Inclusive teaching discussion paper

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Disclaimer: This discussion paper was prepared to get discussion started within RMIT’s newly-established Inclusive Teaching Working Group. The paper’s suggestions should be regarded as tentative, since they are based on only a general overview of the field.
Q. What is inclusive teaching and which inclusive teaching strategies would benefit the rest of the class?

Inclusive teachers make numerous adjustments to prevent individuals or particular groups of students from being marginalised, and many of these strategies might prove beneficial for teaching students in general. By the same token, many might not. The wider suitability of particular inclusive teaching strategies can be tested using the research that has already been conducted on successful educational interventions. The literature on inclusive teaching has generated a lot of empirical data supporting the use of particular adjustments with particular groups, such as students with disabilities or lower ESL proficiency, but relatively little empirical data to support using the same strategies with all students. However, it is often the case that the same or similar strategies have been used elsewhere by educators, so consulting the broader educational literature (beyond the inclusive teaching literature) provides a way of working out which of these strategies are ‘just good teaching’. For the purposes of discussion, the various principles put forward by the literature on inclusive teaching are boiled down to six:

1. student-centred philosophy
2. multiple means of representation, expression and engagement
3. simple and transparent tasks and materials
4. inclusive spaces
5. a community of learners
6. inclusive climate.

This discussion paper aims to describe what inclusive teaching is, to introduce a quantitative method used in the broader educational literature to measure the success of educational interventions, and to find strategies which are supported by empirical data for use not only with particular marginalised groups but with all students. Ultimately, it argues for a form of universal design built around strategies which have been proven for general use.

From deficit to universal design

The idea of inclusive teaching has been shaped by political and legal forces, and by research that replaces old dichotomies (able/disabled, native/non-native speaker, etc) with a continuum of learning abilities and preferences. To teach inclusively, in a broad sense, is to teach to visible and invisible differences within the learner group, including but not limited to:

- religious practices
- cultural and linguistic diversity
- ESL
- indigenous culture
- health conditions
- medical conditions
- disabilities
- age, gender, sexuality
- lower socio-economic status
- young people who left school early
- older learners returning to study
- single parents returning to study
- part time students
- refugees
- survivors of trauma (Training Design 2007)
In the inclusive teaching literature, most has been written about how to include students with disabilities, students with low ESL proficiency, those from different cultures, girls, and those of lower socio-economic status.

In an even broader sense, ‘inclusive teaching’ can be interpreted not just as a way of making ‘adjustments’ for students from minority groups, of assimilating them into an unchanged system, but as an attempt to teach in a way that embraces as many forms of difference as possible across the student population, including different learning preferences (Grace & Gravestock 2009). For example, some strategies used to include students with disabilities might also benefit all other students in the class. So the philosophical shift here is from teaching to include marginalised students to trying to embracing all forms of difference.

In tertiary education, the idea of making special adjustments for students with different learning requirements, such as those with disabilities, has become politically unpalatable, since it perpetuates a ‘deficit’ model of difference. For example, students with disabilities at most tertiary institutions are required to identify themselves with a medical label if they expect additional support. Support takes many forms, for example, students who are physically unable to write or type quickly, or those with dyslexia, might be permitted a scribe and extra time on the exam. Or students with dyslexia might be taught how to use software which converts text to speech, bypassing the difficulty they have with processing words on the page, or to make mind maps and concept maps, which gives them another non-textual way of processing and structuring information. Some of the above learning strategies might benefit the rest of the class as well, but at present they are usually only offered as adjustments to those with declared disabilities.

The increasing number of students registering a disability (Waterfield et al 2006) and the growing number of students from other marginalised groups is making the ‘adjustments’ approach unwieldy and expensive. Consequently, the idea of ‘universal design for learning’ and other approaches that include pre-emptively have gained traction in the inclusive teaching literature. Universal design and allied concepts such as the ‘embedding’ of learning skills are best employed as part of a whole-of-institution approach which attempts to make special adjustments redundant where possible (Scott, McGuire and Foley 2003; Kift 2005; Higbee and Goff 2009; Kift 2009).

