



UNIVERSITY
OF WOLLONGONG
AUSTRALIA

Certificate of Accreditation

AWARDED TO

Davoud Mougouei

Has successfully satisfied the requirements for
Continuing Professional Development
(Learning & Teaching)
Portfolio, Level 1

23 SEPTEMBER 2020

Theo Farrell

Professor Theo Farrell
Deputy Vice-Chancellor (Education)



This teaching portfolio has been endorsed (UOW CPD Accreditation) as “*an exemplary portfolio demonstrating a strong command of policy, literature and practices of learning and teaching in higher education.*”

Comments from the reviewers:

Reviewer 1: “*It is clear that you are a thoughtful and committed teacher that puts students at the centre of their practice. You describe an holistic approach to your research and teaching, which is a pleasure to encounter. The amount and the nature of student feedback confirms the engagement that is elicited by your approach. You have engaged with UOW policies, and it is apparent that your practice is informed by current pedagogical theory ...”*

Reviewer 2: “*CPD portfolio adequately addressed Level 1 criteria. Overview of teaching provided and subjects specified. Teaching philosophy grounded in an active student-centered and inquiry-based approach, which is clearly and consistently articulated throughout the CPD portfolio. Extensive understanding and application of UOW teaching policies and guidance evidenced throughout CPD portfolio, and supported by relevant peer reviewed pedagogical publications. Level 1 descriptors for each criteria were adequately addressed and supported with a range of relevant evidence including: screenshots of ECHO360 lectures demonstrating innovative teaching practices; student comments and ratings; comments from teaching teams; review and ongoing development of teaching resources. CPD (Level 1) recommended.”*

Continuing Professional Development Portfolio (Level 1)

Dr. Davoud Mougouei

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Teaching philosophy

I see teaching as an ongoing effort that aims to enhance the personal and social aspects of human lives. Teaching has helped me realize my passion for learning by reinforcing and deepening my theoretical and practical understanding of different topics in computer science and IT. Teaching has further helped me identify opportunities for making positive social impacts. My research in considering human values in artificial intelligence and software systems has shown a big gap in this area [28]. An example is a racial bias in several AI software including facial recognition and recidivism assessment [2]. To promote equality and fairness and overcome biases, I have an overarching goal to integrate human values such as fairness and in IT subjects at different levels. In doing so, I have incorporated the role of ethics and human values in software development methodologies in CSIT314. I have also designed assignments (e.g., in CSIT314, CSIT121) that encourage students to think about the impact of IT on human emotions and values. Moreover, I am supervising student projects (CSIT321) that focus on identifying human values and emotions in online content. I believe that a successful teaching process in IT has to be active student-centered [20] and inquiry-based to boost students motivation, engagement, and confidence [17, 1]. When I teach a subject, I focus on three major stages: before, during, and after the lectures. Before a lecture, I meet with the teaching team to ensure that we are aligned with class materials during the lecture. Moreover, I discuss the lab exercises to ensure that they help enhance the students' understanding of the lectures. Regular communication among the teaching team contributes to high-quality education. During a lecture, I adopt pedagogical approaches such as inquiry-based teaching [17, 1], group discussion[14], dry run, and concept map[19], that encourage student interaction. I have found this extremely important to ensure the students feel their contributions are always appreciated. After the class, I ensure, through different communication means, the students can find me when they need consultation. That includes holding weekly office hours and beyond that when needed. I've had students needing additional help beyond my consultation hours, and I answered all my students' questions even if I had to stay more than my announced consultation hours. In addition to office hours, I maintain high responsiveness to emails.

Background and UOW context

I completed my Ph.D. (Software Engineering) in 2018 at the College of Science and Engineering, Flinders University, where I was a tutor for graduate and postgraduate subjects: COMP2761 (Database and Conceptual Modeling), ENGR2782 (Computer Networks and Operating Systems), COMP2741 (Application Development in Java). In 2019, I started my role as a postdoctoral research fellow at the Faculty of IT, Monash University, where I also was a lecturer for FIT2014 (Algorithms and Data Structure) and a member of the teaching team for FIT2102 (Programming Paradigms). I joined the School of Computing and Information Technology (SCIT), UOW in Nov

2019; my teaching responsibilities at SCIT primarily include coordinating, teaching, and enhancing subjects in Computer Science and Information Technology at different levels. I commenced my work at UOW with coordinating CSIT121 (Object-Oriented Design and Programming in Java) in Summer 2019–2020, Wollongong campus. Then I coordinated CSIT314 (Software Development Methodologies) and CSIT110 (Fundamental Programming with Python) in Autumn 2020, SWS campus. I am coordinating ISIT315 (Semantic Web) in the Spring session of 2020.

1 Design sound inclusive learning experiences, incorporating TEL

My contributions to the design and enhancement of the subjects at the School of Computer Science and Information Technology concern two main aspects as follows. First, to build a practical understanding of the concepts in computer science and IT (e.g., software development methodologies, software design patterns, and programming languages) above merely delivering the content. Second, to help the students develop an achievable set of technical (e.g., problem-solving) and interpersonal (e.g., teamwork) skills required for their career development in the IT job market as well as higher degree research. To achieve these, in compliance with UOW Code of Practice—Teaching and Assessment, the subjects I have coordinated were designed around interactive lectures, activity-based tutorials [15, 9], and inclusive assessments. In doing so, I have especially focused on the following items as evidenced below.

