Learning from the QMPlus experience of our TNE programmes QMES

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QMES:

- 2 x Programmes in Materials Science and **Engineering**
- 4yr BEng
- ~240 students per year
- 3/4 cohorts (~720 students)
- Recurrent issues with QMPlus + ebooks (streaming videos always an issue, and sometimes even accessing)
- At QMES: QMES WIFI
- Recurrent effort to maintain presence of flying-in faculty when back in UK
- Strong push for student-centred learning (ICTL)
- “Range” of support from IT

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Online tools I: rationale

- One size does NOT fit all (QMPlus +)
- Both QMUL/NPU: Push for Live Sessions
- Work well in China
- Explored:
  - QMPlus: OK for repository and submissions
  - Blackboard Connect: unstable (Considered for smaller groups)
  - WeChat Business: groups < 200 / Live: unstable
  - WeChat: not good for big groups
  - Tencent Meeting: groups > 240 / Excellent
  - RainClassroom: Limited/Chinese

Online tools II: QMES Typical profile

- QMPlus: files, PPT, PDF, some videos, **"Instructions"**
- Tencent meeting for Live sessions: Normally only for camera/screen share + Verbal interaction (1 student at a time) (Groups nominate / or self-nominate WeChat Business)
- WeChat Business Groups: 1 group ("Companies") per cohort/programme (6)
  - Initiating Sessions
  - Asking and Answering Questions (Chat)
- **BACK-UP: All QMPlus content** (files + pages) available on online drive (China)

Example: QXU4002/4003 Online Material

- PPT+PDF “Lecture Notes” + Kaltura videos
- Kaltura videos: Max 20-25 mins
- Old Kaltura version: 80-160MB (x2 in New version)
- Semester schedule
- “Structure of the week” pages
- Module information for each week (Content, L.O., Reading lists)
- “Question Sets” (Guided exercises: “Flipped/Live-Sessions)

Semester schedule

Week	Date	Session 1 (2 hrs; non-live)	Session 2 (2 hrs; non live)	Session 3 (2 hrs; Live Session)	Session 4 (2 hrs, Live Session)	Comments
1	24-Feb					
2	02-Mar					
3	09-Mar	Introduction to Module, Polymer Chemistry: Introduction. Mw and Mn. Tg and structure.	Polymer Chemistry: Introduction. Mw and Mn. Tg and structure.	Guided Exercises: Polymer Chemistry: Introduction. Mw and Mn. Tg and structure.	Guided Exercises: Polymer Chemistry: Introduction. Mw and Mn. Tg and structure.	S1 Mon, S2 Tues, S3 Wed, S4 Thurs
4	16-Mar	Polymer Chemistry: Types of Polymerisation. Step-Growth Polymerisation. Kinetics. Carothers.	Polymer Chemistry: Types of Polymerisation. Step-Growth Polymerisation. Kinetics. Carothers.	Guided Exercises: Polymer Chemistry: Types of Polymerisation. Step-Growth Polymerisation. Kinetics. Carothers.	Guided Exercises: Polymer Chemistry: Types of Polymerisation. Step-Growth Polymerisation. Kinetics. Carothers.	S1 Mon, S2 Tues, S3 Wed, S4 Thurs
5	23-Mar					
6	30-Mar	Polymer Chemistry: Chain-Growth. Free-radical polymerisation. Kinetics. Chain-Transfer	Polymer Chemistry: Chain-Growth. Free-radical polymerisation. Kinetics. Chain-Transfer	Guided Exercises: Polymer Chemistry: Chain-Growth. Free-radical polymerisation. Kinetics. Chain-Transfer	Guided Exercises: Polymer Chemistry: Chain-Growth. Free-radical polymerisation. Kinetics. Chain-Transfer	S1 Mon, S2 Tues, S3 Wed, S4 Thurs
7	06-Apr	Introduction to Chemical Health and Safety and Group Work. Polymer Chemistry: Heterogeneous polymerisation	Polymer Chemistry: Co-polymerisation	Guided Exercises: Polymer Chemistry: Heterogeneous polymerisation and Co-polymerisation	Guided Exercises: Polymer Chemistry: Heterogeneous polymerisation and Co-polymerisation	S1 Tues, S2 Wed, S3 Thurs, S4 Fri

STRUCTURE OF WEEK 3

Structure of the week

Session 1 - Monday 9th March - Non Live Session

1. Read the files and pages on Module Content.
2. Watch the video Introduction to the module (there is a separate PPT/PDF file)
3. Watch the videos on Lecture Notes 1: Videos 1-3
4. Ask questions on the Module Forum
5. If you have time, please start watching the videos for Session 2.