An institution based on universal design attempts to create a climate, a community and teaching spaces which promote diversity and collaboration (Scott, McGuire and Foley 2003; Higbee and Goff 2009) and a curriculum which offers all students ‘multiple means of representation, expression and engagement’ (National Centre on Universal Design for Learning 2009). This kind of curriculum is facilitated partly by educational technology (particularly useful for students with disabilities), but largely by ‘embedding’ academic skills into the curriculum in a way that is integrated with the content (Skillen et al 1998; Kift 2005). To take a different minority group as an example, offering international students expensive ‘bolted-on’ English language support is often less useful in resolving their difficulties in a new academic culture than teaching academic skills and literacies using their actual course materials, and in class time. Teaching such skills as writing structure, paragraphing, synthesis, paraphrasing, referencing, hypothesis testing, argumentation and critical reading in an embedded way is not as expensive as extra-curricular workshops, it is not based on a deficit model, since the whole class benefits, and it is more sustainable, since changes made to the curriculum will benefit future intakes of students. Thus, an inclusive teaching strategy (the ‘embedding’ of academic skills) at once targets lower-proficiency ESL learners and benefits the rest of the class.

Which inclusive teaching strategies are ‘just good teaching’?

The inclusive teaching literature is prone to claiming that inclusive teaching strategies are ‘just good teaching’, that they will be of benefit to all students, but often without producing empirical evidence to support these claims. In fact, teachers employ a great many diverse and sometimes conflicting strategies for teaching to various marginalised groups. When these strategies are tested against the broader educational literature, it is evident that some are not suitable for general use and these should be reserved for students who really need them. Ultimately, inclusive teaching, when applied in its broadest sense of embracing all students, should employ strategies with empirical support.

So, how do we tell which strategies are suitable for general use? When asking this question of the broad (empirical) educational literature, meta-analyses are a good place to start. Meta-analysis is a quantitative method widely used in the physical and social sciences to remove the bias inherent in the research design of any single study by abstracting from a multitude of studies the educational ‘effects’ being tested. This provides a rough way of ‘comparing apples and apples’. The broad categories used in most meta-analyses inevitably compare apples and oranges to some extent, but they are useful if
treated like a geological survey map, as giving an indication of where to dig. To illustrate, Table 1 ranks a number of educational interventions which crop up in the educational literature. An effect size above 0.4 represents a significant positive impact on students’ achievement (typically measured by grades or standard test scores)¹.

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Effect size</th>
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<tbody>
<tr>
<td>Note-taking (teaching students how to take notes in class and from reading)</td>
<td>0.99 (Marzano 1998; n=36)</td>
</tr>
<tr>
<td>Teaching critical thinking to uni. students through argument mapping (turning arguments into diagrams)</td>
<td>0.78 (Van Gelder et al 2003, n=7)</td>
</tr>
<tr>
<td>Study skills programs embedded in tertiary courses</td>
<td>0.77 (Hattie, Biggs &amp; Purdie 1996; n=108)</td>
</tr>
<tr>
<td>Effect of reciprocal teaching on comprehension (students take roles within small group: teacher, questioner, commentator)</td>
<td>0.74 (Hattie 2009; n= 38)</td>
</tr>
<tr>
<td>Implementations that emphasise feedback</td>
<td>0.73 (Hattie 2009; n=1287)</td>
</tr>
<tr>
<td>Metacognitive strategies</td>
<td>0.69 (Hattie 2009; n=63)</td>
</tr>
<tr>
<td>Teaching study skills</td>
<td>0.59 (Hattie 2009 ; n=668)</td>
</tr>
<tr>
<td>Cooperative v individualistic learning</td>
<td>0.59 (Hattie 2009 ; n=774)</td>
</tr>
<tr>
<td>Mastery learning (student can’t proceed to subsequent skill until current skill is mastered, e.g. competency-based assessment)</td>
<td>0.58 (Hattie 2009 ; n=377)</td>
</tr>
<tr>
<td>Concept mapping</td>
<td>0.57 (Hattie 2009; n=287)</td>
</tr>
<tr>
<td>Socioeconomic status</td>
<td>0.57 (Hattie 2009; n=499)</td>
</tr>
<tr>
<td>Peer tutoring (tuition by fellow student)</td>
<td>0.55 (Hattie 2009; n=767)</td>
</tr>
<tr>
<td>Computer based technology providing cognitive support (e.g. simulations) in higher education</td>
<td>0.40 (Schmid et al 2009 ; k=112)</td>
</tr>
<tr>
<td><strong>Average effect of educational interventions</strong></td>
<td><strong>0.40</strong> (Hattie 2009; n=52637)</td>
</tr>
<tr>
<td>Computer-based instruction in higher education</td>
<td>0.38 (Hattie 2009; k=745)</td>
</tr>
<tr>
<td>Computer-based instruction in higher education</td>
<td>0.28 (Schmid et al 2009; n=231)</td>
</tr>
<tr>
<td>Computer-assisted instruction in science education</td>
<td>0.273 (Bayraktar 2002; n=42)</td>
</tr>
<tr>
<td>Online/blended learning (teaching wholly or partly via computer or other ICT)</td>
<td>0.24 (US Education Dept 2009; n=99)</td>
</tr>
<tr>
<td>Web-based learning</td>
<td>0.24 (Olson and Wisher 2002; n=15)</td>
</tr>
<tr>
<td>Individualisation (agreeing with every student in the class on a personalised learning plan)</td>
<td>0.23 (Hattie 2009; n=600)</td>
</tr>
</tbody>
</table>

