Future-forward education in engineering: synergy of conventional and digital methods

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ABSTRACT: In this article, the author explores evolving educational philosophies in tertiary engineering education that blend conventional and digital methods, fostering a versatile and interactive learning experience. The focus is on empowering students by placing them at the core of the learning process, promoting deeper understanding and practical skills. The author introduces customised and innovative teaching methods, such as the author's *right level, time/year, order and volume* (LYOV) and *double-funnel* approaches, designed to cater to the unique needs of engineering students. Emphasising the effectiveness of blended learning, which combines on-line and in-person elements, the approach provides students with increased flexibility. Beyond conventional methods, blended learning enhances student engagement through flexibility, collaborative problem solving, and access to digital resources for knowledge sharing. By incorporating technology into blended learning, students gain access to diverse digital resources and collaborative tools, including open educational resources and discussion forums, facilitating personalised and independent learning. This approach aims to elevate student engagement and foster an environment conducive to collaborative problem solving and knowledge sharing.

Keywords: Evolving educational philosophies; blended learning; post-Covid-19 evolution in learning; e-learning

INTRODUCTION

The Covid-19 pandemic sparked a growing interest among educators in comparing teaching methods before and after the outbreak. The abrupt shift in teaching and learning paradigms in 2020 has rendered this comparison inevitable. Due to Covid-19, educators were compelled to adopt digital techniques. Post-Covid-19, the educational landscape was affected as lecturers sought to maintain their digital preparations. This shift manifested itself in various modules, such as educator training, remote learning, significant improvements in blended learning, greater reliance on technology, changes in assessment and a stronger emphasis on student well-being. Many studies have explored this paradigm shift by examining various disciplines of learning and teaching [1][2]. Al-Badi and Khan explored the transition in teaching technologies after the effects of Covid-19 [3]. They concluded that developing countries should transform their conventional learning to on-line learning through capacity building, infrastructure development, virtual class management, examination systems and national policy frameworks.

Ignatyev et al presented a case of how Cranfield University provided an intense group-based engineering course, Autonomous Vehicle Dynamics and Control, despite the limitations posed by the Covid-19 pandemic preventing the typical laboratory setting. The course was designed to utilise modern simulation tools, allowing students to gain a better understanding of engineering principles and develop useful skill sets in modern engineering applications, while reducing development costs by improving system quality before deployment. The study's conclusion is that the group design project (GDP) implementation was deemed successful since all intended learning outcomes were met, and students were able to produce relevant engineering solutions and develop new software and IT skills despite the challenges of remote learning and time constraints. The use of fully simulation-based GDP also demonstrated the effectiveness of modern simulation tools in deploying complex systems.

Núñez-Canal et al investigated the impact of the digital revolution on education, particularly in the context of the Covid-19 pandemic and the emergence of a new hybrid educational model [4]. They focused on the role of educators in this model and the educator's digital competence (EDC), which is essential for improving students' digital skills and preparing them for success in the digital economy by analysing 251 responses from professors in Madrid's universities in business administration based on 22 competencies in six areas of competence identified in the European Framework for the Digital Competence of Educators (DigCompEdu). The results showed that educators' characteristics, including their previous knowledge about technology, attitude towards technology and the training they received, play an important role

in the learning process. Okolie and Epelle argued that pedagogical training is essential for educators in STEM fields to teach their courses effectively, including experiential learning and equality, diversity and inclusion (EDI) training [5]. To help educators acquire these skills, they suggested a three-year roadmap that should be integrated into graduate school curricula. This is necessary to ensure high-quality course delivery, competency and positive student experiences after taking the course, particularly in the current context of transitioning to on-line or hybrid modes due to the Covid-19 pandemic.

Ayoo examined the impact of the Covid-19 pandemic on African higher education system, including its effects on educational processes and strategies to address the situation [6]. This author highlighted the response of higher education stakeholders to the pandemic and discusses the consequences and lessons learned. Modgil et al believe that due to the Covid-19 pandemic, there has been a substantial rise in the adoption of digital technology in educational institutions [7]. This has led to the emergence of many start-ups in the EdTech field, which have received funding from venture capitalists. These start-ups are offering personalised learning experiences to students by utilising high-tech tools, such as gaming, coding, robotics and musical instruments. They are also regionalising the curriculum and stories to focus on local cultures. The aim of these new technologies is to empower educators to innovate in terms of student learning styles and make the teaching and learning process more effective.

