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

Authors: Matthew Barr, Waqar Nabi & Derek Somerville

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
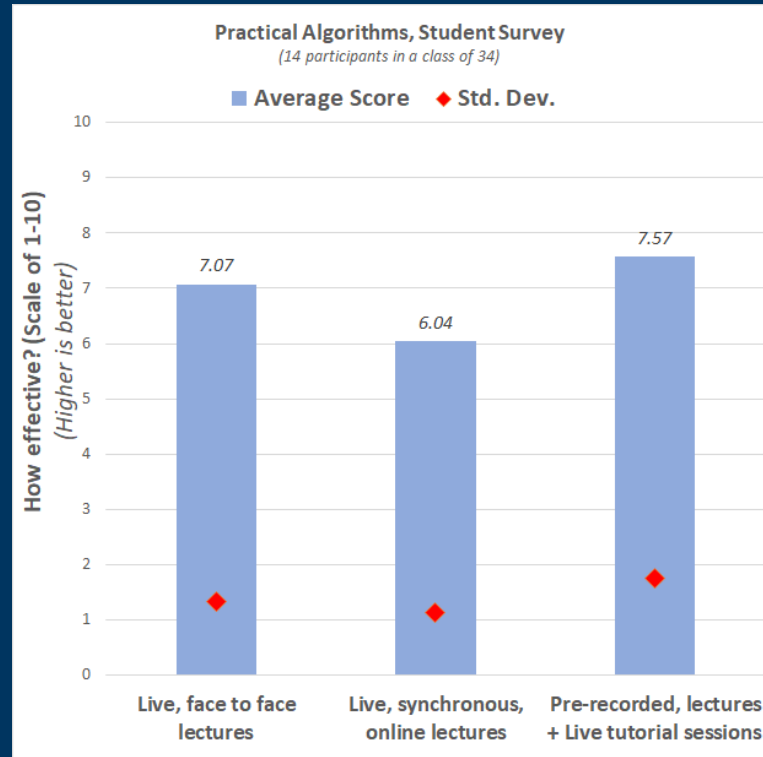
Practical Algorithms – Went Well

➢ 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

Web Application Systems - Teaching

➢ 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