

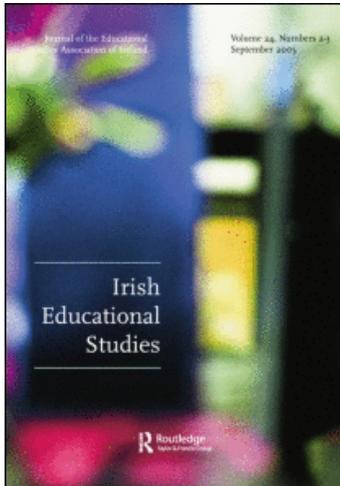
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After behaviourism, navigationism?

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Two previous articles in this journal advocate the greater use of a behaviourist methodology called ‘Precision Teaching’ (PT). From a position located within virtue ethics, this article argues that the technical feat of raising narrowly defined performance in mathematics and other subjects is not sufficient justification for the extensive use of behaviourist techniques such as this. The article uses ideas drawn from ancient Egyptian mythology as well as some more familiar Greek philosophy, to raise broader questions about the wisdom of relying too heavily on technical rationality in present-day educational practice. The polemical intent is to dismiss unreflective behaviourism and to offer a brief glimpse of a very new educational paradigm: ‘navigationism’.

Keywords: precision teaching; behaviourism; constructivism; ethics; navigationism

Introduction

The main thrust of Gallagher et al.’s promotion of Precision Teaching (PT) is that it will help meet the UK government’s ‘ambitious targets for achievement in the three core areas of English, maths and science measured by national curriculum testing’ (Gallagher et al. 2006, 93). The contentious questions of whether or not the UK government ought to be setting such detailed targets for the children within its jurisdiction and whether or not national curriculum testing is the appropriate instrument for measuring the realisation of these targets are ignored by Gallagher et al. in favour of promoting a teaching technology which is claimed to be effective at driving pupils towards the targets. I argue that this stance is both unethical and unimaginative and that *phronesis* (practical wisdom) deployed in the best interests of pupils is a more appropriate virtue for teachers than an uncritical willingness to collude in the micro-management of learning, a movement that is arguably pervasive enough without further encouragement.

Assumptions

The model which is assumed but not openly stated in the pro-PT papers is one in which the government is the customer for educational achievement – in the claimed economic interests of the nation – and so teachers and pupils alike must show a Stakhanovite¹ determination to work towards achieving their allocated production targets and quality-control standards. The following set of pedagogical syllogisms seems to me to capture this managerialist logic:

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- P₁ All customers for goods and services can legitimately specify the standards required.
- P₂ The government is the customer for educational services.
- C₁ Government specifications of the standards for educational services are legitimate.

This first conclusion then becomes a premise in the second of this chain of syllogisms:

- P₃ Government specifications of the standards for educational services are legitimate.
- P₄ Teachers ought to strive towards legitimate standards for educational services.
- C₂ Teachers ought to strive towards the standards which the government specifies.

Next:

- P₅ Teachers ought to strive towards the standards which the government specifies.
- P₆ Government standards are specified in terms of high national curriculum success rates.
- C₃ Teachers ought to strive towards high national curriculum success rates.

Finally:

- P₇ Teachers ought to strive towards high national curriculum success rates.
- P₈ PT is a reliable technology for achieving high national curriculum success rates.
- C₄ Teachers ought to use PT.

However, the final decision to accept or reject an argument within the paradigm of educational technical rationality ought to be taken from a position outside the paradigm, on the basis of teacherly *phronesis* (practical wisdom). This is not to say that the harbouring of doubts by teachers should always be used as a barrier to legitimate progress, but we ought to take seriously the professional misgivings of some teachers over the transfer of theories derived from the behaviour of rats and pigeons, in Skinner's laboratory, to pedagogical practices suitable for the humane education of children. Two hundred years before Skinner's heyday, de la Mettrie (1748) described in outline the learning of mathematics by behaviourist principles:

Man has been trained in the same way as animals. . . . A geometrician has learned to perform the most difficult demonstrations and calculations, as a monkey has learned to take his little hat off and on, and to mount his tame dog.

The 'Precision Teaching' of mathematics is a continuation of this same historical strand of thought; a strand which has narrowed and become more 'scientific' over the years, but which has retained a rather demeaning conceptualization of humanity.