Zhao et al conducted a study on the use of digital education in schools and found that it can enhance teaching efficiency and promote teaching progress [8]. They believe the lack of social responsibility in the application of digital education can lead to various risks, such as cyberbullying, exposure to harmful content, data misuse and age-inappropriate advertising. They suggest that schools integrate social responsibility into their value system to promote significant development of education during the Covid-19 pandemic. Ratten and Jones examined the relationship between entrepreneurship education and Covid-19 [9]. They discussed that the pandemic presented an opportunity to transform this field. They suggested that new management practices and research are necessary to address the challenges brought about by the pandemic and that entrepreneurship education can play a role in finding solutions.

Li investigated how colleges and universities can promote social responsibility among students in the context of the new era under Covid-19 [10]. Li analysed literature, investigated data and examined case studies to identify challenges in education and provided practical strategies for promoting social responsibility among college students. The exploration was based on General Secretary Xi Jinping's emphasis on college students' role in shouldering social responsibility in the new era [10].

Ambrosius believes that space education should be approached from both STEM and social science perspectives [11]. Ambrosius suggests that general interdisciplinary courses on space policy have the capacity to attract students from more majors and prepare them for future careers in the space industry. Ambrosius presented a case study of a course titled *Toward a Spacefaring Society*, which demonstrates the effectiveness of a space-themed course in achieving valuable learning outcomes related to methods of research and communication in the social sciences.

Kalantzis and Cope studied the shift to on-line teaching and learning, which was accelerated due to the Covid-19 crisis [12]. They argued that while many universities and colleges were unprepared for this rapid shift, on-line learning has the potential to be much superior to in-person teaching if the right tools are used. They suggested that current educational technologies that simply mimic traditional classrooms should be abandoned in favour of new solutions as they conducted research on these solutions at the University of Illinois. Kanetaki et al investigated the impact of Covid-19 on education and presented a case study of a mechanical engineering CAD module that switched from face-to-face to fully remote learning [13]. The study found that this approach significantly improved students' spatial perception in 2D drawings. They suggested that this teaching strategy could be sustainable beyond the pandemic (Figure 1).

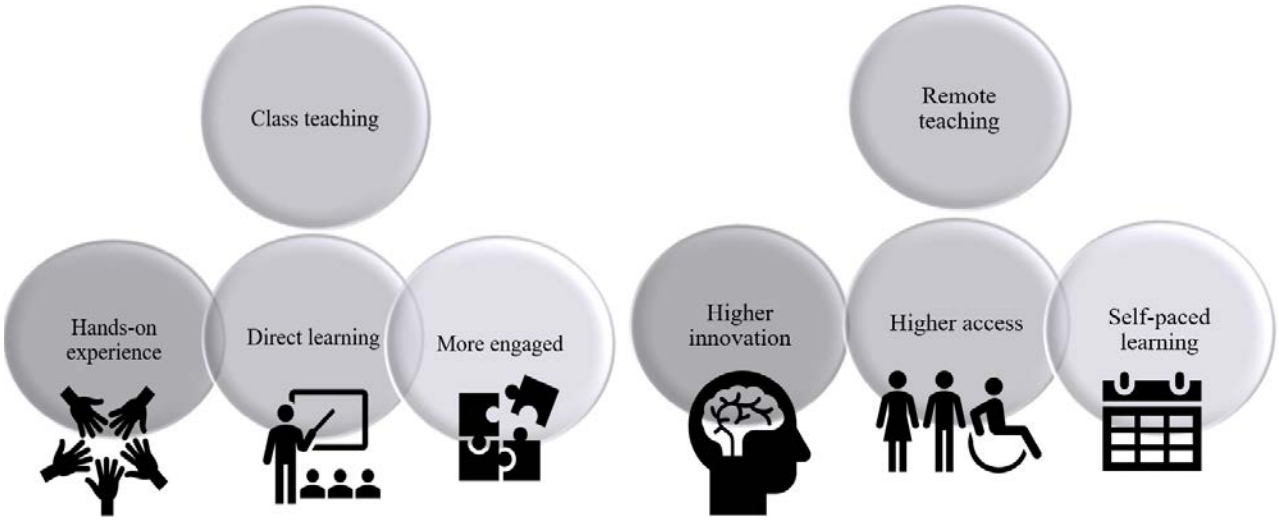

Figure 1: Remote and in-class teaching.