Session 2- Tuesday 10th March - Non Live Session

1. Watch the videos on Lecture Notes 1: Video 4.
2. Ask questions on the Module Forum
3. The reminder of the time please concentrate on the aspects of Lecture Notes 1-Videos 1-4 that resulted the most difficult to you. Revise and ask questions on the module forum.
4. If you have time, please start doing the guided exercises for Session 3.

Session 3- Wednesday 11th March - LIVE SESSION

1. Connect to WeChat Work and Tencent Meeting
2. Start the exercises on Question Set 1
3. Ask questions on WeChat Work or Tencent Meeting
4. If you still have questions at the end of the session, please ask them in the Module Forum
5. If you have time, please start doing the guided exercises for Session 4.

Session 4- Thursday 12th March - LIVE SESSION

1. Connect to WeChat Work and Tencent Meeting
2. Start the exercises on Question Set 2
3. Ask questions on WeChat Work or Tencent Meeting
4. If you still have questions at the end of the session, please ask them in the Module Forum
5. If you have time, please start looking at the material for Week 4.

QXU4003 – Polymer Chemistry

Module Description – Rotation 1

Week 3 (9-13th March 2020)

Detailed Content for this week:

- Introduction to Polymers and essential terminology in Polymer Science
- Molecular Weight averages
- Classification of Polymers and Monomers
- Thermal properties of Polymers and their relationship with chemical structure

Specific learning outcomes and objectives for this week:

Learning Outcomes related to Academic content:

Students will be able to…

- identify and use correctly terminology related to polymer science
- have an awareness for the evolution of polymer science and how this relates to development of new materials
- identify types of polymer classification and use them correctly to differentiate types of polymers
- identify types of monomer according to how they can be potentially polymerised (for example vinyl *vs.* non-vinyl monomers)

Weekly module spec: Content, Academic/Disciplinary/Graduate L.O. + Weekly Reading list

QXU4003 – Polymer Chemistry

Rotation 1 – Question Set 1

1) Have a look at the Introductory Lecture Notes Set 1 and ask questions of what you do not understand.

2) What are the similarities and the differences between M_n, M_w and MW?

3) In QMPLUS you can find an Excel spreadsheet called "Molecular weight calculations file". This file contains two sheets: one is called MW. Open this sheet. It contains molecular weight data of a hypothetical polymer sample. Calculate the M_n and the M_w of the sample. Calculate the PDI of the sample. Be prepared to share your answers for discussion.

4) In the same file, open the other sheet, called "Capitals". It has population data for all the Chinese provincial (or municipal) capital cities.

    a. Use these data to calculate the population average of Chinese Provincial capitals (this is analogous to M_n for polymers).
    b. Now calculate a "weighted population average" (analogous to M_w for polymers). Of course, there is only one of each city, therefore, Ni is 1, for all the cases.
    c. What is the percentage of population living in any provincial capital city in China with less than 3M people? Be prepared to share your answers for discussion.