1.1 Enhancing students engagement and flexible learning

Online subject presence using Moodle. The time-pressed 21st century requires flexible and mobile learning to enhance both on-campus and off-campus learning experiences and facilitate the inclusion of the students from different backgrounds with different constraints [13]. To help the students reach their full potential of learning [21], I have extensively used Moodle learning platform and its interactive features for continuous and flexible access to the subject resources, activities, information, and support. In compliance with UOW Digital Learning Thresholds, I ensured that the subject outline, activity schedule, deliver mode, and subject learning outcomes are listed on the Moodle site of CSIT121, CSIT110, CSIT314, ISIT315. Also assessment submission, evaluation and feedback procedures were all managed via the Moodle sites of the subjects. For safety purposes, UOW Emergency Procedure (SWS/UOW campuses) was communicated with the students and the teaching staff. For ease of access, all lectures were video-recorded and uploaded on Moodle using ECHO360 (CSIT121) and Webex (CSIT110, CSIT314, ISIT315), which addressed Technology-Enriched Learning Strategy. Online resources shared on the Moodle sites of CSIT121, CSIT110, CSIT314, and ISIT315 include lecture slides, multimedia (creative commons compliant), additional readings, sample code (CSIT121, CSIT110, ISIT315), tutorial resources and assessments. All of the assessments were managed online via Moodle. For CSIT121 the feedback was initially provided in the laboratory (CSIT121) and then recorded in the Moodle site of the subject. For CSIT110 and CSIT314, however, face-to-face feedback was not feasible due to the outbreak of COVID-19 (from Week 4 on); feedback was provided online. In addition, I provided more detailed feedback and answered technical questions via email and Webex (within and beyond consultation hours). The following student comments from CSIT121 evidence this.

CSIT121 (Summer 2019–2020): “Well-prepared for class, content is very structured, well-presented lecture slides. Always available to answer questions/make appointments; Ensures when Q’s asked, he answers fully; Open to receiving feedback ...”

Effective Lectures. Lectures aims to convey information, generate understanding, and stimulate motivation, which can lead to a deeper understanding of the subject when student-centered and inquiry-based learning is utilized [7]. If the lectures do not actively engage and motivate the students, however, their effectiveness will be limited to other methods of conveying information

[7]. This is particularly important for computer science and IT subjects, where the students need to develop a practical understanding of the subjects and expand their skillsets beyond theoretical frameworks to prepare for the job market. As such, I structured my lectures for CSIT121, CSIT110, CSIT314, and ISIT315 with emphasizing on student engagement and encouraging critical thinking and challenging opinions to enhance the effectiveness of the lectures [12] and deepen the students' theoretical and practical understanding of the subjects. I also constantly adapted my teaching style to tailor the needs of the students. The following student comments collected from the teacher evaluations evidence the above-mentioned.

CSIT121 (Summer 2019–2020): “*Overall happy with Davoud’s teaching, he is one of the best I have had. Great to see he actually teaches from the textbook. He made a hard subject possible.”* “*He is passionate about teaching and has a pretty chilled personality.”* “*Always happy to explain multiple times, touches back on the past content to help us with current content.”*

CSIT110: “*He frequently checks in on his students during the lectures to make sure we understand the material and to see how we feel about the subject matter and tasks we are given - even asking us why we all chose the subject so he could get a feel for what aspects to focus on in the additional material and how to approach the subject matter.”*

CSIT314: “*Interactive lectures, appropriate lab assistance, help with doubt in labs.”*

I used Live Coding (Figure 1) and Live Modeling, which have proven to be highly effective in teaching programming and designing subjects in computer science and IT [3], during the lectures of CSIT121, CSIT110, and ISIT315 using local and cloud-based tools such as Repl.it. There were several questions in the lectures to promote inquiry-based teaching and instigate critical thinking in the students and the lectures including a variety of engaging activities such as online games (e.g., games from math is fun¹). Figure 2 summarizes the quantitative feedback on my teaching (Q1-Q14) for CSIT121 (Summer 2019–2020), CSIT110 (Autumn 2020), and CSIT314 (Autumn 2020).

```

    main.py
    323     m1 = [[1, 2, 3],
    324             [4, 5, 6],
    325             [7, 8, 9]]
    326
    327     m2 = [[5, 6, 7],
    328             [8, 9, 1],
    329             [2, 3, 4]]
    330
    331     R = [[0, 0, 0], [0, 0, 0], [0, 0, 0]]
    332
    333     for i in range(len(m1)):# iterate over the rows of m1
    334         for j in range (len(m2[0])):# iterate over the columns of m2
    335             for k in range (len(m2)):# iterate through the rows of m2/ col of m1
    336                 R[i][j] += m1[i][k]*m2[k][j]
    337
    338     for r in R:
    339         print(r)
    340
    341     # multiply them
    342     if __name__ == "__main__":
    343         main()

```

https://While.davoudmougoei.repl.run

```

[114, 160, 60]
[74, 97, 73]
[119, 157, 112]
> []

```

Figure 1: Live coding in Repl.it; the snapshot of a recorded lecture, CSIT110

Response to COVID-19. With the outbreak of COVID-19, I used integration of Webex with Moodle (Figure 3) for online lectures, tutorials, and consultations. All lectures were recorded using Webex and made available on the Moodle site of the subjects (Figure 3). To fully utilize the potentials of online teaching, I incorporated activities that facilitate student-centered teaching [20, 9, 23] into the teaching materials and laboratories. Despite its negative impacts, the COVID-19 pandemic reinforced the importance of being prepared for global challenges. It also motivated utilizing the potentials of online teaching [9, 23]. It further became apparent that it is important to commensurate the teaching methods and assessment tasks with the students' mental health [8] as well as other financial and technological constraints [29] during such distressing times. To reduce the stress

¹<https://www.mathsisfun.com>

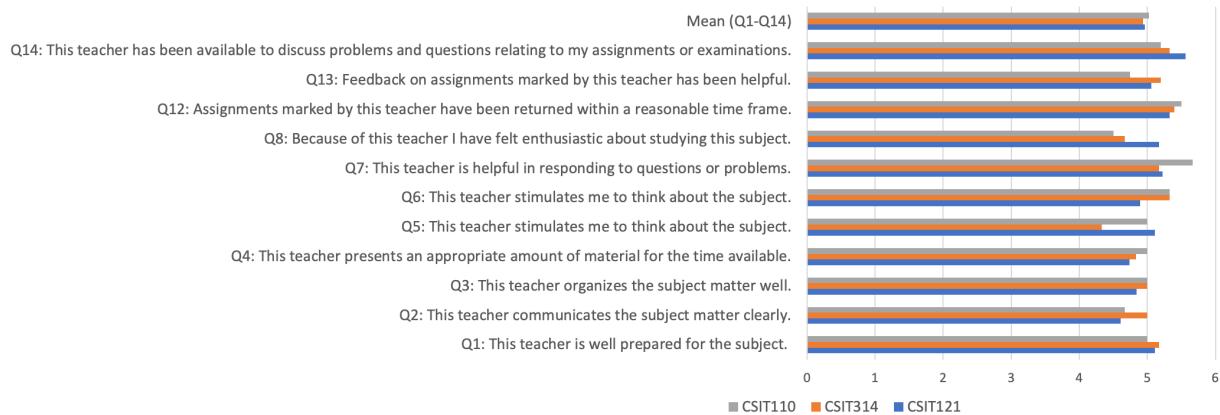


Figure 2: Teacher evaluation results for Q1–Q14, CSIT121, CSIT110, CSIT314.

