Online Delivery of Intensive Software Engineering Education During the COVID-19 Pandemic

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Software Engineering Programme

- Graduate Apprenticeship/Degree Apprenticeship
- First year second semester - Eight-week teaching block
- Four hours of instructed tuition almost every day
- 40 credits of 120 credits for first year
- University stopped face to face teaching in week 2
Courses

➢ Practical Algorithms
➢ Testing and Software Improvements
➢ Web Application Systems
Practical Algorithms

➢ Theoretical - Discrete Mathematics, and Data Structures and Algorithms
➢ Eight week block
  ➢ Live, face to face lectures
  ➢ Online synchronous lectures
  ➢ Recorded lectures
  ➢ Live tutorial sessions
Practical Algorithms – Online synchronous Lectures

➢ Two hours live online classes were tedious
➢ Peer observer concurred
➢ Limited interaction, cameras off
➢ Recorded for students to watch at their own pace
➢ Week four recorded lectures to pre-view – five minutes to 25 minutes
➢ Live tutorial sessions – Flipped classroom
Practical Algorithms – Lecture Styles

Practical Algorithms, Student Survey
(14 participants in a class of 34)

<table>
<thead>
<tr>
<th>Lecture Style</th>
<th>Average Score</th>
<th>Std. Dev.</th>
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<tbody>
<tr>
<td>Live, face to face lectures</td>
<td>7.07</td>
<td></td>
</tr>
<tr>
<td>Live, synchronous, online lectures</td>
<td>6.04</td>
<td></td>
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<tr>
<td>Pre-recorded, lectures + Live tutorial sessions</td>
<td>7.57</td>
<td></td>
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Practical Algorithms – Went Well

➢ Weekly Moodle Multiple Choice Quiz
➢ Tutorial Sheets
➢ Lab exercises
➢ Links to additional material
Practical Algorithms – Went Less Well

➢ Rapid pace of module
➢ Group activities
➢ Dedicated time for labs with tutor
➢ Live tutorial review of recorded content
➢ Lack of visibility of students
Testing and Software Improvements

- Two 2 week blocks, with two hours almost every day
- Mainly practical
- Clean code, refactoring and testing
Testing and Software Improvements – Live Two Hours

- Pre-reading
- Class test
- A short 20 to 30 minute lecture
- Active learning discussions
- A lab
Testing and Software Improvements

➢ Regular milestones, group submissions and individual submissions
➢ Split into groups
   ➢ Top five by ability in first group, mixed ability for other groups
   ➢ MS Teams for groups of students
   ➢ MS Teams for groups of students plus lecturer
Testing and Software Improvements

➢ Zoom interaction
➢ Testing - Mocking unit tests and guess results
➢ Zoom chat to guess answers
➢ Positive response from students
Web Application Systems

- Four-week block in the middle of lockdown
- Theory and practice
- Lectures for concepts
- Labs for students to develop a substantial piece of course work
➢ Student feedback concentrating for two hours unexpectedly tiring for students
➢ Lectures broken into 20-minute live chunks with regular breaks
➢ Pre-recorded short videos
➢ Significant class time allocated to practical course work with tutors
Web Application Systems - Teaching

➢ Students suffer in silence – Webcams off, no body language or eye contact

➢ Solution - Divided into smaller groups of five to six
  ➢ MS Teams private channel
  ➢ Higher level of experience distributed across the teams
  ➢ Consistent tutor support – remarkably active
  ➢ Most helpful student - award
Student Support

- Lockdown raised questions for students
- Zoom based drop-in sessions first two weeks
  - A handful made use, but tailed off after first week
- MS Teams channel – Chatter – Mental health challenges
  - Still active after three months
Conclusion

- Software Engineering successfully delivery online
- Relatively straight forward adjustments
- No one size fits all
- Smaller chunks
- Consideration of group work
- Pay attention to student feedback
- Retain post pandemic era