Question Sets: Guided/Scaffolded exercises

Structure of the week

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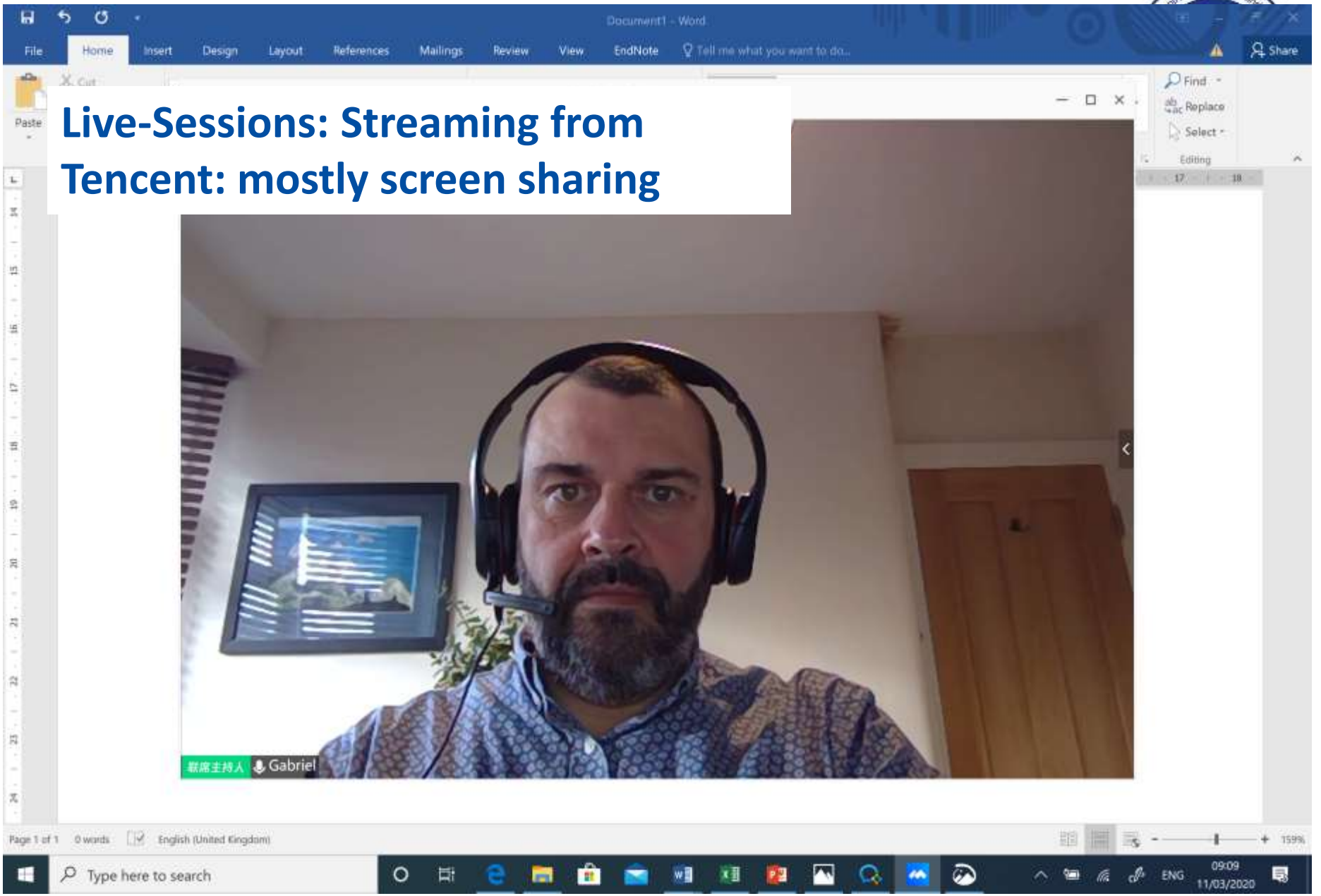
3. Ask questions on WeChat Work or Tencent Meeting
4. If you still have questions at the end of the session, please ask them in the Module Forum
5. If you have time, please start looking at the material for Week 4.