on the students [30] amid COVID-19, I facilitated open and easy communication and offered more flexibility with the assignments, e.g., flexible deadlines and open book assessments [26]. I also allocated additional points to the small quizzes during the lectures and labs to encourage attendance. Sharing motivating YouTube videos in the lectures and tutorials was another method I used to make the online teaching experience during the COVID-19 pandemic less stressful. I also remained available to the students outside my consultation hours. The following student comments evidence the above-mentioned.

CSIT110: *“During the first few weeks before the COVID epidemic, I vividly remember an engaging learning experience during the first three lectures. Whilst going through lecture notes, the lecturer had also went through examples via applying the code and showing what can be done and trying to engage the class in these. This same approach was applied to remote learning and was helpful when watching recordings of the lecture.” “I’m personally thankful that lecture and lab attendance was not mandatory. There are students that may have circumstances that may not allow them to attend and being able to watching lectures to study was helpful.”*

Name	Date	Duration	Actions
Lecture-20200406 2242-1	Apr 07, 2020 08:42 am	2h 48m 48s	View Recording
test5-20200402 0130-1	Apr 02, 2020 12:30 pm	25m 36s	View Recording

Figure 3: Webex integration with Moodle for CSIT110.

I am coordinating ISIT315 in the Spring session of 2020. Based on the lessons learned from the Autumn session, I have adjusted the assessment tasks, lab activities, and the lecture so that it keeps the students engaged while commensurating the assessment with the pandemic-induced technical challenges both international and domestic students may be facing. To expose the students to industrial contexts and motivate their career goals, I have invited guest speakers from the industry to share their views on the latest trends in semantic web and search engines.

1.2 Activity-based tutorials linked to assessment tasks and the learning outcomes

The tutorials of CSIT121, CSIT110, CSIT314, and ISIT315 were designed to help students put into perspective the theoretical concepts and think critically about what they learned. The tutorials focused on different assessment components of the subject, mapped to the subject learning outcomes. CSIT121 tutorials were two-fold: i) lab exercises, that were aimed to motivate the students and encourage them to adopt Object-Oriented design and programming in Java and ii) assignments that were aimed to challenge the programming skills of the students in relation to the subject learning outcomes as well as giving students insights about what they would be expected to achieve in real-world software projects. In this regard, assignments were designed that used YouTube Application Programming Interface (API) as a real-world third-party library to interact with and analyze YouTube content. At the end of the session, the students delivered a working Java program, where each component of the program mapped to different learning outcomes in a real-world context. I used Live Coding and Modeling during the tutorials for CSIT121, CSIT110, CSIT314, and ISIT315. Tutorials for CSIT314 (Software Development Methodologies) were primarily structured around team-work as the subject's main focus was on processes, activities, and human interaction in software development teams. The students practiced developing software using different methodologies such as Agile Scrum, Kanban, and traditional methods. In the following, I have listed some of the student comments regarding the tutorials of CSIT121, CSIT110, and CSIT314.

CSIT110: *"He communicates the work to us in a step by step manner to help us understand why the processes of the coding occurs." "He offers additional non-compulsory work for students who are ahead and/or are wanting something different to work on to sharpen their skills."*

CSIT121: *"Very helpful and available to answer questions, Good at explaining problems, uses a variety of resources, loved that YouTube channel."*

CSIT314: *"..., appropriate lab assistance, help with doubt in labs."*

2 Facilitate a variety of inclusive learning experiences

2.1 Engaging, including, and challenging the students

I used inclusive and active student-centered learning in CSIT121, CSIT110, CSIT314, and ISIT315 to engage, include, and challenge the students. During my teaching experience for CSIT121 and CSIT110, I included diverse content, materials, and ideas in the subject material and the assessment tasks to encourage the students to think outside the box and see themselves as technology developers with positive impacts on the society. In CSIT121, I designed activities that encouraged the students to think about alternative ways to implement Object-Oriented concepts. I also asked them to think about the limitations of the available programming frameworks and propose ideas for improving them. I adapted my teaching style and the contents of the subjects to tailor the needs of the students and used a variety of engaging activities such as games (Figure 4) to help students deepen their understanding of the topics. To empower students with different programming skills, I used Live Coding in CSIT121, CSIT110, and ISIT315, e.g., in Eclipse, Spider, and Reple.it.

CSIT110: *"He challenges us during class to use what we have learned outside of the labs we have been given; gives us optional tasks during lectures to allow us to test ourselves on what we have learned at a pace." "He offers additional non-compulsory work for students who are ahead and/or are wanting something different to work on to sharpen their skills." "During the first few weeks before the COVID epidemic, I vividly remember an engaging learning experience during the first three lectures. Whilst going through lecture notes, the lecturer had also went through examples via*

“applying the code and showing what can be done and trying to engage the class in these. This same approach was applied to remote learning and was helpful when watching recordings of the lecture.”