Aesthetic judgement

If we, as teachers, find the final conclusion (C₄) distasteful, this negative judgement can be justified either on aesthetic grounds, upon which we can arguably claim to adjudicate as pedagogical connoisseurs or, alternatively, by refuting one or more of the premises upon which the reasoning depends. Almost every aspect of PT, as described in Gallagher et al.'s 2006 paper, could be regarded as aesthetically offensive. On page 96, Cooper is quoted as describing four essential guidelines for PT:

1. A focus on observable behaviour
2. The use of frequency as a data metric
3. Graphing student performance on the standard celeration chart
4. Making decisions based on performance data

The goal of PT is that ‘the student can achieve a level of fluency in correct behaviours’, ‘behaviour’ being defined negatively by the ‘dead man’s rule’ – ‘If a dead man can do it, then it ain’t [*sic*] behaviour’ (Grant and Evans 1994 in Gallagher et al. 2006, 97). B.F. Skinner is invoked as an authority, ‘time probes’ are used to gather test-data to plot on an intricate, logarithmically scaled ‘standard celeration chart’ for each pupil and ‘accuracy plus speed’ is used as a benchmark for mastery (100). Having registered an æsthetic shudder at this mechanistic pedagogy, my next steps are attempts to cast doubt upon the reasoning which led to the final conclusion (C₄ – Teachers ought to use PT).

Cave teaching

The authors of the articles consider the aim of increasing national curriculum success rates to be a legitimate justification for the use of PT, so this part of the syllogistic chain is the one to be challenged:

P₇ Teachers ought to strive towards high national curriculum success rates.

P₈ PT is a reliable technology for achieving high national curriculum success rates.

C₄ Teachers ought to use PT.

To show that there is something wrong with this reasoning, we might consider a parallel, parody, argument, based on the Allegory of the Cave in Plato’s *Republic* book VII. In Premise P₈, let ‘Precision Teaching’ (PT) be replaced by ‘Cave Teaching’ (CT). If CT is effective at achieving high national curriculum success rates, then, using the same logical template as above, the modified conclusion C₄ – Teachers ought to use CT – will follow. In this proposed variation – Cave Teaching – the pupils have ‘their legs and necks fettered from childhood, so that they remain in the same spot, able to look forward only’ (Plato 1961, *Republic* 514). The passing shadows on the dark cave wall are PowerPoint® presentations, carefully chosen to enhance national curriculum success rates; electrodes are attached to pleasure-centres in the brain to enable Skinnerian rewards to be administered, so that ‘the student can achieve a level of fluency in correct behaviours’ (Gallagher et al. 2006, 97); feeding is intravenous and consists of a balanced nutritive mixture, supplemented by additives known to boost brain-function, such as vitamins, trace-elements and omega-3 oils. And so on. The parody could continue, and incorporate all manner of techniques experimentally known to enhance national curriculum success rates. But, no matter how reliable and effective Cave Teaching was empirically shown to be, the conclusion that ‘C₄ – Teachers ought to use CT’ would not be widely supported, and so the parody-argument, and its serious counterpart which advocates PT, collapses. Understanding why this is so involves an excursion well outside the chilly domain of technical rationality into the myths of warmer climes, an excursion which demonstrates how strict instrumental reasoning can be trumped by other considerations. A willing suspension of your disbelief is requested for a short while.

Horus, Set, the Pharaoh and Aristotle

On the ground floor of the Egyptian museum in Cairo stands an impressive life-size statue of Rameses III being crowned by the gods Horus (personifying order) and Set (personifying anarchy). Although the trio is intended to establish the claimed divine right of the pharaoh to rule, it could also stand as a metaphor of the teacher's role: that of mediating between order and chaos in the educational realm. In ancient Egyptian mythology, Horus was the son of Isis and Osiris. The young Horus was in continual danger from his uncle Set, but nevertheless survived to adulthood to fight with him in order to avenge the death of his father at the hands of Set. Horus won this battle, but both victor and vanquished suffered losses, as *The Papyrus of Ani* (Anon 240 BCE) describes:

It was the combat which took place on the day when Horus fought with Set, during which Set threw filth in the face of Horus, and Horus crushed the genitals of Set.