¹ Hattie (1992) explains that:

An effect-size of 1.0 is typically associated with advancing children's achievement by one year, improving the rate of learning by 50%, or a correlation between some variable (e.g. amount of homework) and achievement of approximately .50. When implementing a new program, an effect-size of 1.0 would mean that approximately 95% of outcomes positively enhance achievement, or average students receiving that treatment would exceed 84% of students not receiving that treatment (p 5-6).

Note that in education, the effect sizes represent the impacts of the various educational ‘interventions’ (experiments conducted using actual classes in a school or university) on which the studies were based. For example a class might be divided into an experimental and a control group, and their relative achievement measured at the end of the year.
Reducing class size | 0.21 (Hattie 2009; n=96)
Web-based learning | 0.18 (Hattie 2009; n=45)
Problem-based learning | 0.15 (Hattie 2009; n=)
Gender (in favour of males) | 0.12 (Hattie 2009; n=2926)
Television (impact of) | -0.18 (Hattie 2009; n=37)

Table 1 (adapted from Hattie 2009): effect sizes for different types of educational intervention, where n=number of studies analysed and k= number of effects analysed (where k is provided, but not n)

Hattie rightly argues that, given scarce educational resources, it is wise to first explore types of intervention which have an effect on achievement that is higher than the average effect (0.4). It is important to note that this average, like most of the effect sizes in the above table, is not based entirely on tertiary education studies, since meta-analyses specific to tertiary education do not exist for most of these interventions. But such a ‘league table’ gives an indication of which strategies are worth trialling or doing more of with tertiary cohorts. The grey section of Table 1 shows some of the interventions which have had a below-average effect on student learning. This indicates that the (sometimes considerable) expenditure of resources on some of these interventions is not warranted, or that they might need to be implemented in different ways.

It is evident that many of the most successful strategies for teaching students in general are highly compatible with those suggested by the inclusive teaching literature, while others are not. For example, formative feedback, graphic representations of knowledge (mind maps and concept maps), reciprocal teaching and the teaching of meta-cognition have been shown to be of great benefit to students with many kinds of disability and students with lower ESL proficiency.