Qadir and Al-Fuqaha provided a guide for engineering students on how to succeed in the volatile, ambiguous, complex and uncertain times after the start of the Covid-19 pandemic [14]. They presented seven steps leading students to thrive in outcome-based education settings during these challenging times, drawing from research on effective student learning in on-line, normal and disrupted cases. They also addressed important problems of on-line education and remote teaching, e.g. to make sure the equity and laboratory work for engineers in such settings are properly handled. They concluded that engineering students can thrive in volatile times, such as the Covid-19 pandemic by adopting seven evidence-based steps, which include developing metacognitive skills, focusing on holistic learning, taking ownership of their learning and becoming proficient in being a lifelong learner. In this article, the author aims to assess his preferred teaching philosophy and innovative practices in light of the post-Covid-19 advancements observed in tertiary education. The main themes discussed in this article include a pedagogical philosophy based on the lessons learned from Covid-19, creative teaching plans for the post-Covid-19 period and the impact of e-learning on teaching.

PEDAGOGICAL PHILOSOPHY

With the increasing integration of technology into teaching especially in the wake of the Covid-19 pandemic, higher education providers (HEPs) now expect a wide range of teaching methods that align with their specific needs and policies. Over the past few years, there have been three main categories of teaching modalities: technology-based teaching and learning (e-learning), traditional face-to-face teaching and blended teaching, which combines both digital and in-person elements. Given the advantages and drawbacks of the former two approaches, the author advocates for the use of blended (e.g. flipped) learning, which places students at the centre of the learning experience, promotes deeper learning and enhances practical skills (Figure 2). Through active communication with their peers and instructors, students can build practical knowledge and real-world skills. In essence, blended learning represents a move towards active learning (aka guide on the side) instead of passive listening (sage on the stage). Here are some ways in which Covid-19 has strengthened blended learning:

1. Flexibility in learning: The Covid-19 pandemic has forced educational institutions to become equipped with more resources and facilities to offer flexible learning options. This has led to the integration of on-line learning with traditional classroom teaching, resulting in a blended learning approach that offers greater flexibility to students. While the pandemic has largely ended, the legacy of this shift remains as a footprint of Covid-19.

2. Personalised learning: The use of technology in blended learning, gives students access to a wide range of digital resources, such as open educational resources (OER) and collaborative tools, such as discussion forums, which all can support personalised and independent learning. This also includes on-line quizzes, virtual laboratories and interactive simulations that enable students to learn in their own way and at their own pace.

3. Improved engagement: The Covid-19 pandemic undoubtedly reduced in-person communications due to lockdowns and social distancing measures; this led to an increased reliance on collaboration tools and hence remote communication. The shift towards remote learning has helped improve some aspects of student engagement during blended learning by allowing them to participate in interactive on-line discussions, collaborate with peers and access multimedia resources. As a result, blended learning has led to a more active and engaged learning experience, offsetting the negative impact of reduced face-to-face interaction caused by the pandemic.

4. Enhanced accessibility and inclusiveness: Blended learning has made education more accessible to a wider range of students. Those who have difficulty attending classes in person, such as students with disabilities or those who live far from the institution, can now participate more easily. This increased accessibility has been particularly important during the Covid-19 pandemic when many students were unable to attend classes in person due to health concerns or travel restrictions. By providing greater diversity and opportunities for collaboration and interaction, this more inclusive learning environment benefits all students.

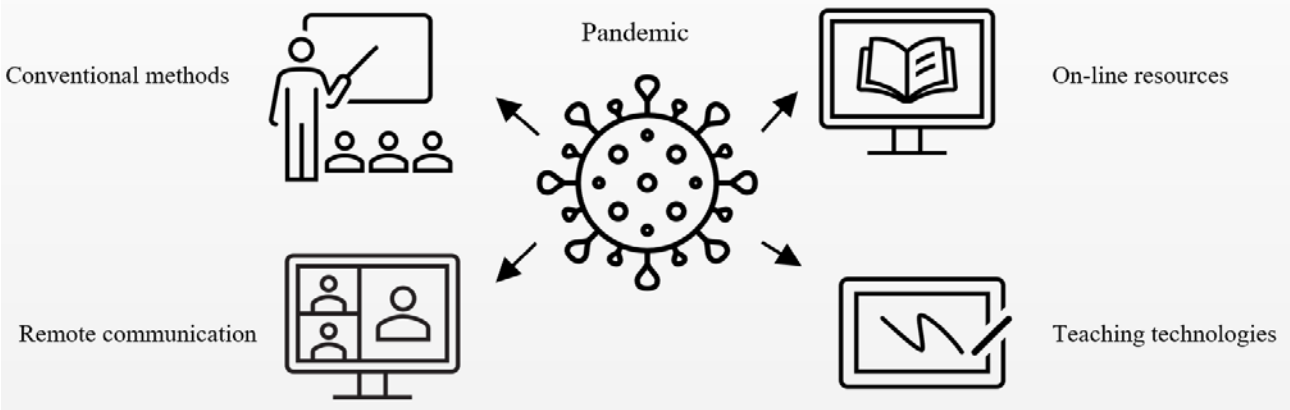

Figure 2: Covid-19 and promotion of blended learning.