More significant than the biographical details of the two protagonists, though, are the ideas that they each represent. As the victor in a righteous battle for family honour, Horus personifies order and legitimate authority. Set, the defeated, on the other hand, represents anarchy and otherness. He is an outsider, associated with the desert, with sandstorms and with red-haired foreigners (Loprenio 1995). After the battle, there is a rapprochement and a healing of wounds:

Lo! Medicaments have been brought.
Horus purifieth Set and Set strengtheneth,
And Set purifieth and Horus strengtheneth.

However, Horus' damaged eyesight is never fully restored, and at times he becomes 'Horus the sightless', who, unable to distinguish between friend and foe, attacks those whose activities are in fact in his own best interest. Likewise, Set's injuries compromise his potency, so it is only by using the powers of *both* deities that the pharaoh can reign effectively.

Similarly, I argue, it is only by judiciously using both order and anarchy that the teacher can be truly effective as an educator and not merely effective in a narrow technical sense. Precision teaching falls squarely in Horus' domain, being concerned exclusively with order and leaving nothing to chance. This vision has its merits, but suffers from the dual flaws of trusting the imperfect eyesight of Horus too completely and averting its focus from the anarchic insights to which Set gestures. If we were omniscient (if we had perfect eyesight, so to speak) we might be justified in imposing a strict order for the good of our pupils, but we are not. The teacher ought therefore to act in the best interest of the pupils, I suggest, by using some of the characteristics represented by *each* deity, not exclusively one or the other. To switch to a more familiar Aristotelian idiom, this should involve using the virtue of practical wisdom (*phronesis*) to find a compromise, flexible pedagogy, which (i) promotes learning by largely satisfying the requirements of order but also (ii) leaves room for the invigorating effects of those random and unpredictable elements which also have educational value. The teacher ought to promote the flourishing² of the individuals in the class by navigating a course between order and chaos; a slightly hazardous journey, open to the possibilities of exploring the pathlessness³ of uncharted territory, as well as following time-honoured and familiar routes. I shall return to this navigation metaphor later.

Happy medium

Sketching exactly where this route should meander is not a straightforward matter. In fact, if it *could* be mapped out in advance it would completely obey the ‘order’ signposts of Horus and steer clear of any of Set’s anarchy, and would thus not be the middle way that is being sought. So we must trust the teacher to use professional judgement and follow the right path rather than the marked path. What is clear, though, is that allowing oneself to be guided entirely by either of the opposing poles of ‘order’ or ‘anarchy’ is to miss out on rich pedagogical opportunities for the pupils. A completely *laissez-faire* randomness could well be a waste of time, but conversely, seeking refuge in the predictable and orderly would bypass the learning potential which lurks in chance and in the following through of serendipitous gifts.

I suggest that finding this happy medium between the extremes represented by Horus and Set has never been more important in education. Plato too feels that being able to discern this *via media* will reveal the route to happiness. We must:

know how always to choose in such things the life that is seated in the mean and shun the excess in either direction . . . for this is the greatest happiness for man. (Plato 1961, *Republic* 619)

Similarly, in the *Nicomachean Ethics*, Aristotle defines virtue as ‘a mean between two kinds of vice, one of excess and the other of deficiency’ (Aristotle 1953, Book II, 1107a). Unchallengeable order and complete anarchy are clearly vices in the educational realm: one suffering from an excess of control, and the other a deficiency. Finding the happy medium between these extremes is not achieved by simply locating the midpoint, however. Aristotle recognises that the virtuous mean will often lie nearer to one extreme than the other, and proposes a way of overcoming the difficulties of deciding exactly where this point lies:

For one of the extremes is always more erroneous than the other; and since it is extremely difficult to hit the mean, we must take the next best course, as they say, and choose the lesser of the evils. (Aristotle 1953, Book II, 1109b)

The lesser of the evils *may* be to use PT and hence sacrifice learner-autonomy for the greater good of achieving government targets. This would also have the benefit – if benefit it be – of accustoming pupils to a working life of achieving the production-targets beloved of the audit culture, and drawing extrinsic motivation from the charting of these achievements. An alternative view, however, is that our duties lie more with the pupils in front of us, and to our calling, rather than an unquestioning allegiance to whichever politician happens to be temporarily filling the office of Education Minister. Plato’s description of the duties of a sea-captain seems to me to capture well the obligations of a teacher navigating a learning route with a class:

Stranger: The ship’s captain fixes his attention on the real welfare at any given time of his ship and his crew. He lays down no written enactments but supplies a law in action by practical application of his knowledge of seamanship to the needs of the voyage. (Plato 1961, *Statesman*, 297)

By splendid coincidence, Gilbert and Sullivan have a view on the relationship between politicians and practitioners which is also expressed in nautical analogies.