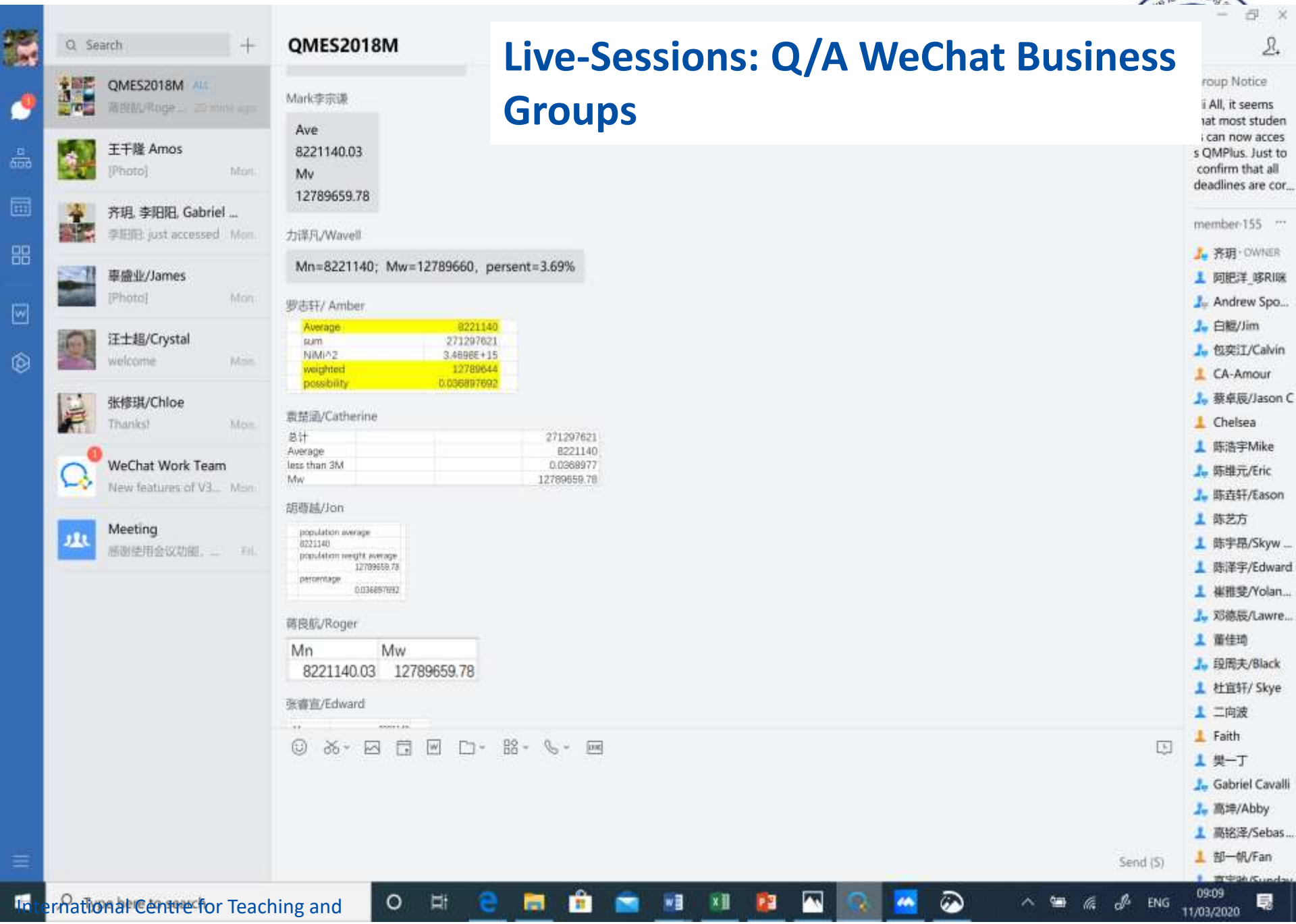
Non-Live sessions: Students work at own pace ("Lectures")/ Staff presence on chat (WeChat Business) + QMPlus forum (issue with delayed submission)

Live-Sessions: "Flipped" sessions, with constant formative feedback. Tencent + WeChat Groups + Screen capture from tablet