Structure of the author's pedagogical philosophy: As one moves forward into a post-Covid-19 world, the author's educational approach prioritises flexibility and adaptability, leveraging technology and innovative teaching methods to deliver optimal learning outcomes for students. The author's pedagogical philosophy is principally grounded in comprehending, fostering and actualising five key criteria: 1) establishing lucidity; 2) cultivating expertise and curiosity; 3) embracing transformation (enhancement); 4) fostering effective communication; and 5) appreciating diversity.

1) Establishing lucidity: One of the most common remarks heard by academic staff from students is, I (we) am (are) a bit confused about.... An organised teaching plan must minimise this by making firm and clear statements during the teaching period. It is crucial to prioritise lucidity in all aspects, such as using clear and concise language, using appropriate visuals and examples, providing organised and easy-to-follow instructions and ensuring that the learning environment is conducive to learning. To meet this standard, several techniques can be employed. Firstly, a comprehensive course outline should be provided, which includes a weekly breakdown of topics, readings, assignments and assessments. For technical subjects like engineering, lecture notes should include detailed information on relevant parameters, symbols and instructions to ensure comprehension by both in-person and remote learners. For remote learning, clear consultation times help students seek assistance, and transparent assessment ensures fairness and realistic progress tracking.

2) Cultivating expertise and curiosity: Effective teaching requires a combination of expertise and a genuine interest in learning, which fosters confidence. However, instructors must also remain adaptable, as teaching responsibilities can shift due to institutional needs or career changes. While instructors often teach the same subject for multiple semesters, it is essential they continuously develop their expertise and curiosity, particularly when covering new or unfamiliar topics. Course coordinators play a key role in ensuring that educators possess the necessary skills to deliver a valuable and enriching learning experience.

3) Embracing transformation (enhancement): It is the responsibility of educators to equip students with the skills and knowledge needed for their future careers. To achieve this, embracing transformation in teaching is crucial. It means consistently striving to enhance one's skills and viewing teaching as a long-term commitment to society. Teaching broadly can facilitate the transition from abstract concepts to concrete examples, solidifying students' understanding of engineering concepts. But teaching is not just about imparting knowledge; it is also about empowering students to apply what they have learned in their future careers. By embracing transformation in teaching, educators can fulfil their role in shaping the future of society by providing students with the tools they need to make meaningful and well-rounded contributions to the world.

The opportunity of teaching somewhat broadly helps make an effective transition from abstract cognition to concrete examples towards long-term assimilation and solidification of (engineering) concepts. This has been a mindset of the author during the preparation of a new course, which turns the preparation into a professional and yet pleasant commitment!

4) Fostering effective communication: Significant parameters in delivering quality teaching in academia include effective communication and interpersonal skills. A professional approach to fostering courteous and effective relationships with team members, administrative staff, colleagues and students, including heads of schools at universities, students, academics, laboratory technicians and industry bodies is crucial for academic achievements. The author's communication philosophy is coined the right time, right person approach, which leads to mature relationships with students and helps in developing networks that enable significant progress and improvement in teaching.

5) Appreciating diversity: Understanding and committing to equity in relation to gender, culture, religion, ethnicity and race are fundamental elements in a multicultural workplace, and it is the responsibility of all to respect and uphold these values. The author has lived and worked in several countries, including Australia, Belgium, Germany and China, gaining a deep appreciation for equity and diversity in academia. Building rapport and trust with colleagues from diverse cultural backgrounds is essential for effective collaboration.

TEACHING PLANS

The fundamental structure of a comprehensive pedagogical framework is dependent upon an academic institution's guidelines and expectations. Yet the core structure of a pedagogical plan can be classified into three pivotal timeframes: 1) effective preparation; 2) delivery and instructions; and 3) evaluation and assessment.

1) Effective preparation: Preparation is a crucial element in building a solid foundation to deliver high-quality teaching, particularly in tertiary education. The initial step in the process is to develop a unit outline including pertinent details, such as unit overview, timeframe, activities, resources and assessment criteria. In terms of content preparation, the author devised and implements a self-developed strategy known as LYOV, which stands for right level (L), right time/year (Y), right order (O) and right volume (V). The LYOV method aims to achieve optimal delivery considering the following factors (Figure 3).