I grew so rich that I was sent
By a pocket borough into Parliament.
I always voted at my party’s call,
And I never thought of thinking for myself at all.

I thought so little, they rewarded me
 By making me the Ruler of the Queen's Navee!
 ...
 Stick close to your desks and never go to sea,
 And you all may be rulers of the Queen's Navee!
 (Gilbert and Sullivan 1878)

Admittedly, some education ministers in some jurisdictions have been teachers (and thus metaphorically strayed from their desks and been to sea), but irrespective of the credibility or otherwise of the individual politician there are times when the following of the prescriptive advice of these remote admirals is appropriate and times when the practical wisdom of the individual teacher on the spot is a far better guide. Plato is clear that an excess of control (which, on the Egyptian model described in this article, would fall within Horus' domain) is not sustainable:

Stranger: Of course he is right, Socrates. How could any law-giver be capable of prescribing every act of a particular individual and sit at his side, so to speak, all through his life and tell him what to do? (Plato 1961, *Statesman*, 295b)

Control in education

The notion of education as a system which has to be controlled in an orderly way has a long history. Plato, for example, expresses the view, in the words of the Athenian, that education should be 'compulsory for every mother's son, on the grounds that the child is even more the property of the state than his parents' (Plato 1961, *Laws*, 804d–e) and that the process ought to consist in 'the drawing and leading children to the rule which has been produced right by the voice of the law, and approved as truly right by the concordant experience of the best and oldest men'. The authoritarian Plato of *Laws* and *Republic*⁴ advocates (i) a compulsory education system, the function of which is to promote state interests, defined by (ii) a clearly prescribed curriculum, delivered by (iii) teachers who are servants of the state, who comply with political rhetoric. Again, these look very like the arguments advanced in favour of PT.

Echoes of the controlling tenor of Plato's later writings on education can be found throughout present-day education systems. That the main aim of education should be to remedy deficiencies in children, in the claimed national interest, is taken as axiomatic:

In today's global economy, in which our national competitiveness increasingly depends on the skills of each and every person . . . [t]oo many young people are unattractive to employers; deficient in the basics of English and maths, unprepared for further study; and unable to demonstrate their true potential. (Kelly 2005)

Dismal assertions such as this, which give prominence to education for 'national competitiveness' in a global economy, are frequently heard from politicians in various countries. This rhetoric is very like premise P₂ above: 'The government is the customer for educational services' (which ought, the politicians assert, be put at the disposal of economic policy). From this, conclusion C₁ follows, so state-mandated national curricula and control and surveillance systems are imposed, those for England and Wales being particularly prescriptive. Moreover, to qualify as teachers in England and Wales, 'trainees' (tellingly the UK government's preferred term for student teachers) must show that they have met a number of statutory 'Standards'. The general thrust of these is that trainees are to adopt centrally determined values, use approved methods and deliver prescribed skills to pupils, if they wish to be licensed by the state to teach.

Objections

The notion that pervades Gallagher's (2006, 304) description of PT, and educational technical rationality in general, is one of 'mastery'. Teachers' political masters dictate what shall be taught and how; school-masters (and mistresses) maintain tight control of the classroom and faithfully deliver pre-ordained subject-matter; pupils attempt to master the content of the lessons and demonstrate this mastery in centrally devised examinations or – in the case of PT – in timed tests of frequency logged on 'standard celeration charts'. Viewed from *within* a technicist paradigm, all seems to be in order. When the system 'works' well, governmental prescriptions are based on the democratic process, the perceived needs of the economy and of employers, and the best available research; teachers trust their political and institutional leadership and do their utmost to meet their imposed improvement targets; pupils do their duty as compliant stockpilers of knowledge and skills and are willing to be trained to deploy these in whatever way the instruments of assessment require. If the machine is not working well it can be tuned up by more powerful governmental edicts, greater enforcement of policy by the inspection and disciplining of teachers, and increased pressure on schools to improve pupil-performance or risk being 'named and shamed' in league tables. However, the technicist paradigm is not the only possible world view. The current obsession with control, mastery and performance is a prejudice: a contemporary veneration of Horus and a sidelining of Set, so to speak. Technical rationality cannot be justified from *within* the paradigm of technical rationality, for, as a consideration of 'Cave Teaching' demonstrated, the mere fact that a technique 'works' does not unproblematically translate into a justification for using it with human beings.