By way of contrast, individualised learning programs (‘individualisation’) are recommended for general use by some inclusive teaching researchers, because they have been successful when used with special needs students. But there is a lack of empirical support for the general use of individualisation. Since the 1970s, the average effect of giving all students in a class an individualised learning program, across six hundred studies (0.21), has been very small. This is not to say that certain individualised learning interventions have not been highly successful. For example, Kulik (1981) points out the successful use of one system of individualisation in college mathematics instruction, and Hattie concedes that the effects of such systems dramatically increase when individualisation is combined with sufficient feedback, which might explain the success of mastery learning (0.58). Hattie suggests that most forms of individualisation fail because teachers don’t have time to give sufficient feedback on personalised study programs. In tertiary education, teachers are increasingly short of time, so if individualisation were pursued in general classes, the extra feedback would generally need to come from some source other than the teacher, such as a peer tutor. It may be that individualised learning programs have the same susceptibility as web-based learning (0.18), namely ‘garbage in, garbage out’.

Conceding that meta-analyses give only a general overview, that certain types of intervention work best for certain types of instruction, and that almost any kind of intervention can work under certain conditions, the following list of inclusive teaching principles ignores those with low average effect sizes, and uses examples which pluck the low-hanging fruit from the quantitative literature on successful teaching strategies.

**Inclusive teaching principles**

There is no definitive set of inclusive teaching principles, though a number of researchers have attempted to make umbrella headings to cover the horde of strategies. A set of principles provides a

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2 The Hattie (2009) and Marzano (1998) meta-analyses employ data from across the educational sectors, but the bulk of these data come from primary and secondary schools. The 1996 Hattie, Biggs and Purdie meta-analysis of learning skills interventions, and the 2003 meta-analysis on argument mapping (Van Gelder et al) were conducted entirely using post-secondary studies and the 2009 US Education Department meta-analysis on e-learning used around 90% tertiary studies.
useful checklist for teaching practice, however. The list below is included mainly as a starting point for discussion. It has been compiled using a number of previous schemata, most of them from the literature on ‘universal design for learning’. The principles are not ranked in order of priority, though it might be useful to attempt that. A few larger-scale examples are given to illustrate each principle, and areas of controversy are indicated.

1. Student-centred philosophy

Inclusive teaching is often contrasted with the traditional didactic or ‘transmission’ model of university teaching, now widely discredited, in which the professor, an authority on the content of his subject, simply transmits information at a large audience of passive students in a difference-blind manner. The limitations of that particular teacher-centred model has made attractive a more ‘student-centred’ approach to teaching, not just in the inclusive teaching literature, but more generally.

While it is true that students have traditionally been somewhat neglected by the academy, a more student-centred approach should not lead us to disregard the importance of the teacher. Allowing students to construct their own learning, the teacher acting as merely a ‘facilitator’ of learning, as in problem-based learning (0.15), web-based learning (0.18), and inquiry-based teaching (0.31), needs to be balanced with direct teaching, since such methods are by conventional measures less effective than instruction in which the teacher is an ‘activator’ and guide of learning.

Hattie’s 2009 meta-analysis of 800 earlier meta-analyses, comprising around 52,637 studies found that active, guided instruction is generally far more effective, by conventional measures of achievement, than less guided, facilitative instruction (Table 2). Examples of ‘activator’ approaches include direct instruction (0.59), reciprocal teaching\(^3\) (0.74) and teaching meta-cognitive strategies (0.67). Note that direct instruction is not the same thing as ‘transmission model’ didacticism, since it uses feedback and guided practice.

A combination of guided and less guided activities is generally recommended. For example, problem-based learning should not be used to teach students the necessary basic knowledge, since it is generally a poor way of teaching students facts (Hattie 2009), but it works very well to promote deep learning and a firm grasp of underlying principles if students have already been taught the necessary surface knowledge, for example, through direct instruction.

So the practical implementation of a student-centred approach to teaching is likely to be most effective when it employs guided instruction mixed with ‘active learning’ strategies, which get students talking, doing and reflecting, rather than sitting passively in lectures and tutorials.