Live-Sessions: Streaming from Tencent: mostly screen sharing



Live-Sessions: Q/A WeChat Business Groups



Live-Sessions: Screen-share (Tencent) + Tablet screen capture annotation

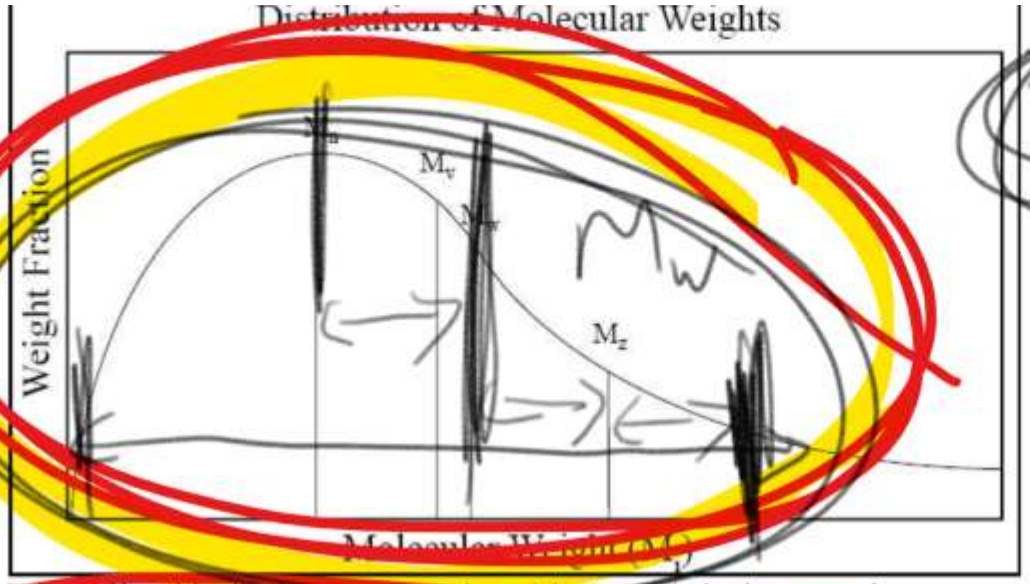
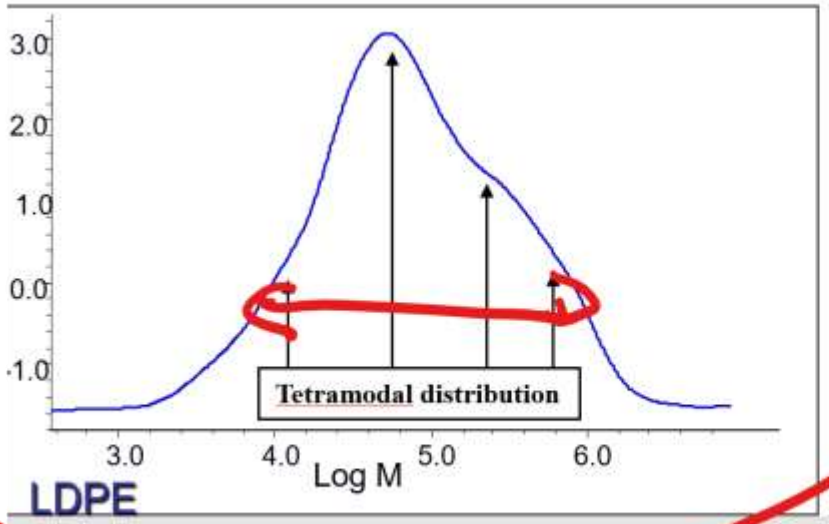


Figure 1: Plot of the distribution of molecular weights in a typical polymer sample.

PDI = 2

Real molecular weight distributions are not normally this nice and "regular" looking. (more advanced methods of synthesis might look like this)