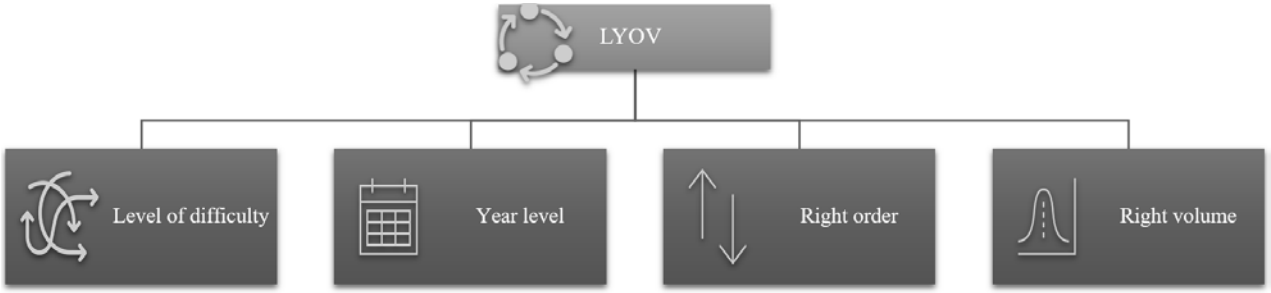

Figure 3: The author's implemented method in teaching preparation.

- Level of difficulty (L): In tertiary education, it is crucial to consider the level of difficulty when designing and delivering a unit. Instructors should have a comprehensive understanding of students' prior knowledge and academic performance. This can be achieved through collaboration with colleagues or analysing past data. By evaluating the level of difficulty, instructors can differentiate their pedagogy to meet students' needs and provide appropriate scaffolding. Understanding the level of difficulty helps establish attainable learning outcomes and objectives, fostering student engagement and motivation. This ensures students are challenged at an appropriate cognitive level, allowing them to reach their full potential and acquire essential competencies.

- Year level (Y): The year level of the students indicates the extent to which they have adapted to the nature of their studies. For instance, teaching first-year students is different from teaching third- or fourth-year students in terms of creating an effective teaching culture, including the level of delivery and expectations. The teaching approach for first-year students should provide a solid foundation with clear instructions and gradual complexity to build critical thinking skills and confidence. Third- and fourth-year students require more independence, such as advanced project-based activities, to promote higher-order thinking skills and self-directed learning.

- Right order (O): The fundamental knowledge must be taught first to build a strong foundation. Within a subject area, some topics inherently possess a logic-based sequence of content. Arranging the curriculum in a correct order enhances student involvement by presenting a well-defined route of education, minimising confusion, and allowing students to recognise the significance of every lesson towards achieving their learning goals.

- Right volume (V): The LYOV approach relies heavily on achieving the correct volume of information delivery. It is essential to match the amount of information provided with the unit outline objectives and the students' comprehension level. Overloading or underloading students with information can impede their learning progress. Maintaining a suitable balance guarantees that students receive the necessary amount of information to enhance their learning and memory retention. Instructors can customise their teaching methods to cater to individual student requirements, promoting academic achievement.

In light of the Covid-19 pandemic, the importance of effective planning and preparation in teaching cannot be overstated. The author suggests that teachers should finish the preparation for each session at least three sessions ahead of time to have enough time for necessary revisions and modifications. This approach not only ensures that the material is well-prepared but also enables more flexibility in response to unexpected events, like the sudden switch to remote teaching that many educators faced during the pandemic. Another valuable lesson learned from the pandemic is the importance of involving students in the learning process. The teacher can achieve this by incorporating interactive elements into the session plan, such as questions and discussions, to encourage participation and promote critical thinking. The use of technology tools to facilitate virtual collaboration has also become increasingly important, where hybrid learning became more dominant.

2) Teaching: In preparation for and during delivery, the author developed a method called the double-funnel method, (Figure 4). This method starts with general concepts, narrows down into specific problems and ends with general solutions and recommendations. The author believes that this approach stimulates both divergent and convergent thinking in students. To keep the students' subconscious actively engaged with the subject even after leaving the class, the author prepares small tasks for the next session.

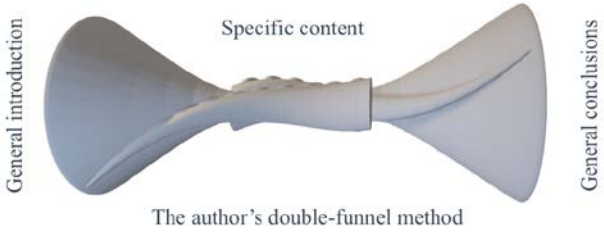

Figure. 4: The proposed and implemented method devised by the author for teaching.