<table>
<thead>
<tr>
<th>Teacher as activator</th>
<th>ES</th>
<th>Teacher as facilitator</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reciprocal teaching</td>
<td>0.74</td>
<td>Simulations and gaming</td>
<td>0.32</td>
</tr>
<tr>
<td>Feedback</td>
<td>0.72</td>
<td>Inquiry-based teaching</td>
<td>0.31</td>
</tr>
<tr>
<td>Teaching students self-verbalisation</td>
<td>0.67</td>
<td>Smaller class sizes</td>
<td>0.21</td>
</tr>
<tr>
<td>Meta-cognition strategies</td>
<td>0.67</td>
<td>Individualised instruction</td>
<td>0.20</td>
</tr>
<tr>
<td>Direct instruction</td>
<td>0.59</td>
<td>Problem-based learning</td>
<td>0.15</td>
</tr>
<tr>
<td>Mastery learning</td>
<td>0.57</td>
<td>Web-based learning</td>
<td>0.09</td>
</tr>
<tr>
<td><strong>Average activator</strong></td>
<td>0.60</td>
<td><strong>Average facilitator</strong></td>
<td>0.17</td>
</tr>
</tbody>
</table>

*Table 2: Effect sizes (ES) for teacher as activator and teacher as facilitator (adapted from Hattie 2009)*

2. Simple and transparent tasks and materials

This vitally important principle relates to many areas of teaching, but most interestingly to assessment. It calls for simple and detailed course guides and assessment rubrics that spell out exactly what will be taught and how it will be assessed. Assessment is generally regarded as ‘the Achilles’ heel of quality’ (Knight 2002, p 107) in university teaching (Knight 2002; Rust 2009), and current assessment practices, particularly in universities, have been widely criticised for not assessing ‘genuine learning’ (Boud &

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\(^3\) Reciprocal teaching is a small group approach to reading and analysing a text, in which students practise steps that have first been modelled by the teacher.
At the same time, it is widely acknowledged that, for students, the assessment is the curriculum: students are primarily driven by grades. The literature on ‘embedding’ argues that, given the high stakes, the least we can do is teach the things we are assessing. The argument is that you cannot expect students, particularly those from other cultures, to pick up the norms of western academic culture by osmosis. If you want to ask students to submit a particular form of assignment (e.g. a report), then you need to teach the skills and ‘literacies’ involved (e.g. structure, expected patterns and style of academic discourse in English, paraphrasing, synthesising, integrating references, etc), and not assume that students already know them. That is, it is not enough to name these skills in the assignment rubric, you need to teach them alongside course content in a way that is scaffolded, and test for them using formative assessment tasks before you ask students to demonstrate such skills in a high-stakes assignment.

In this connection, Hattie, Biggs and Purdie’s 1996 meta-analysis shows that if academic skills and literacies programs are embedded into the curriculum and taught in a meta-cognitive way, they have a large effect (0.77) on student achievement. Such interventions are typically collaborative efforts between teaching staff and Academic Language and Learning (ALL) staff.

The principle of ‘simple and transparent’ can be applied to most areas of teaching. For instance, to include students with lower English proficiency, jargon, long words and colloquial language can always be explained or simplified. This tends to help other students in the class besides ESL students.

3. Multiple means of representation, expression and engagement

This is an important principle for day-to-day teaching and curriculum renewal, but it should be applied with care. The National Centre on Universal Design for Learning’s oft-cited principles of Universal Design for Learning (2009) call for:

1. **Multiple means of representation**, to give learners various ways of acquiring information and knowledge.
2. **Multiple means of action and expression**, to provide learners alternatives for demonstrating what they know.
3. **Multiple means of engagement**, to tap into learners' interests, offer appropriate challenges, and increase motivation.

Multiple means of representation might involve such strategies as using (and teaching students to make) visual representations of knowledge, which has been shown to have large positive effects on student achievement. It might also mean offering course materials in electronic form, so that students can use adaptive technology to access those materials in their preferred ways.

**Assessment**

Most controversially, perhaps, the principle of ‘multiple means’ (specifically, ‘multiple means of expression’) calls for a range of assessment alternatives for every assessment task. Many teachers fear that this would mean a lot of extra work (Waterfield et al 2006). Universal design advocates contend that most of this extra work and cost comes at curriculum renewal stage, and that this cost and workload diminishes in subsequent years. They argue, moreover, that the cost of routinely offering a choice of assessment methods to all students must be weighed against the rising cost of providing individual ‘adjustments’ to the growing number of students with special needs.