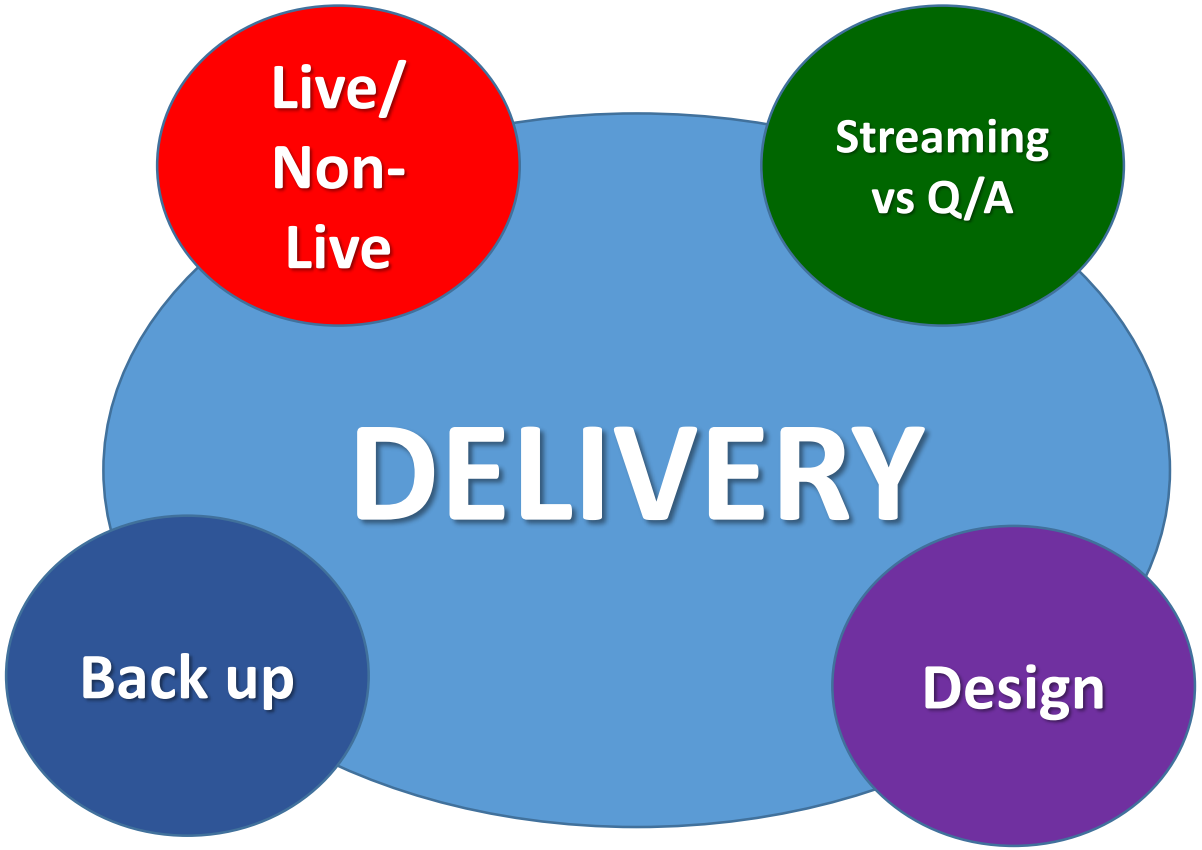
One example of a real molecular weight distributions for a sample of low density polyethylene. Distribution is "tetramodal" (tetra= greek meaning 4): there seems to be 4 different types of simpler MW distributions