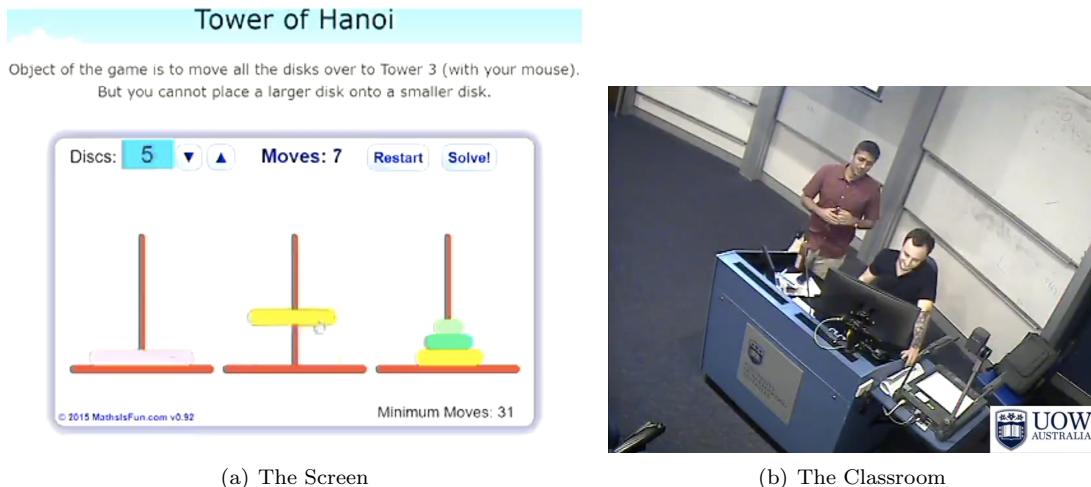


Figure 4: The snapshot of a CSIT121 lecture recorded (Echo360) on Jan 23, 2020: a volunteer student solves the Tower of Hanoi problem to devise a recursive algorithm. All students contributed; at the end, everybody received additional points for their contributions.

2.2 Promoting diversity, fairness, and equality

There is a diverse range of students (socially and culturally) at the SCIT, UOW. That requires considering the differences among the students in terms of their needs and expectation. To ensure my inclusive teaching leads to successful learning for a diverse group of students in CSIT121, CSIT110, CSIT314, and ISIT315, I focused on understanding the needs and preferences of the students of different backgrounds and supporting them to acquire or develop the skills required for navigating into, through and beyond university [10, 22]. In doing so, I have seen diversity as a resource and designed a variety of class activities and assessment tasks that suits students with different abilities. The following student comments evidence that.

CSIT110: “*He frequently checks in on his students during the lectures to make sure we understand the material and to see how we feel about the subject matter and tasks we are given - even asking us why we all chose the subject so he could get a feel for what aspects to focus on in the additional material and how to approach the subject matter.” “He offers additional non-compulsory work for students who are ahead and/or are wanting something different to work on to sharpen their skills.”*

Recognizing the positive value of a diverse community, and in alignment with UOW Respect for Diversity Policy, I have ensured the subjects I have coordinated are free from the manifestations of unlawful discrimination, and diversity is respected and encouraged among the students as well as the members of the teaching team. I have also made sure that a trusted communication channel remains always available to the students to assist them with their considerations, in accordance with UOW Student Academic Consideration Policy. I specially offered more flexibility to the students (CSIT110, CSIT314, and ISIT315) with regards to the deadlines and attendance requirements amid COVID-19 to mitigate the emotional distress on the students. I also ensured a fair, reasonable, timely, and consistent evaluation of the assessable components. Also, I provided online support (beyond my consultation hours) to the students who could not attend the tutorials due to the work-related or family-related matters amid COVID-19. Moreover, in compliance with UOW Disability Policy–Students, I have always ensured that the students with special needs can get access to the information they need via Moodle and other communication channels, and I have provided

reasonable adjustment to the assessment components of the subjects to ensure a fair evaluation.

CSIT110 (Autumn 2020): *"I'm personally thankful that lecture and lab attendance was not mandatory. There are students that may have circumstances that may not allow them to attend and being able to watching lectures to study was helpful."*

My research in integrating human values (e.g., fairness, equality, sense of belonging, and social justice) in software and AI systems [25, 27, 16, 28, 24] has shown that the existing technology developers in IT do not pay sufficient attention to those values. That, unfortunately, has to lead to a wide-spread bias in AI and software systems such as facial recognition and recidivism assessment [2]. To overcome biases and inequality in IT, a generation of technology developers need to be trained that account for these values. To promote equality and fairness and overcome biases, I integrated human values into my teaching contents and assessment tasks to encourage the students to think about the implications of their design choices on our values, e.g., fairness, equality, privacy, diversity, and social justice. In doing so, I incorporated, in consultation with the teaching team, the role of ethics and fairness in Agile software development methodologies in CSIT314. I also designed assessment tasks (e.g., Lab exercises in CSIT314, and CSIT121) that encouraged students to think about the impact of IT on human values. Moreover, I am supervising student projects (CSIT321) that focus on identifying human values and emotions in video content (e.g., YouTube videos).

3 Facilitate learning environments that assist student transitions

Student transition [10] at SCIT is a process through which the students build on their educational experiences and become independent, lifelong learners, at university, and in their future careers. I have facilitated student transition in the subjects I have taught at SCIT as follows.

3.1 Supported students in moving from previous experiences to university study

In the first lectures of CSIT121, CSIT110, CSIT314, and ISIT315 I introduce myself and tell the students about my academic and industrial background so they know how to address and contact me and what to expect with relation to my expertise. Also, I communicate my availability for consultation as well as the expectations and classroom protocols. To avoid confusion, this information has been posted on the Moodle site of the subjects. I have also actively used Moodle forums for sharing the announcements and reminding the students about the assignment releases and deadlines. I have always ensured that the student has read and understood the subject outlines. Besides, I have emphasized the main points of the subject outlines during the first few lectures and tutorials of the session, as new students may arrive over the first few weeks. To facilitate student transition, I have encouraged students to talk about their expectations of the subjects and introduced the subject by demonstrating how it links students' past experiences and their future goals. For instance, in the first lecture of CSIT110 the students talked about their previous experiences with other programming languages and that, for instance, they expected to learn Python for machine learning and AI job opportunities. Teaching practices such as comparing the programming paradigms (Java versus Python) were used to assist the students to relate the contents of the subject to their previous experiences. Same approach was used in CSIT121, CSIT314, and ISIT315.