Against this background, Gallagher (2006, 304) expresses disappointment that 'PT has failed to generate any substantial interest among teachers'. This should not be surprising, given the major concerns of large numbers of teachers about the imposition of excessive testing and other arguably oppressive measures by the UK government. Read (2006, 131) speaks for many fellow teachers in his heartfelt – if rather intemperately phrased – attack on inordinate levels of testing:

Testing, SATs and their evil spawn the league tables have been the enemy of creativity, distorted learning, choked initiative and drained our energy. We all feel their presence lurking behind us like malevolent phantoms.

The frequent testing which PT demands merely adds to the burden on pupils and their teachers.

Wise practitioner vs. technicist

One obvious criticism of an alternative to technicism – the virtue ethics approach advocated in this article – is that the wise practitioner, for all his or her virtuous motivation, is not omniscient and may not in fact be promoting the flourishing of pupils on a particular occasion. Counter-arguments that if the teacher is not acting in such a way as to encourage the flourishing of his or her pupils then *s/he* is not *truly* a wise practitioner seem to fall under Flew's (1975) 'No true Scotsman' fallacy.⁵ Plato, however, similarly suggests that teachers – when they are actually operating as teachers – cannot err:

Thrasymachus: ... we say that the physician erred, and the calculator and the schoolmaster. But the truth, I take it, is that each of these, in so far as he is that which we entitle him, never

errs . . . no craftsman errs. For it is when his knowledge abandons him that he who goes wrong goes wrong – when he is not a craftsman. (Plato 1961, *Republic*, 340d–e)

This move would certainly not be enough to satisfy those who require accountability from teachers, and I would also take issue with his characterization of the ‘schoolmaster’ as ‘craftsman’ (or the schoolteacher as craftsperson, in more inclusive parlance), for this gives the teacher a technician role, rather than that of a wise practitioner. The value of a *techne* (craft) lies in the products of the associated activity, whereas for *phronesis* (practical wisdom), the resultant activity – *praxis* – is an end in itself. As Aristotle puts it: ‘For while making has an end other than itself, action cannot; for good action itself is its end’ (Aristotle 1953, Book VI). The paradigm case of the user of *techne* is the shoemaker, whose productive activity results in shoes. The good resides in the products – the shoes themselves – rather than in the productive activity from which they issued. A process which somehow transformed technical knowledge (*techne*) directly into useful products, without any intermediate production stage, would be highly desirable to industry. A thought-experiment around this notion of minimal (ideally zero) effort casts further doubt on *techne* as a reasonable model for education. If an ultra-efficient technology for learning were to be devised, which required little productive effort (perhaps involving direct electronic downloads into human memory, or the use of the ‘Cave Teaching’ described earlier), would we feel morally justified in using it on children? Our intuition that this would amount to brainwashing or indoctrination rather than ‘genuine’ teaching, and would thus be morally reprehensible, points to a flaw in the characterization of education as a productive *techne*. We are not artisans, crafting finished products out of passive raw materials, but wise practitioners, engaging with active learners in a practice which has its own inherent good.

Elsewhere in his writings, however, Plato himself rejects this notion of the teacher as craftsperson. In the dialogue *Meno*, he suggests that knowledge is not something that can be transmitted from teacher to learner in order to create the finished product of an educated person, but must be brought out of the learner. He goes further than this though, and makes the rather extravagant claim that the learner knows *everything* as a result of the soul’s journeys to ‘the other world’ and back during its many re-births (Plato 1961, *Meno*, 81c). The teacher’s duty is thus, according to Plato, to help the learner begin to remember this implicit knowledge because:

when a man has recalled a single piece of knowledge – learned it, in ordinary language – there is no reason why he should not find out all the rest, if he keeps a stout heart and does not grow weary of the search, for seeking and learning are in fact nothing but recollection. (Plato 1961, *Meno*, 81d)

In other words, once a start has been made, the whole interlinked set of ‘true justified beliefs’ can in principle be reconstituted from the learner’s own resources. Although Plato’s metaphysical commitments⁶ are implausible to modern readers, his characterization of learning as remembering has a surprisingly useful application over twenty centuries later, a point to which I shall return in the conclusion.