Designing assignments should stimulate students to activate their divergent thinking *along with their* convergent thinking *to improve imaginative solutions.*

Teaching methods are key to promoting student engagement and achieving learning outcomes. With the shift to on-line and hybrid learning, educators must adapt to meet students' needs across different units. For theoretical subjects in engineering, such as analysis and design of structures, the use of a document camera or iPad to write down formulas, shapes and equations is recommended. This approach enables students to visualise complex concepts and follow the instructor's thought process. Additionally, technology tools like document cameras and iPads facilitate easy sharing of notes and recordings, which can be beneficial for students who miss a class or need to revisit a concept. In contrast, for units that require more discussions and descriptions than formulas, a presentation-based teaching approach using slides or videos may be more effective. The approach in question helps maintain high level of engagement and provides visual aids to support the lecturer's delivery. Slides or videos can also incorporate interactive elements, such as polls, activities or quizzes to further enhance student participation and critical thinking. The delivery period (in-class time) is when the main end-result takes place after all planning and preparation stages.

A lecturer's focus should be to achieve a professional and clear presentation while in class. Before a course starts, the lecturer identifies and outlines a set of *ground rules* to ensure that every detail is communicated about teaching. The author compiles notes and handouts to cover the planned content. During the first session, the author outlines the topics and sub-topics of the session to provide an overview of the content before it is delivered. After the first session, the lecturer can begin with a recap to connect the sessions and refresh students memories. According to Yale University's Poorvu Center for Teaching and Learning, *The first five minutes is often heralded as the most crucial, and underappreciated, moment to promote student motivation and engagement* [15]. To this end, the lecturer can gain attention by asking a general question about the content, waits for the answers, creates a group discussion, and then finally provides the students with the right answer. Facilitating brief discussions or debates between students also helps students digest and memorise the main content. Research-proven strategies indicate that a debate makes a virtual story for the content, and any concept in the form of a story remains in memory longer and easier [16].

Statistics indicate that students are more focused at the beginning of the classes than towards the end. Therefore, the author believes that keeping students actively engaged until the end of the class requires special skills. To achieve this, the author oftentimes changes teaching methods for a short while during classes, e.g. playing a video relevant to the subject halfway through the classes and linking key points of the subject to the video, towards integrating learning with practice. Also, the lecturer can design short presentation tasks (fine-ten minutes) run by students every few sessions to create a vibrant atmosphere (rather than the lecturer constantly speaking in the class). All these tricks make students enjoy the in-class environment, especially these days that (e.g. in Australia), lectures are mostly recorded and available straightaway after each class, which has negatively impacted the attendance rate.

The lecturer can design activities to encourage students to attend the lectures and enjoy a face-to-face learning environment as an active approach as opposed to the passive method of learning through recorded videos. The author supports having very clear lecture notes for each unit. The notes have suitable headings and sub-headings to avoid confusion. As pointed out earlier, the author follows a double-funnel method, by which the content comes in a broad-to-specific, then specific-to-broad sequence. This way, students start learning a general concept, and then specific concepts are given after their minds are prepared with general ideas on the content. Finally, the conclusion includes broad areas of the content to conclude teaching in a way that students can easily grasp and remember concepts (like a structured story!).

3) Feedback and assessment: Feedback and assessment generally constitute the final stage of teaching, and they play a crucial role in instilling confidence in students and aligning their skills with their learning objectives. Constructive alignment (Bigg's model) [17] highlights the importance of consistency between students' skills and their confidence levels, which is achieved through assessment. This model emphasises the evidence that students provide regarding how they have attained their learning outcomes, instead of focusing solely on the topics that instructors teach. The author supports that idea of using formative assessment (as opposed to summative assessment) because this can effectively facilitate the implementation of Bigg's model. In his teaching, the author designed and implemented an in-class assessment system based on Skinner's incentive theory of motivation [18]. This theory postulates that an individual's performance is influenced by the consequences they receive externally (Figure 5).