CSIT121: *"... touches back on the past content to help us with current content."*

3.2 Proposed students to see transition as an ongoing experience

I have always stressed the importance of good communication and personal responsibility for learning as an important factor in a successful student transition. For instance, in the cases of disagreements among the students in group-based assignments (CSIT121 and CSIT314), I guided the students through the steps to communicate their issues in a respectful environment and come to

a reconciliation. The approach worked in all cases, equipping the students with the skills required for handling similar situations in their future work environments. Also, I have emphasized the importance of self-learning as a key factor in academic and career success. In teaching CSIT121, I came across student expectations that did not match with independent self-learning; the tutors helped the students overcome the main obstacles that prevented them from trying but encourage the students to find the solutions themselves. Also, the students practiced team-work and taking personal responsibility through participating in group-based class activities and assessment tasks for CSIT121, CSIT110, CSIT314, ISIT315. The students were evaluated based on their team-work as well as their ability to demonstrate a reasonable understanding of different parts of the assignments, including those contributed by their teammates. Finally, I have always ensured my lectures are well-structured and well-sequenced to assist the students in how the subject is sequenced and increases in complexity.

3.3 Oriented students to work, professional practice, and careers.

I have always encouraged my students to see themselves as the developers of future technologies with positive impacts on the society. In this regard, I have encouraged the students in CSIT121 and CSIT110 to think about different programming concepts they learned and apply them to the contexts that they are familiar with (e.g., local businesses). Several examples were given during the lectures and tutorials. Assignment 2 and Assignment 3 in CSIT121 encouraged the students to work with a real-world application programming interface; the assignments aimed to simulate a real-world situation for the students and stimulate their critical thinking as to how the programming concepts can help enhance the sales for small and medium-sized businesses in Australia. I also designed group-based projects, in consultation with the teaching team, for CSIT314 which allowed the students to practice different methods of developing software and take up different roles, simulating real-world positions in IT projects. I have further emphasized learning to act and communicate professionally and ethically in students' future work environments. The role of ethics in software development teams was incorporated in CSIT314 and the students were encouraged to think critically about the challenges and potentials of the IT projects concerning ethics, fairness, equality, and privacy. This has also been incorporated in the class activities and assessment tasks of CSIT121, CSIT110, CSIT314, and ISIT315.

4 Develop a variety of effective assessment tasks that foster learning. Provide constructive feedback to students in a range of settings

Effective assessments help engage the students, develop their skills, and prepare for the job market [5]. As specified in UOW's Assessment and Feedback Principles, effective assessment tasks must "develop and demonstrate student learning, to build their capacity to become confident, capable, self-regulating, life-long learners". This, underlines the importance of providing timely and constructive feedback to the students, so they can use that to enhance their skills in a timely manner. Based on UOW Teaching and Assessment Code of Practice and its related policies (Subject Delivery Policy, Assessment and Feedback Policy, Code of Practice—Casual Academic Teaching), I have developed a variety of effective assessment tasks for CSIT121, CSIT110, CSIT314, and ISIT315. Figure 2 summarizes the quantitative feedback related to the assessment (Q12-Q14) of CSIT121 (Summer 2019–2020), CSIT110 (Autumn 2020), and CSIT314 (Autumn 2020).

The assessment tasks for CSIT121 comprised weekly lab exercises, which were designed mainly to encourage student engagement and instigate critical thinking in the students in relation to the subject learning outcomes. Feedback on the exercises was provided in the lab. The students were encouraged to improve their solutions and go beyond the requirements of the exercises when possible. Also, the students were encouraged to solve the same problem by using alternative methods. The

assessment tasks of CSIT121 also included three assignments: Assignment 1 was mainly focused on understanding the requirements of the users to develop an object-oriented software, (group-based) Assignment 2 was mainly focused on understanding an object-oriented model and translating it into code, and (group-based) Assignment 3 extended Assignment 2 by adding the requirements needed for a real-world software and learning how to interact with the exiting application programming interfaces provided by Google and YouTube. The final exam evaluated all subject learning outcomes.

In CSIT110, the assessment was built around weekly exercises, each of which challenged the students' programming skills in relation to the learning outcomes. To account for differences among the students, additional exercises were given to the students to further challenge and develop their problem solving and programming skills. The final exam for CSIT121 and CSIT110 tested the theoretical and practical (through programming questions) understanding of the students with regard to the learning outcomes. The assessment tasks of CSIT314 were mainly based on team-work (Project 1 and 2) as the subject's main focus was on processes, activities, and human interaction in software development teams. The students practiced developing software using different methodologies such as Agile Scrum, Kanban, and traditional methods. The subject's assessment also included 2 lab tests and a final exam to evaluate the theoretical and practical understanding of the students with relation to the learning outcomes.

5 Apply sound, discipline relevant Learning & Teaching theoretical principles to explain their teaching practice.

As explained, with several examples, in the previous sections, I have used active student-centered learning [11, 18] and inquiry-based teaching [17] with focus on inclusiveness, diversity, and human values such as fairness and equality in the activities and contents of the lectures and tutorials. I teach subjects in computing and information technology, where the students need to develop a practical understanding of the subjects and expand their skillsets beyond theoretical frameworks to prepare for the job market. To facilitate this, I have used inquiry-based teaching and active student-centered learning that helps convey information, generate understanding, and stimulate motivation, which can lead to a deeper understanding of the subject [7]. As such, I have structured my lectures for CSIT121, CSIT110, CSIT314, ISIT315 with emphasizing on student engagement and encouraging critical thinking and challenging opinions to enhance the effectiveness of the lectures [12] and deepen the students' theoretical and practical understanding of the subjects.

CSIT314: “*Interactive lectures, Appropriate lab assistance, help with doubt in labs.*”

CSIT121: “*content is very structured, well-presented lecture slides, fairly engaging lectures.*”

To support inquiry-based teaching and active student-centered learning, I have used some brief and easy supplements for my lectures. That includes introducing short pauses during the lectures to ask questions that encourage the students to think critically and try some (e.g., programming) tasks for themselves. This also provides an opportunity for questioning and clarification, which has demonstrated to significantly enhance learning [4]. I have also widely used Retrieval Practice in the subjects I have taught by asking questions about the previous lectures and having the student to map the concepts they have learned to the concepts they are going to learn. This prompts students to retrieve information from memory and develop a full picture of the concepts they are learning [6]. The following student comment evidences this.