For example, in Australia, universities well know that they are required by law to make ‘reasonable adjustments’ for people with disabilities, according to the Disability Discrimination Act (1992) and the Disability Standards for Education (2005). In this connection, the number of tertiary students who identify themselves as having a disability has reached eight percent in the UK (Department for Innovation, Universities and Skills 2009, p 11). This rate is rising by roughly one per cent a year, and Australia seems to be following the same trend, largely due to an increase in diagnoses of dyslexia and mental illnesses. All of these students have legal grounds for demanding ‘adjustments’ and/or a more inclusive curriculum. Less well known is that Australian universities will soon be audited for compliance with a new set of standards requiring them to develop the ESL proficiency of international students throughout their degrees, and assessment will likely come under scrutiny from this angle, as well.

Given the lack of success which characterises most attempts at individualisation, it might be wise to offer students a narrow, rather than a wide choice of assessment options. An example would be offering all students the choice of doing a major project or taking an exam.
Learning 'styles'

The principle of offering ‘multiple means’ is frequently recommended as a way of addressing different ‘learning styles’ within the group, but the use of ‘learning styles’ questionnaires in designing instruction is not supported by a strong evidence base, and there are better reasons to offer ‘multiple means’. A large analysis of the learning styles literature by Coffield et al (2004), could not find any empirical grounds for choosing one learning styles model over the hundred-odd others. Coffield et al did, however, recommend that some learning styles models be ‘discontinued for educational use’. One of these was Honey and Mumford’s ‘Theorist Activist Pragmatist Reflector’ model, which is still taught on Australia’s Certificate IV in Training and Assessment. A more recent review by Pashler et al (2008) went further, finding that there is less empirical support for the argument that students learn best when taught according to their diagnosed learning style and more evidence that students learn better against their learning ‘style’. They also point out that humans are, overwhelmingly, visual learners, and other preferences are far less significant.

The questions of whether there are learning styles, and whether they have any educational significance are vigorously contended, but offering multiple means is good practice for other reasons. One reason is that offering multiple means is a more equitable way to teach, since it engages students who might otherwise be marginalised. Secondly, there is mounting evidence that it helps most students to encode information in more than one modality (e.g. visual, verbal, textual), since forcing the brain to make multiple associations with the same material gives that information more neural scaffolding (Marzano 1998; Carey 2010; Davies 2011). That is, it benefits most students to manipulate information using more than one sense. Thirdly, the large effect sizes for meta-cognition and study skills support for providing students with a variety of tools and teaching them the self-awareness to use these tools in some learning situations but not in others.

e-learning

Much of the research on providing multiple means has focused on computer-mediated means of representation, expression and engagement. In general, computers have made tertiary education far more accessible to students with disabilities, by circumventing many physical and sensory barriers, but computers are not an educational panacea.

Assistive technology which is useful to students with particular disabilities, such as screen-reading, speech recognition and diagrammatic mapping software can also benefit students without diagnosed disabilities. And it is generally beneficial for students to be able to access information in different electronic formats, such as audio, Powerpoint (with or without voiceover) and video.

But computer-mediated instruction has generally had a below-average effect on student achievement. This is illustrated by the big-picture data on e-learning. In a 2002 meta-analysis, Bayraktar recorded a small effect size of 0.273 for the use of e-learning in college science education, and concluded that e-learning in science ‘may not be highly effective at this point’. Seven years later, Schmid et al (2009) found a figure in almost precise agreement with Bayraktar’s for the use of technology in higher education (0.28), indicating that little progress had been made. Interestingly, they found that students on campuses with a moderate level of technological saturation tend to achieve better than those from campuses with a low or high level of technological saturation. More promising, and only slightly below average, is Hattie’s 2009 effect size of 0.38 for computer-based instruction in higher education, which seems to have been boosted by a few large effect sizes, including the use of computers in group work.