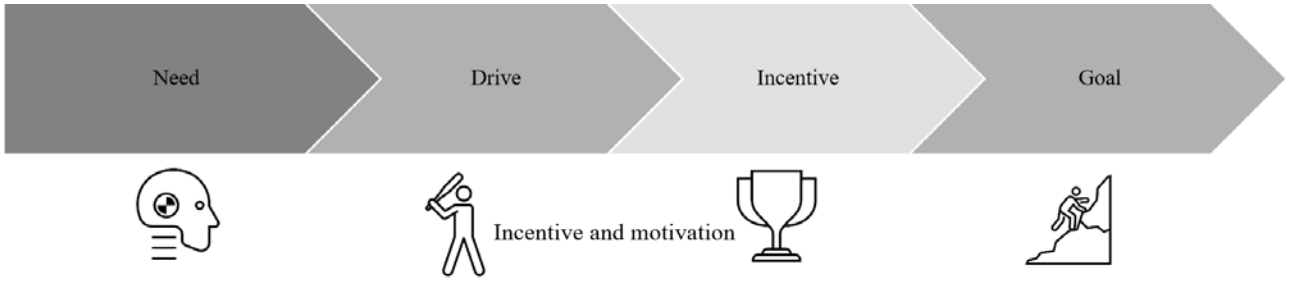

Figure 5: Key elements for motivation towards a goal.

To put this theory into practice, the author incorporates small but critical questions during lectures and asks students to answer them. He then allocates scores for class activities as a small proportion of the final mark; this method has been a highly motivating incentive. By adopting this approach, he directs the assessment towards the recommended methods of formative assessment rather than relying solely on summative assessment.

To effectively implement constructive alignment (Bigg's model) in the teaching and learning process, it is important to have an assessment system that aligns students' skills with their learning objectives. Skinner's incentive theory of motivation incorporates formative assessment into the teaching process to motivate students to achieve their learning outcomes. By integrating these theories, it is possible to improve the overall effectiveness of the assessment process and ensure that students' skills are tailored to their learning objectives. From an educational psychology point of view, the outcome of assessments can elicit strong feelings of success or failure in students, regardless of their genuine skills in a given unit. For instance, during his teaching, the author has encountered many top-performing students who received low marks due to unforeseen circumstances and subsequently expressed negative sentiments towards the entire unit. It is crucial for any lecturer to ensure that the final mark aligns with the students' capabilities, and to this end, moderation of assessments must be supported and implemented.

As a general and standard practice, the author divides examination questions into three levels of difficulty, with the bulk of questions (60%) at the average level of difficulty, 15% designed for top-performing students and 25% for students with lower abilities. This distribution has proven to produce a reasonable shortlist of the top and bottom 20% of students, with the rest falling within a fair range based on their performance, and a *normally distributed* marks across all students. In addition, the author employs a special strategy when designing assignments such as laboratory and class activities. In this method, the first activities are designed slightly more challenging than the expected average level of students, then these initial activities are graded not so generously (but obviously fairly!). This approach encourages students to maintain their focus and diligence throughout the semester. By the end of the semester (and given their experience in the past assignments), most students find the final examination to be slightly easier than they expected, resulting in more consistent and sometimes higher performance that aligns with their knowledge and abilities.

E-LEARNING IN TEACHING

Academics have long expressed concerns about the harmful effects of extensive use of whiteboards, including allergic reactions, eye strain, exposure to harmful chemicals and the environmental impact of using plastic. The use of traditional blackboards is also associated with adverse effects, such as chalk dust inhalation. With the emergence of Covid-19, the use of electronic devices, such as interactive whiteboards, document cameras, electronic writing pads (tablets, iPads, etc), clickers or classroom response systems, and virtual and augmented reality tools for teaching has become increasingly prevalent in tertiary education, replacing conventional methods of writing on black/white boards (Figure 6).

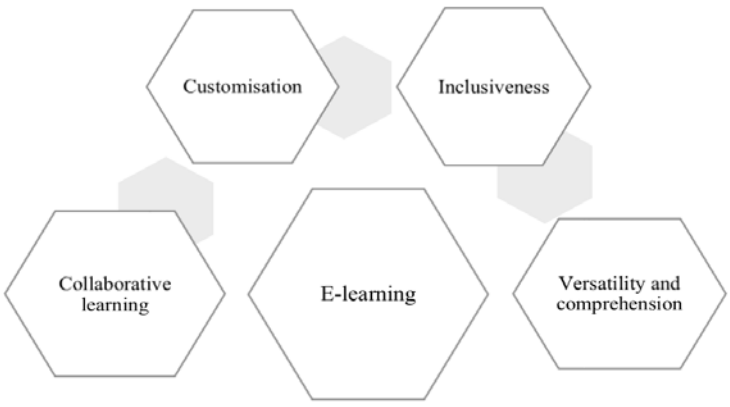

Figure 6: Key elements in e-learning.