CSIT121 (Summer, 2019–2020): “*Always happy to explain multiple times, touches back on the past content to help us with current content.*”

To support active student-centered learning and due to the nature of the subjects I have taught, I have widely used Demonstrations (Figure 5) in CSIT121, CSIT110, CSIT314 to ask students to predict the result of a demonstration and compare their predictions with the actual result. I always

provided an explanation at the end to clarify why some of the students predicted different results. This approach helps the students test their understanding of a problem (e.g., a software code in CSIT121 and CSIT110) by predicting an outcome and restructure their mental model when there is a misconception.

CSIT121 (Summer, 2019–2020): “Quality demonstrative example code and answering questions. He communicates the work to us in a step by step manner to help us understand why the processes of the coding occurs.”

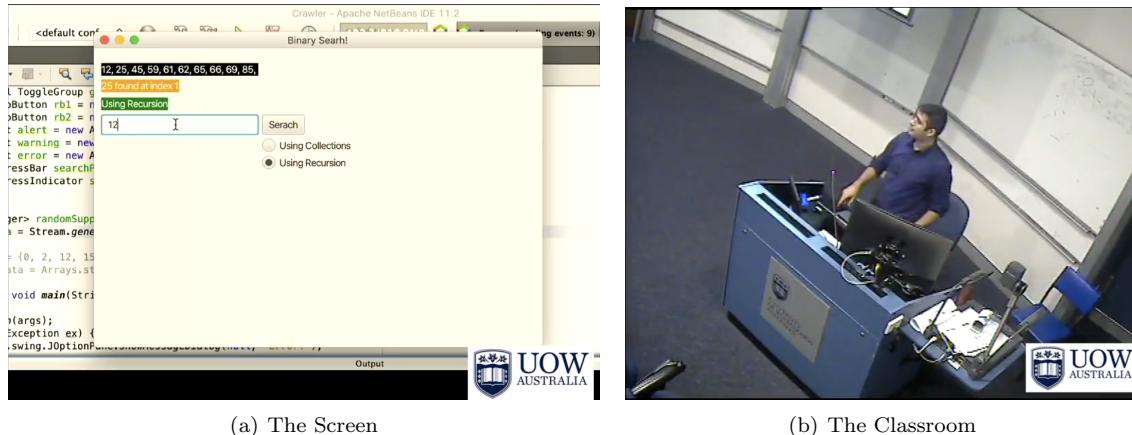


Figure 5: The snapshot of a CSIT121 lecture recorded (Echo360) on Jan 29, 2020: live coding and demonstration was used to encourage the students to think about a complex topic (a search algorithm). The students were asked to predict the results step by step and then encouraged to compare their answers with the demonstration results.

6 Evaluate the effectiveness of teaching practice and student learning outcomes. Reflect upon feedback/data from students and colleagues, as well as personal experiences, in order to improve teaching practice.

I am proud of the positive feedback from my students in CSIT121, CSIT110, and CSIT314. However, I have always recognized the significance of reflecting on my teaching to adopt the effective methods of teaching and ensure a smooth transition for the students, thus helping them find job opportunities or peruse their study to higher degrees. The ever-changing nature of the computing and IT job market requires keeping abreast of those changes and reflecting them in teaching to ensure the subject materials and assessment tasks benefits the students. An example is the new job opportunities that emerged with the advent of technologies around AI, Data Sciences, and Machine Learning in recent years. As a result, Software Engineers need to be equipped with the latest advances and technologies in those areas as the future software heavily relies on AI and many job opportunities need developing software for Data Sciences and Machine Learning. In this regard, in consultation with the teaching team, I incorporated Data-Driven software development methods, which emphasized the role of AI in software development, in CSIT314. I also incorporated some light-weight machine learning tasks in the tutorials of CSIT121 and ISIT315. I asked my students about their intention for taking the subject and their career objectives so I can adjust my teaching style and the contents to suit their needs. Also, student differences always require the attention of the teacher to ensure the contents and class activities suit all of the students despite the differences in their backgrounds and technical knowledge. For instance, in CSIT121 it came to my attention, during the very first tutorials, that some of the students could finish the lab exercises pretty quickly while others struggled to finish their tasks. This was also brought to my attention by other members of the teaching team during the Weekly meetings we had. Recognizing that, I designed more sophisticated items as well as optional tasks for the lab exercises to keep all of the

students engaged regardless of their levels of competence. To ensure the effectiveness of the new strategy, I continued to observe the students during my tutorials and visited other tutorials ran by my colleagues to ensure the result was consistent. With the great results achieved, a similar strategy was used for the tutorials of CSIT110. The following student comments support these.

CSIT110: *"He frequently checks in on his students during the lectures to make sure we understand the material and to see how we feel about the subject matter and tasks we are given - even asking us why we all chose the subject so he could get a feel for what aspects to focus on in the additional material and how to approach the subject matter." "... gives us optional tasks to allow us to test ourselves on what we have learned at a pace." "He offers additional non-compulsory work for students who are ahead and/or are wanting something different to work on to sharpen their skills."*

CSIT121 (Summer 2019–2020): *... ensures when Q's asked, he answers fully; Open to receiving feedback; Patient teaching. ... is Good at listening and solving problems.*

I have further adapted my teaching style as well as the tools/technology used for the lectures and tutorials based on the student feedback. For instance, in Assignment 3 of CSIT121 (Summer 2019–2020), there was initially a requirement that students had to use an Oath-based authentication mechanism to retrieve YouTube comments. It came to my realization that the majority of the students found it beyond their level of competence in programming; I mitigated this by relaxing the requirement to optional. Also, I provided the template for the programs they were expected to develop so they can follow the steps provided in the template, which was appreciated by many students in the class. I also extended the deadline of Assignment 3 of CSIT121 as a good number of the students requested extra time due to the time pressure induced by the shorter summer session. With the outbreak of COVID-19 and the socio-economic challenges it introduced to the lives of many students, it became apparent that it is important to commensurate the teaching with the students' new circumstances, e.g., the emotional distress induced by COVID-19 [8] as well as other financial and technological constraints [29]. To address that, I facilitated open and easy communication and, based on the student feedback, offered more flexibility with the assignments, e.g., flexible deadlines. Instead of making the attendance compulsory, I allocated additional points to the small quizzes during the lectures and labs to encourage students' attendance. Sharing motivating YouTube videos in the lectures and tutorials was another method I used to make the online teaching experience during the COVID-19 pandemic less stressful. I also remained available outside my consultation hours. The following student comments evidence the above-mentioned.

