

Future of university learning and teaching

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Within 10-20 years Australian university learning and teaching should aim to have the following key features (in brief):

1. Time of research-and-teaching academics concentrated on tutorials or practicals where there is critical exchange of ideas and opinions, and for which students are well prepared
2. Lectures and textbooks replaced by online materials, developed by networks of academics, at least at nationwide scale, ideally at global scale with Australian leadership
3. Student preparation for face-to-face tutorial time with academics enforced via quizzes
4. Individualised tutoring support via AI incorporated with the online materials
5. Arrangements in the style of Regional University Centres whereby students at significant travel time from university campuses can conveniently study and meet and converse with other students, and get non-specialist help if needed.

The most important, and limiting, resource in universities is the time of academic staff. By academic staff I mean lecturers-to-professors with role partly in teaching and partly in research. The nexus between teaching and research is really important. An essential characteristic of universities is for students to be in conversation with people who are actively engaged in advancing and changing knowledge.

The past 30 years have seen progressive deterioration in how much academic time is devoted to each student, partly due to drift in staff-student ratios and partly due to increasing load of administration associated with actually delivering lectures, tutorials, feedback on assignments, and examinations. Therefore a key question for the next 20 years is what is the highest-value application of academic staff time? And how can learning and teaching be restructured to maximize that high-value activity?

The highest value application of academic time to learning and teaching is where there is critical exchange of views and questions between academic and student. This would typically be in tutorials. (Also in some practicals, those where there is conversation, not just supervision of an exercise.) It is important for students to be well-prepared for such tutorials, otherwise they devolve into mini-lectures that re-teach basics, wasting the time of those students who have prepared thoroughly.

10-20 years from now, lectures should have been superseded by online open-access curriculum material equivalent to lectures-plus-textbooks-plus-exercises. A model is CORE-Econ (<https://www.core-econ.org/>). Some video materials might be included, but not the recorded standard 50-min lectures that are prevalent currently.

The CORE-Econ model means that such materials should be developed by networks of academics, rather than each academic separately developing lecture material as is common currently. The government should catalyse this sort of curriculum development via competitive grants to the best proposals for novel curriculum developed by a network.

Currently tutorials often devolve to mini-lectures or to remedial help sessions. This is a low-productivity use of time and of morale for well-prepared students, and for academics. Students should be required to pass a quiz on relevant basics before being permitted to participate in a tutorial. To illustrate from my own field of ecology, students might be required to have understood basics of exponential growth before a tutorial to discuss population outbreaks and how they might be predicted or managed.

The established knowledge (such as basics of exponential growth) should have individualised tutoring by AI integrated as early as possible into the online curriculum materials. As everyone knows, AI applications are developing very rapidly. They have enormous potential for helping individual students, allowing them to work at their own speed, providing continuous encouragement, keeping track of the type of errors an individual makes, offering alternative framings and alternative exercises for a given principle. The aim is to focus the time spent by academics in conversation with students on matters distinctive to research-and-teaching academics, such as topics where the research frontier is unsettled, or novel applications of a principle.

For many students, it might work better for them to study online for several weeks followed by 2-3 days of intensive tutorials, rather than to visit campus for 3-4 individual tutorials during each week. Flexible subsidised accommodation would be an important consideration for some students, to make this sort of work pattern feasible.

Working online in isolation for several weeks at a time is not attractive or psychologically healthy for most. There is merit in arrangements in the style of Regional University Centres whereby students distant from university campuses can conveniently study and meet and converse with other students, and get non-specialist help as needed. These would not be for regions only, but also for suburbs at significant commuting distance from university main campuses.

This submission has argued that the teaching time of teaching-and-research academics should be concentrated on tutorials, where the wider experience of the academics and their high-level skill in interpreting evidence contribute something important beyond textbook knowledge. Clearly, some time needs to be spent also in setting and assessing student work where critical thought and opinion is required. However, communication of established knowledge, that can be assessed via questions where answers are simply right or wrong, should move to communally-developed online resources.