Despite the incommensurability of the two competing models (*phronesis* leading to flourishing, versus *techne* leading to measurable success), there is no reason for a wise practitioner (who possesses prudence⁷ as part of the over-arching virtue of *phronesis*) to act recklessly. So, the teacher’s duty might, at a particular moment, be seen as serving the flourishing of the pupils by helping them towards measurable examination success and the consequent enhanced life-chances in the present job-market. Prudence is not a wholly

admirable virtue⁸, however, and we would not think highly of teachers who unquestioningly drilled pupils in the party propaganda of a suspect regime for cynically prudential reasons. In democracies like ours, though, it is reasonable and prudent for teachers to have regard to state policy, but we need not extend this as far as being unquestioning instruments of government.

Differences between the technician and the wise practitioner will be most obvious in terms of risk-avoidance. The technician perhaps eschews imaginative teaching in favour of a safe, humdrum drill-and-practice, for fear of short-term measurable consequences; the wise practitioner is maybe more willing to try pedagogically risky innovations when this is judged on balance to be desirable for the longer term flourishing of the pupils. Technical-rational systems of accountability would generally frown on the latter approach and favour the mundane, predictable and reliable, but a system of *peer*-evaluation or mentoring would perhaps encourage greater experimentation, since wise practitioners would be better able to appreciate the motivation of fellow wise practitioners trying a novel approach.

Risk and creativity

Technical rationality is, then, at heart a risk-averse orientation. It seeks a reliable *techne* to arrive at well-defined ends predictably and efficiently. PT *may* lead to success by the lights of technical rationality, either because of genuine merit inherent in the method, or because of the performance-enhancing effects of commitment, expectancy and observation (the Hawthorne effect: Mayo [1933]; teacher expectation: Rosenthal and Jacobson [1968, 1992]). However, whether or not it ought to be adopted more widely, as Gallagher (2006) suggests, depends not solely upon its claimed *efficacy*, but also upon its perceived *ethical desirability*. The earlier discussion of ‘Cave Teaching’ brought out this consideration clearly.

Virtue ethics stresses the importance of doing the right thing in a particular set of circumstances by acting virtuously, rather than by seeking a set of reliable rules to apply. A teacher may deploy *phronesis* (practical wisdom) in a given situation by recognizing, for example, that things have become a little stale and that an innovative approach is called for. Such an approach may or may not affect examination scores, but this was not the reason for the change of tack: the flourishing of pupils was the motivation for altering course. This recognizes that flourishing and examination success are not co-extensive and, given a choice, the promotion of the former takes precedence over the latter in the eyes of the virtuous teacher, even if this carries some degree of risk vis-à-vis measurable attainment. PT thus may well be shunned by the wise practitioner because it stresses the measurable to the exclusion of all else, puts the teacher and learner in a rather technician relationship and conveys an objectionable message about both the nature of learning and the nature of that which is to be learned. A PT methodology in which drill-and-practice is relentlessly used to teach mathematics, for example, allows the learner to leave school with a misguided notion that maths is uncreative drudgery and that academic success involves responding ‘appropriately’ and obediently with as high a frequency as possible. This is surely the ethos of the old-fashioned production-line rather than that of a learning institution.

Hughes (1998, 224) suggests that the current UK educational climate, in which league tables, accountability and other control-mechanisms are so dominant, has the effect of forcing even teachers of art to play safe and not take the gamble of allowing pupils to develop individualistic and innovative work:

... we are still delivering art curricula in our schools predicated largely upon procedures and practices which reach back to the nineteenth century – procedures and practices which cling to a comfortable and unpretentious view of art and its purposes.

If this is the case for such an avowedly creative subject as art, it is no surprise that the situation for maths and science is also less than ideal. Rather than encouraging genuine experimentation, second-level school science departments typically find ‘safe’⁹ experiments such as those of confirming Hooke’s law for springs, establishing the relationship between concentration and rate of reaction in the ‘sulphur clock’ experiment, or finding the optimum temperature for digestive enzymes to work. Instead of the creative excitement of artistic endeavour and scientific exploration (located at least partly in Set’s domain, to use the Egyptian metaphor), pupils are subjected to a surfeit of order (squarely in Horus’ zone of influence). Richard Brawn (2000, 151) feels that:

This denuded cognitive environment and . . . almost algorithmic approach to science . . . may lead to the erosion of cognitive qualities which are the characteristics of expert practitioners in the field.