CSIT110: *"During the first few weeks before the COVID epidemic, I vividly remember an engaging learning experience during the first three lectures. Whilst going through lecture notes, the lecturer had also went through examples via applying the code and showing what can be done and trying to engage the class in these. This same approach was applied to remote learning and was helpful when watching recordings of the lecture." "I'm personally thankful that lecture and lab attendance was not mandatory. There are students that may have circumstances that may not allow them to attend and being able to watching lectures to study was helpful."*

Moreover, I have always encouraged the teaching team to provide feedback and make suggestions to enhance the delivery and assessment of the subjects I have taught. Figure 6 shows an example of reflecting upon feedback from a member of the teaching team for CSIT121.

7 Develop effective professional practices that enhance teamwork

Teaching a subject at SCIT is a team effort, that involves a range of academic roles such as subject coordinator, lecturer, and tutor. Each subject may have more than one subject coordinator, managing the subjects across different campuses. Also, the subjects may be taught by different lecturers and tutors across different campuses and laboratories. That requires a high level of en-

 Sun 12/15/2019 5:41 PM
Inbox

Mark as unread

It seems clear and simple. What kinds of concepts are being tested? As far as I can see there is cross-class relationships and ArrayLists. Did you want to include any inheritance, exception handling, or file io (considering they have a long time to complete the work)? Interfaces could be an easy addition.

The week 3 exercise seems fine as well. I believe you could also test exception handling/throwing for people who get through the work quickly.
C) says "PieceWorker" which should be "PieceWorker" and D) mentions "concert class" which should be "concrete class"?

 Davoud Mougouei
Sun 12/15/2019 6:39 PM
Sent Items

Hi [REDACTED]

Thanks for the prompt reply and useful feedback! The assignment is focused on understanding class diagrams and being able to translate them into java code. OO concepts such as inheritance, composition, abstraction, static members, use of Objects across different packages have been emphasized, also proper use of access modifiers. In Task 2, they will implement readPOIs() method, which uses IO and Exception Handling. I have a special plan for the use of interfaces/abstract classes in Assignment 3 :)

Regarding the exercise, that's a very good suggestion specially that they are going to use IO in the assignment; I have added the following.

F) Modify PayrollSystemTest so that the employee details (type, name, ...) are read from an input file. Use exception handling to prevent from failure in the presence of IO issues.

P.S. thanks for picking up the typos! I've fixed them.

Cheers,
Davoud

 Sun 12/15/2019 6:41 PM
Inbox

Mark as unread

Ah ok. Yep that seems good then.

Figure 6: The teaching team clarifies some doubts (during the Weekend) about Assignment 3 and lab exercises for CSIT121 (Summer 2019–2020). Feedback is provided by the tutor and suggestions are made to enhance the assignment and lab exercises.

gagement among different academic staff, with different working styles and backgrounds. Effective teamwork, therefore, is critical to ensure consistency across different components of the subject (e.g., lectures, tutorials, assessment tasks) and the quality of the teaching. As such, it is important to reflect on professional practices that enhance teamwork. I have been coordinating and teaching CSIT121, CSIT110, CSIT314, and ISIT315 across different campuses (SWS and Wollongong); my professional practice has always relied on a consultative, respectful, and reflective approach to decision-making regarding the teaching contents, assessments, and activities.

In coordinating CSIT121, I arranged weekly meetings with the teaching team to discuss potential issues and ensure consistency in the delivery of the tutorials as well as the assessment components, e.g., marking exercises and assignments and the feedback provided to the students. At the meetings, I encouraged the teaching staff to bring up any potential issues and feel free to make suggestions to improve the subject delivery and assessment. I further encouraged the tutors to take initiatives, based on their preferred teaching style, to demonstrate live coding examples (Figure 5) in the tutorials and give coding challenges to the students who are keen to learn more and expand their skills beyond the essential requirements of the subject. In addition to the face-to-face and online meetings, the teaching staff communicated their doubts via email before and after the tutorials to keep everyone on the same page and find solutions to the identified issues. I have documented feedback from the teaching team to make evidence-based decisions about enhancing my subject coordination. Figure 6 shows an example of staff communication on Assignment 3 and lab exercises for CSIT121 (Summer 2019–2020); the teaching team has clarified some doubts (during the Weekend) and suggestions are made to enhance the assignment and lab exercises.

I have also met, regularly, with the subject chairs and other subject coordinators involved in developing the contents and assessments of the subjects I have taught (CSIT121, CSIT110, CSIT314, and ISIT315) and improving the quality of education across the university. With the outbreak of COVID-19, I regularly consulted with the members of the teaching team across different campuses on how to reduce the stress on the students while maintaining high-quality teaching and assessment for CSIT110 and CSIT314. As online exams became imperative for the subjects, I actively discussed with the subject coordinators of CSIT110 and CSIT314 at the Wollongong campus (I was the subject coordinator at SWS) to mitigate the challenges of an open book exam and ensure a fair evaluation. In that regard, we decided to hold the exam in a specified time period and designed the exam questions in a way that minimized the risk of breaching academic integrity and plagiarism in the exam. To facilitate online and student-centered learning, and to enhance the quality and

the pace of the feedbacks, I proposed the use of a Moodle plugin, named Code Runner, for online evaluation of programming assignments, at SCIT, EIS. The proposal was approved by the Associate Dean of Education, EIS and the enhancement of the learning system is in progress.