Less generally, Schmid et al recorded low effect sizes for the ‘presentational’ uses of technology (0.10), and roughly average effect sizes for the uses of technology providing ‘cognitive support’ (0.41), giving the example of a computer simulation as an application which provides cognitive support. Specific applications which depend on proven educational strategies tend to be more successful. For example, argument mapping and concept mapping are successful teaching strategies, and the use of computer software designed for these purposes tends to have large positive impacts in trials. For example, the seven trials of computer-aided argument mapping software yielded a large effect size of 0.78. Conversely, applications which lack some essential educational ingredient generally don’t succeed. For example, web-based learning seems to be a lagging area: Olson and Wisher measured an effect of 0.24 across 15 studies in 2002, and there was no improvement by 2009 when Hattie recorded an effect of 0.18 across 45 studies. Hattie (2009) suggests this is because web-based learning tends not to provide enough of that crucial ingredient, feedback.
The above findings lend support to the oft-repeated observation that, in e-learning, technology has preceded pedagogy. Advocates of educational technology tend to agree that it is the instructional design, the pedagogy, that makes the use of technology in education succeed or fail (Schmid et al. 2009).

The United States’ National Centre on Universal Design for Learning, which emerged out of the movement to include students with disabilities, has produced exhaustive lists of strategies that provide multiple means of representation, expression and engagement, for all kinds of students (see http://www.udlcenter.org/aboutudl/udlguidelines).

4. Inclusive spaces

There are two aspects to this principle. The first is that classrooms themselves should be fit for inclusive teaching, and the second is that there should not be too many people in the room.

On the plus side, recent decades have seen ergonomic provisions such as access ramps and lower lab benches made for students with disabilities, as mandated by law. Moreover, adjustable furniture has become more widely used, preventing some of the injuries associated with one-size-fits-all furniture. Attention has been paid to lighting, sometimes to air quality, and to ensuring that there are still classrooms with flat floors and moveable furniture as well as lecture theatres.

On the minus side, the trend is to keep squeezing more people into classrooms. The traditional ‘transmission’ model of university teaching has been transformed by commercial imperatives into a ‘stack em deep and teach em cheap’ approach, in which hundreds of students are crammed into lecture theatres and dozens into tutorials, which is not conducive to the small group-based, collaborative practices of inclusive teaching (Cornell 2002; DeGuire North 2002; Graetz and Goliber 2002; Van Note Chism 2002).

The debate over the impact of class size on achievement has raged for decades and the meta-analytic data is inconclusive. Hattie (2009) found an effect size of only 0.21 across 96 studies for reducing class size. While this suggests that increasing class sizes is not a good idea, it provides little incentive to reduce them. At the same time, this number doesn’t really tell us much, since it is an average taken across all educational levels, and thus compares lectures to 80 or more students with classes of fifteen doing group work. The reality is that different-sized classes get different kinds of teaching, and the standards for what constitutes an excellent lecture (in the traditional lecture mode) are not the same as the standards for excellence in more student-centred teaching, which relies more on group work and smaller class sizes (Hattie 2009).

Furthermore, students in large classes are more likely to be assessed in ways that, it has been argued, emphasise surface and strategic learning, such as multiple choice tests, instead of ways which emphasise deep learning, such as essays and reflective journals. Thus, increasing class size may have little apparent impact on ‘achievement’, but it might have strong implications for depth of learning.

With respect to higher education in particular, there is a small body of recent research indicating a strong negative relationship between class size and student performance in higher education. Cuseo (2007) provides a narrative synthesis of the recent empirical research on class size in higher education and finds that increasing class size has a deleterious effect on educational outcomes for students in general and first year students in particular, judged by the following measures:

1. Students’ active involvement in the learning process
2. Interaction between staff and students
3. Feedback to students
4. Depth of thinking inside the classroom
5. Breadth and depth of course objectives and assignments
6. Course-related learning outside the classroom
7. Students academic achievement and performance (learning and grades)
8. Course satisfaction

Bedard and Kuhn (2008) and Westerlund (2008) also found a negative relationship between class size and students’ evaluation of the course.