In other words, we are often subjecting pupils to denatured copies of the living disciplines: pale versions, from which the intellectual thrill of grappling with the unpredictable has been removed.

Concluding discussion

A difficulty in critiquing Precision Teaching is that the technique clearly *does* increase the quantity of learning, if we accept that this should be measured in terms of the frequency of ‘correct’ behaviours. What is at issue, though, is not its *effectiveness* but its *desirability*, particularly in view of its unapologetically behaviourist origins and, in Gallagher’s (2006) articles, its uncritical yoking to government targets. The daily experience of both pupils and their teachers would be impoverished by the extensive use of PT, and pupils would leave school with an unfortunate view of what constitutes learning. Gallagher (2006, 316) speculates that ‘teachers’ belief that PT is based on a dubious philosophy may account for why PT has not entered the classroom’. The discussions of the present article have shown that there is indeed something philosophically ‘dubious’ about PT.

Moreover, it is also suspect on pragmatic grounds. No one can predict what skills will be marketable in the world of the future (to take up the ‘economic imperative’ agenda, beloved of government, for a moment), but the obedient compliance and toleration of drudgery which PT fosters are likely to be further down the list than the personal attributes of creativity, interpersonal-adeptness and good judgement which PT marginalizes.

Having said this, there are legitimate uses for less extreme forms of behaviourism, as every teacher who has ever praised a pupil knows. There may even be situations in which a type of PT is a least-worst option for use in intractable conditions in which the indignity of being programmed in this way is less serious than leaving the ‘undesirable’ behaviours intact.¹⁰ For this latter justification to be made, though, the errant behaviour would need to be significantly maladaptive vis-à-vis daily life, and not simply out of kilter with the latest government directives. Similarly, technical rationality is not unremittingly malign. We expect the electricity supply in the classroom to work, for example, and also perhaps accept the need for some level of government guidance over what we do in that classroom (since they are funding the project after all). The problems arise when the level of control diverges too far from a happy medium: when Horus’ influence is too strong, so to speak.

It is clear, though, that we can no longer take behaviourism seriously as an overall framework for learning. Boghossian (2006, 1) plausibly claims that: ‘Behaviorism [*sic*] dominated the educational landscape 20 years ago, while the foremost learning theory today is constructivism.’ Instead of programming children to deliver ‘correct behaviours’

on demand, in respect of prescribed content, the newer paradigm involves learners in constructing their own knowledge. The Vygotskian variety of constructivism – ‘social constructivism’ – has the teacher identifying the learner’s Zone of Proximal Development (ZPD) and providing the scaffolding to help them enter this zone and co-construct extensions to their existing knowledge. This approach makes some concessions to Set’s anarchy, since there is a random element to each pupil’s ZPD which must be taken into account. Nevertheless, the teacher still typically imposes a substantial degree of Horussian order on both the content and the learning process.

At this point, I shall draw together some of the threads which run through this article and suggest how they might be woven into a better learning paradigm than behaviourism, and perhaps even improve on our current ‘foremost learning theory’ of constructivism. The main threads are:

- the need for a balance between order (Horus) and anarchy (Set) in learning
- the teacher’s use of practical wisdom (*phronesis*) to promote the flourishing of learners
- navigational metaphors
- Plato’s theory of learning as remembering.

I want to suggest that Plato’s rather implausible claim – that we all have a memory of ‘the other world’ – has a useful analogue in the digital age. The virtual realm, which is becoming a repository of much of humanity’s collective memory, can be used by the learner to construct a set of true justified beliefs, given a ‘stout heart’ (and some level of digital literacy). One recovered piece of knowledge leads to another, in a journey signposted by a multitude of hyperlinks between websites. However, the collective memory at the disposal of learners is growing so huge, and is so variable in its reliability, that there is an irreducibly anarchic, random element to the route taken by a particular learner. Some degree of (Set’s) anarchy is desirable and energizing, but this ought to be balanced by a certain amount of (Horus’) order, so learners will continue to need our help and practical wisdom in developing their navigational skills, if they are going to flourish and not flounder in the ocean of information. These navigational skills are not merely the technical skills of surfing the web, though (in which we are comfortably outclassed by many of our students), but the higher order practices of testing, evaluating and engaging with *information* and thus transforming it into reliable¹¹ *knowledge*.

