e. by changing our lecturing habits and using today's tools and applications.

Some examples of such approaches and implementation in our current teaching process may be the use of virtual university web based tools, e-learning platforms, portable device and applications that will allow offering extra lesson materials, examples, quizzes, animations and simulation tools. These types of resources can be used before (proactive), during and after the lectures. During classes, the use of short animated clips could help to capture student's attention and interest. Likewise, interactive tools e.g. Plickers or Socrative, can allow polling questions to stimulate student attention and involvement as well as assess capture of key points.

Lecturing Large Classes will remain a wide spread teaching method, however strategies to improve student engagement, interest and especially knowledge acquisition, can evolve and profit from available new tools and approaches.

IS-04 MSc STUDIES IN BIOSCIENCES

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To enable students to study for part of their education in other European countries, the Bologna Process was launched with the Bologna Declaration of 1999. The Bologna guidelines, which have been implemented in 48 European countries aim to improve the internationalisation of higher education by standardising BSc, MSc and PhD programs, thus allowing comparison and approval between countries. Generally the MSc is a 3 + 2 structure, meaning that students first complete a 3-year BSc program before entering a 2-year MSc program. Each of these programs comprises course modules assigned ECTS (European Credit Transfer and Accumulation System). Sixty ECTS equal 1 year of full-time studies. The BSc is generally 180 ECTS and the MSc 120 ECTS. Some variability occurs regarding the MSc, which varies between 60 and 90 ECTS among countries and institutions. The scope of MSc programs is to bring the students to an advanced level of knowledge and competences in a specific field of study. In general, a Bioscience MSc comprises both theoretical and practical courses in addition to a scientific project, forming the basis of an MSc thesis. Among the theoretical courses some may have the purpose of improving a student's general knowledge, however the major part is aimed at gaining specific knowledge. When initiating the MSc project period, the student either chooses or is assigned a supervisor. In this phase the student works closely with the supervisor more or less as an apprentice. Further, the supervisor is responsible for introducing the student to the scientific world including how to create networks, write a paper, give a lecture and build a CV. To maximize the outcome of this collaboration, it is very important the supervisor and student get along well on a personal level. At least in the Scandinavian Countries an MSc project will typically be part of the supervisor's project.

IS-05 PhD TRAINING: NEW PROSPECTS

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PhD is the title conferred to candidates who have completed an original research work and contributed to the scientific literature with published papers. The careers awaiting PhD holders have changed over time. It is no longer only an "academic" title. PhD holders nowadays can find an array of different jobs ranging from the academic positions to the industrial and governmental sectors. Moreover, many European countries can no longer offer purely academic positions to the trained PhD's, as the numbers have notably increased over time. All this necessitates a new perspective for PhD training. In Europe, the Bologna process has focused on PhD training since the Berlin meeting. EUA, with its Council on Doctoral education, has been working on PhD projects since more than a decade. ORPHEUS (Organisation for PhD

Education in Biomedicine and Health Sciences in the European system) specifically addresses PhD training in the health science fields, which demand some more specified criteria. When analysed systematically, all these important organisations have attached importance to the following issues: "PhD is a research degree" (training should be based on "research"); "PhD training should not only prepare for academic life, but also for other careers" (therefore, transferable skills should be part of the PhD training programme); internationalization of PhD training is crucial (thus, mobility should be encouraged and the thesis jury should also be international); supervision has a pivotal role in PhD training (supervisor courses should be structured); the benchmark for a PhD thesis should be scientific articles published in international journals (thus, criteria for a thesis degree should be well defined). This talk will cover an overview of all these issues and the Group Discussion will be based on the elaboration of certain points as well as discussion of the PhD training status in Turkey.

IS-06 GOOD SUPERVISION FOR GOOD RESEARCH

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Research lies at the center of the doctorate education. A vibrant research atmosphere is essential. Ph.D. studies can be conducted where sustainable research activity exists. The two primary outcomes of the Ph.D. education are the thesis, which shows the student's contribution to the science, and the graduate (Ph.D.), who thus becomes an independent researcher. Graduate students are aspiring researchers who need guidance. The old-school doctorate education claims an academic leader, akin to the old master-apprentice system, to guide the student all the way to the dissertation in full academic freedom. The supervisor, often also the mentor, represents the establishment and occupies a higher status which creates a power distance between him/herself and the student. However, as the study progresses, that distance should fade, and in the end, the student becomes on equal terms with the supervisor. From the supervisor's angle, the management of this relationship needs a specific set of skills. The transition from student-to-colleague may create unanticipated conflicts that may compromise the thesis. It is imperative that the supervisors be actively engaged in research activity. However, besides the scientific aspect, supervisor's ability "to supervise" plays a crucial role in the making of a doctorate. Increasingly, collaborative nature of the research imposes the intervention of a unit of supervisors rather than a single one. Although the supervisor-student relationship has long been considered a solely academic issue, increased industrial sector involvement transformed it into a more market-oriented partnership. ORPHEUS (Organization for Ph.D. Education in Health Sciences in European System), a pan-European platform to discuss and promote best practices in Ph.D. education in health sciences emphasizes the role of the supervisor in the success of the Ph.D. programs. Good scientists do not necessarily become good supervisors, but with training and practice, they can improve their supervision skills. Institutions should develop training programs for supervisors and set up administrative mechanisms to monitor the supervision process. Most institutions allow students to choose their supervisors. However, it is not comfortable to break up once matching is made. Institutions prefer not to interfere with the supervisor-student relationship. Some institutions appoint a mentor besides the supervisor to deal with non-scientific aspects of the Ph.D. education. Recently, spearheaded by some American and Scandinavian Universities, more institutions adopt the signature of a formal contract between the student and supervisor to determine respective duties and responsibilities. The formulation of an explicit mechanism to deal with mutual grievances is also relevant. Bylaws and regulations covering all facets of the Ph.D. education need to be clear and transparent.