Kokkelenberg et al (2008) argue persuasively that the ‘diseconomies of scale’ associated with poorer student outcomes cannot always be measured financially, but they are measurable, and increasingly well-documented. Their own longitudinal study of class size at one public university in the United States concludes that ‘class size has a negative relationship to grades and that while the value of the class size coefficient differs across different departments and subsets of data, it is negative in all cases’ (p 229).
Accepting the reality of large classes in post-secondary education, many of the principles under ‘multiple means’ can be applied successfully to large groups. And there are many responses teachers of large classes can make to the needs of various marginalised groups or individuals which benefit all students (see Doyle and Robson 2002; Wright et al 2006; Grace and Gravestock 2009, National Centre on Universal Design for Learning 2009). For example, it is quite possible to do group work in a lecture theatre, though few teachers seem to attempt it.

5. A community of learners
This principle spans the curricular and extra-curricular aspects of tertiary education, and recognises the importance of the latter for student retention and achievement.

Scott, McGuire and Foley (2003) call for structures that promote contact between students and staff, between students outside class, and for more personalised interactions between staff and students in the classroom. Discussion groups, chat rooms and compulsory meetings between students and teachers are offered as means to achieving a robust ‘community of learners’ (p46). Such relationships influence ‘students’ disposition to learn’, for which Hattie (1992) recorded a large effect size of 0.61.

More democratic, personalised relationships between students and staff in class, and, ideally, out of it, are characteristic of an inclusive classroom, and some of the interactions called for by Scott, McGuire and Foley might flow naturally from the sort of changes to learning spaces and class sizes called for under the principle of ‘inclusive spaces’ (Cornell 2002; DeGuire North 2002; Graetz and Goliber 2002; Van Note Chism 2002).

Another model for building a community of learners is peer tutoring. Peer-support programs are gaining traction in many western universities as a scale-able model for extending academic and social mentoring networks throughout the university. Besides the social benefits, the academic benefits of peer tutoring are considerable (0.55).

6. Inclusive climate
The importance of an inclusive climate, the research suggests, is most obvious on campuses that don’t have one. Perhaps this is why much of the campus climate research has been focussed on bridging the racial divide across some US campuses, in order to improve retention rates and grades among marginalised groups.

Scott, McGuire and Foley (2003) call for a ‘climate of respect for diversity’ which can be ‘modeled by the faculty member through awareness and considerate treatment of all students.’ (p 46). Practical suggestions for doing this include ‘putting a statement in the class syllabus affirming the need for class members to respect diversity’ (p 46), surveying students to monitor their comfort level in class discussions, and incorporating diversity content into the curriculum, for example, by highlighting the work of thinkers from diverse backgrounds.

There is a body of qualitative research suggesting ways to promote a more tolerant attitude towards diversity on campus, which include academic support initiatives to retain students from minority backgrounds, various curricular and co-curricular initiatives, ‘safe space’ initiatives, and community outreach initiatives undertaken by institutions (Hurtado et al 2005). Hurtado et al concede that climate research would be strengthened if the behavioural and psychological data gathered by the welter of different climate surveys (they studied 90) were linked more explicitly to educational outcomes.

Conclusion
The term ‘inclusive teaching’ covers a broad and at times conflicting range of teaching strategies. The major shift in recent years has been to extend ‘inclusion’ to all students, with all their diverse and shifting strengths and learning preferences. This shift has been caused and accompanied by a growing dissatisfaction with the culture of making ‘adjustments’ for exceptional cases, while leaving the system unchanged. Research that calls for a whole-of-institution approach to inclusion, including that on ‘universal design for learning’, has grown out of this dissatisfaction. The main concern of this paper is to suggest that where inclusive teaching principles are applied to the general student population, it is wise to employ strategies which are supported for general use by evidence from the broader educational literature. This is perfectly compatible with the prevalent system of making special-needs-based adjustments for disabilities; it merely argues that some of these adjustments should be offered to the rest of the class as well, while adjustments that offer little general benefit should be reserved for those who really need them. Of course, the argument and the inclusive teaching principles set out in this paper are not intended to be the last word, but to get discussion started.
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