Navigationism

The ‘navigationist’ theory which has arisen very recently makes fewer demands on the teacher as a font of all knowledge, or prescriber of content, but rather suggests that:

Teachers and educators should become the source of how to navigate in the ocean of available information and knowledge. We should become coaches and mentors within the knowledge era ... (T.H. Brown 2006, 108)

Now we have a paradigm which incorporates both Horus and Set. Indeed, Brown (T.H. Brown 2006, 117) identifies one of the key skills for learners as ‘Sense making and **chaos management**’¹² (my emboldening). Another is ‘The ability to distinguish between valid alternate views and fundamentally flawed information.’ These skills are very different from passively complying with behaviourist conditioning, or being led into a constructivist ZPD which is typically strongly determined by the teacher and the syllabus. Released from the

prime duty of delivering content, educational institutions can become places where practical wisdom is used to promote engagement with both virtual and real sources of knowledge.

However, the emergence of a new learning model – particularly one as untried as navigationism – does not render the earlier versions redundant, so constructivist teaching (and to a lesser extent, behaviourist programming) will still have a major role to play. Virtual knowledge and the navigationist paradigm can only take learning so far. Plato points out that a person may have ‘true opinions on a subject without having knowledge’ (Plato 1961, *Meno*, 85c). This is eminently so in the case of the many Google-generationists and Wikipediasts (S. Brown 2006) whose engagement with the information retrieved is not deep enough to qualify as knowledge, in the sense of ‘true justified belief’. Plato’s solution to this problem is still relevant today:

Socrates: At present these opinions, being newly aroused, have a dreamlike quality. But if the same questions are put to him [the learner] on many occasions and in different ways, you can see that he will have a knowledge on the subject as accurate as anybody’s. (Plato 1961, *Meno*, 85c–d)

This ‘dreamlike quality’ is an apt description of many students’ superficial grip on the information they highlight, copy and paste as they skip adroitly from site to site. To turn these unexamined opinions into *knowledge*, pupils will need to be part of some form of intersubjective triangulation¹³ ‘on many occasions and in different ways’. A piece of information retrieved from the Internet may be *true*, but it does not become *knowledge* until it is known by the learner as a *true justified belief*. The justification and belief-formation processes will almost certainly require constructivist pedagogies, so that pupils’ ‘dreamlike’ opinions can be authentically tested in the real world of discussion, writing, calculating, scientific experiment, craft activities, artistic endeavour, cooking, physical exercise and so on. Our role is to help and encourage learners to engage constructively with the virtual world, the real world, each other and ourselves, in order that they may learn.

Keeping the most productive balance between order and anarchy, sensitively aligning the flourishing of the learner with national priorities, and making use of constructivist (and even behaviourist) methods in order to develop pupils’ ability to navigate for themselves through the real and virtual worlds will all depend on the practical wisdom of the teacher with the best interests of learners at heart.

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Notes

1. Ironically, the prodigious feats of Georgian miner Alexei Stakhanov in the 1930s – which made him a hero of the USSR and a role-model for the workforce – were revealed by the Soviet press in 1988 to be an elaborate propaganda hoax (Bernard 1999, 343).
2. *Eudaimonia* in the ancient Greek scheme.
3. *Aporia* in the Greek.
4. In contrast to the debunking *modus operandi* of the historical Socrates in the earlier works of Plato.
5. Uncle Angus must not be a true Scotsman, because no true Scotsman puts sugar on his porridge.
6. The doctrine of reincarnation described in *Meno* comes to Plato from Pythagoras (of right-angled triangle fame).
7. *Sophrosyne*.
8. Blake calls prudence a ‘rich, ugly old maid courted by incapacity’, in Grayling (2001, 41).
9. In the intellectual sense, rather than that of risk-assessment.

10. Although claims have been made for the success of behaviourist techniques such as ABA – Applied Behavioural Analysis – in ameliorating some problems of children with autistic spectrum disorders, these are not uncontroversial.
11. This is of course a relative term, falling short of infallibility.
12. On the ancient Egyptian model, Set would generate the chaos and Horus would take care of its management.
13. Where two or more people (one of whom could be the teacher) jointly examine a piece of putative knowledge.

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