M_n

M_w

PDI

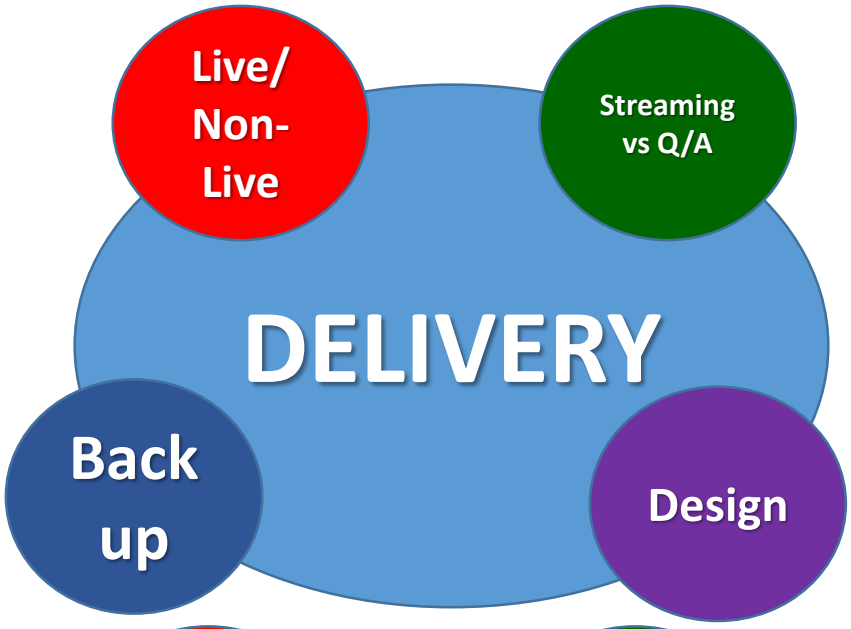
Rationale/Issues

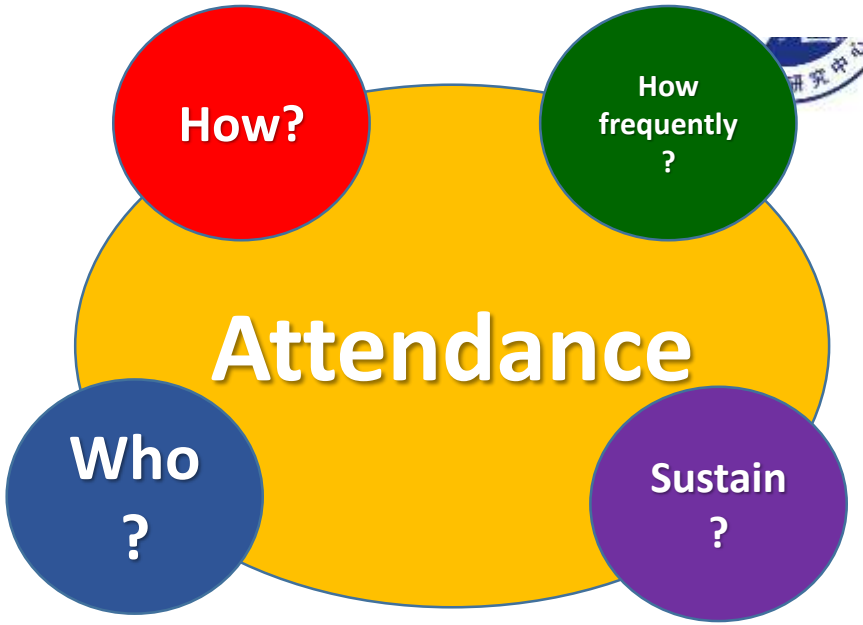


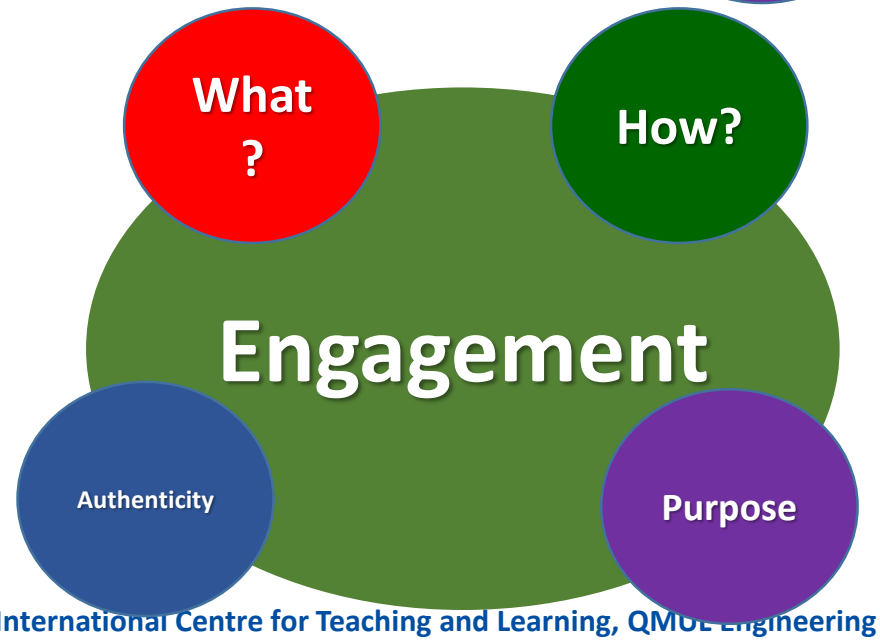
Delivery of what? Learning outcomes

Experimental Modules: Data vs manipulation

Rationale/Issues







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Emerging:

- Not just content: **learning activities**
- Best **Delivery** online tools might not be the best for recording **Attendance/Engagement**
- Attendance/Engagement: balance **(offline teaching may assess less!)**

- Relation to assessment
- QMES: One-off academic regs suspension: Rearranged assessment to reduce exam to 20% (Engagement!)
- **Include group activities (Community/Assessment)**

What facilitated our shift online?

- **School embedded T&L Centre (ICTL) + QMES ethos:**
  - Flipped-learning + student-centred learning
  - Scaffolded (group) Learning activities + videos already in place
- **Integration Academic + Professional Services staff**
  - QMES PS staff are part of our teaching team: **seamless.**
  - QMPlus, Back up, attendance, engagement
  - **Currently: all our online shift is co-delivered with PS (set-up + testing + admin + sit in sessions)**
- **Collaboration between staff across modules**
  - In general (See ICTL + QMES Ethos)
  - Currently: Weekly share of online-shift experience

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