References

- [1] F. V. Akuma and R. Callaghan. Teaching practices linked to the implementation of inquiry-based practical work in certain science classrooms. *Journal of Research in Science Teaching*, 56(1):64–90, 2019.
- [2] R. K. Bellamy, K. Dey, M. Hind, S. C. Hoffman, S. Houde, K. Kannan, P. Lohia, S. Mehta, A. Mojsilovic, S. Nagar, K. N. Ramamurthy, J. Richards, D. Saha, P. Sattigeri, M. Singh, K. R. Varshney, and Y. Zhang. Think Your Artificial Intelligence Software Is Fair? Think Again. *IEEE Software*, 36(4):76–80, 2019.
- [3] A. Blackwell, A. McLean, J. Noble, and J. Rohrhuber. Collaboration and learning through live coding (dagstuhl seminar 13382). In *Dagstuhl Reports*, volume 3. Schloss Dagstuhl-Leibniz-Zentrum fuer Informatik, 2014.
- [4] C. C. Bonwell and J. A. Eison. *Active Learning: Creating Excitement in the Classroom. 1991 ASHE-ERIC Higher Education Reports*. ERIC, 1991.
- [5] D. Boud and R. Soler. Sustainable assessment revisited. *Assessment & Evaluation in Higher Education*, 41(3):400–413, 2016.
- [6] C. J. Brame and R. Biel. Test-enhanced learning: the potential for testing to promote greater learning in undergraduate science courses. *CBE—Life Sciences Education*, 14(2):es4, 2015.
- [7] G. Brown and M. Bakhtar. Styles of lecturing: a study and its implications. *Research Papers in Education*, 3(2):131–153, 1988.
- [8] W. Cao, Z. Fang, G. Hou, M. Han, X. Xu, J. Dong, and J. Zheng. The psychological impact of the covid-19 epidemic on college students in china. *Psychiatry research*, page 112934, 2020.
- [9] J. Caulfield. *How to design and teach a hybrid course: Achieving student-centered learning through blended classroom, online and experiential activities*. Stylus Publishing, LLC., 2012.
- [10] T. Gale and S. Parker. Navigating change: a typology of student transition in higher education. *Studies in Higher Education*, 39(5):734–753, 2014.
- [11] S. A. Gauci, A. M. Dantas, D. A. Williams, and R. E. Kemm. Promoting student-centered active learning in lectures with a personal response system. *Advances in physiology education*, 33(1):60–71, 2009.
- [12] G. Gibbs, S. Habeshaw, and T. Habeshaw. *53 interesting ways to appraise your teaching*. Technical & Educational Services, 1989.
- [13] N. Gordon. Flexible pedagogies: Technology-enhanced learning. *The Higher Education Academy*, pages 1–24, 2014.
- [14] H. Haerazi, R. M. Vikasari, and Z. Prayati. The use of scientific-based approach in elt class to improve students' achievement and classroom interaction. *Register Journal*, 12(2):157–180, 2019.
- [15] J. R. Hill. Teaching technology: Implementing a problem-centered, activity-based approach. *Journal of Research on Computing in Education*, 31(3):261–275, 1999.

- [16] W. Hussain, D. Mougouei, and J. Whittle. Integrating social values into software design patterns. In *2018 IEEE/ACM International Workshop on Software Fairness (FairWare)*, pages 8–14. IEEE, 2018.
- [17] J. Jerrim, M. Oliver, and S. Sims. The relationship between inquiry-based teaching and students’ achievement. new evidence from a longitudinal pisa study in england. *Learning and Instruction*, page 101310, 2020.
- [18] R. T. Johnson and D. W. Johnson. Active learning: Cooperation in the classroom. *The annual report of educational psychology in Japan*, 47:29–30, 2008.
- [19] M. Kaddoura, O. Van-Dyke, and Q. Yang. Impact of a concept map teaching approach on nursing students’ critical thinking skills. *Nursing & health sciences*, 18(3):350–354, 2016.
- [20] D. S. Knowlton. A theoretical framework for the online classroom: A defense and delineation of a student-centered pedagogy. *New directions for teaching and learning*, 2000(84):5–14, 2000.
- [21] A. Loveless. Creativity, technology and learning—a review of recent literature. 2007.
- [22] O. Meerbaum-Salant, M. Armoni, and M. Ben-Ari. Learning computer science concepts with scratch. *Computer Science Education*, 23(3):239–264, 2013.
- [23] R. Motschnig and J. H. Cornelius-White. Small versus large student-centered courses. *The Routledge International Handbook of Student-Centered Learning and Teaching in Higher Education*, 2020.
- [24] D. Mougouei. Engineering human values in software through value programming. *arXiv preprint arXiv:2003.04477*, 2020.
- [25] D. Mougouei, H. Perera, W. Hussain, R. Shams, and J. Whittle. Operationalizing human values in software: a research roadmap. In *Proceedings of the 2018 26th ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering*, pages 780–784, 2018.
- [26] O. Ozdemir and C. Hendricks. Instructor and student experiences with open textbooks, from the california open online library for education (cool4ed). *Journal of Computing in Higher Education*, 29(1):98–113, 2017.
- [27] H. Perera, W. Hussain, D. Mougouei, R. A. Shams, A. Nurwidiyantoro, and J. Whittle. Towards integrating human values into software: Mapping principles and rights of gdpr to values. In *2019 IEEE 27th International Requirements Engineering Conference (RE)*, pages 404–409. IEEE, 2019.
- [28] H. Perera, A. Nurwidiyantoro, W. Hussain, D. Mougouei, J. Whittle, R. A. Shams, and G. Oliver. A study on the prevalence of human values in software engineering publications, 2015–2018. *arXiv preprint arXiv:1907.07874*, 2019.
- [29] P. Sahu. Closure of universities due to coronavirus disease 2019 (covid-19): impact on education and mental health of students and academic staff. *Cureus*, 12(4), 2020.
- [30] M. Yusufov, J. Nicoloro-SantaBarbara, N. E. Grey, A. Moyer, and M. Lobel. Meta-analytic evaluation of stress reduction interventions for undergraduate and graduate students. *International Journal of Stress Management*, 26(2):132, 2019.