Enhancing teaching versatility and comprehension: The use of electronic devices can improve the versatility of teaching and enhance in-class comprehension. Controlling a paper (on document camera) or screen (electronic pads) is easier for lecturers than managing a board. Along with better flexibility, visibility (even for tiny objects or details) and accessibility, using electronic boards enables easy review of hard copy materials in case any updates are required. In addition, teaching by iPad allows for dynamic delivery, utilising colours and highlighting for improved engagement. Applications such as Goodnotes, Zoomnotes and Notability, which cater to most teaching needs, are very helpful to facilitate teaching verticality and using electronic boards instead of conventional methods.

Improving inclusiveness of students with learning challenges: The use of electronic devices also allows for easy and high-quality video recording of sessions, which can be accessed any time after classes. When a session is recorded, students do not need to worry about taking notes because the video files of the class are uploaded for their use. This positive reinforcement, promotes mindfulness, clearer communication and active listening in students, and is especially helpful for those students with special needs. These students include, but is not limited to, students with

ADHD, dyslexia or dysgraphia, who may have challenges with their organisational skills, focus, and more importantly, multi-tasking. Thus, using technology can facilitate lecturers' pastoral care as one of their key responsibilities.

Customisation: The utilisation of electronic devices provides the opportunity for customisation in teaching, enabling lecturers to tailor their teaching approaches to meet the unique needs and interests of individual students for each unit. This is now made possible through the implementation of personalised learning applications, which offer a diverse range of potentials for designing creative activities such as forums, quizzes, and many more. These tools tend to enhance the learning experience, providing a more enjoyable and effective educational environment.

Promoting collaborative learning: The utilisation of electronic devices provides a versatile environment for collaborative learning, e.g. communication through shared platforms, video conferencing and other means in diverse teams. Achieving collaborative assignments is enhanced using these technical capabilities in learning, leading to higher engagement and co-operative problem solving and knowledge sharing. These tools enable allocation of specific tasks, track progresses and provide constructive feedback, which all can lead to improving the quality of their collective work.

CONCLUSIONS

The integration of technology into teaching has resulted in a wide range of teaching methods, moving away from traditional face-to-face methods. As a result, the focus of educators has shifted towards technology-based e-learning and blended teaching. Blended learning places students at the centre of the learning experience, promoting problem-solving and practical skills, deeper learning, and active communication with their instructors and peers. The Covid-19 pandemic has predominantly strengthened blended learning by offering flexibility in learning, personalised learning, improved engagement, and enhanced accessibility and inclusiveness. The author advocates for a flexible and adaptable approach to education, leveraging innovative teaching methods and the implementation of technology in teaching.

In a nutshell, the author's approach prioritises establishing clarity in teaching, cultivating expertise and curiosity, embracing transformation, fostering effective communication and appreciating diversity. The Covid-19 pandemic has caused significant changes in the education sector, leading to the emergence of hybrid learning models. Developing a comprehensive teaching plan that incorporates both in-person and on-line instruction requires consideration of various variables, including the teacher's responsibilities, teaching facilities and departmental culture. The author proposes a structured teaching plan that incorporates effective preparation, delivery and evaluation. The author's LYOV method can help instructors design units that cater to students' needs by considering the level of difficulty, year level, right order and right volume of content. The author's double-funnel method and interactive teaching elements, coupled with technology tools, can enhance student engagement and promote critical thinking.

The Covid-19 pandemic has led to an increased use of electronic devices in tertiary education to replace conventional methods of writing on black/white boards. The use of electronic devices can improve the versatility of teaching and enhance in-class comprehension. Using electronic devices allows easy and high-quality video recording of sessions, which promotes mindfulness, clear communication and active listening in students, and is especially helpful for those with special needs. Electronic devices also provide opportunities for customisation in teaching, enabling lecturers to tailor their teaching approaches to meet the unique needs and interests of individual students. Additionally, these devices promote collaborative learning, leading to higher engagement among students and co-operative problem solving and knowledge sharing.

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BIOGRAPHY

Tohid Ghanbari-Ghazijahani earned his BEng (Civil), MEng (Structural) and PhD with the Dean's Exceptional Research Performance Award. He joined Macquarie University, New South Wales, Australia, as an assistant professor (lecturer) in civil-structural engineering. He was a teaching-research fellow at KU Leuven, Belgium, and a recipient of the prestigious Alexander von Humboldt Research Fellowship. He held a DVC(R)'s University Research Fellowship at the University of Adelaide, South Australia, and worked as a research associate on an industry co-funded project at the University of South Australia. He has been the sole lecturer in charge of structural mechanics at both UTAS, Tasmania, Australia, and KU Leuven, and currently serves as the unit convenor and lecturer of structural units at Macquarie University, New South Wales, Australia. He has also lectured at XUST in China and Payame Noor University (PNU) in Iran, where he received a distinguished lecturer award.