Personalised learning: lessons to be learnt

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Personalised learning is now broadly endorsed as a key strategy to improve student curricular engagement and academic attainment, but there is also strong critique of this construct. We review claims made for this approach, as well as concerns about its conceptual coherence and effects on different learner cohorts. Drawing on literature around differentiation of the curriculum, self-regulated learning, and ‘relational agency’ we propose a framework for conceptualising and enacting this construct. We then report on an attempt to introduce personalised learning as one strategy, among several, to improve student academic performance and wellbeing in four low SES regional secondary schools in Australia. We report on a survey of 2407 students’ perceptions of the extent to which their school provided a personalised learning environment, and a case study of a programme within one school that aimed to apply a personalised approach to the mathematics curriculum. We found that while there were ongoing challenges in this approach, there was also evidence of success in the mathematics case.

Keywords: personalised learning; relational agency

Personalising learning

If Matt, a Year 7 student, had to tackle a difficult mathematics problem at school, he would use past experience to try to work it out. Failing that, he would seek peer help. As a last resort, because he does not like to ‘hassle’ his teacher, he would ask for assistance. At home, if he wanted to learn to play a new sport or video game, he would investigate it on the Net for any ‘tips or advice I could find from videos’, and then he would practise. If he still did not understand, ‘I’d ask...
for help from my Dad because he’s into sport as well’. As a high achieving student, Matt has a strong sense of personal responsibility for his own learning and a repertoire of strategies that vary little from school to home. Students from a young age have personal ideas, values, beliefs and strategies about their agency, motivation and role in successful learning. These strategies are culture-, task- and context-dependent, as well as indicative of developmental capacities, and bring into focus critical issues about the assumptions, claims, and rationale around conceptualising and enacting personalised learning approaches. As a Year 7 student in the Australian education system in 2011, Matt is participating in curricula characterised by his teachers as ‘personalised’ to meet his academic and wellbeing needs. Given this construct’s ongoing popularity in policy statements and advice to teachers in primary, secondary and tertiary contexts in various countries, it is timely to review again its claims, strategies, and asserted outcomes.

In this paper we review the origins, rationale, assumptions, and claims for this approach, as well as concerns about its conceptual coherence, underpinning values, and effects on different learner cohorts. Claims include sociocultural, pedagogical, motivational and pragmatic justifications, as well as appeals to its role in curricular reform (Hargreaves, 2005; Paludan, 2006; Sebba et al., 2007; Blanchard, 2009; Drexler, 2010; McLoughlin & Lee, 2010). We also evaluate concerns about its underlying assumptions, conceptual coherence and implied values, proposed implementation strategies, and the quality of research espousing its effectiveness. In reviewing this literature and in drawing on relevant research on differentiation of the curriculum, self-regulated learning, and ‘relational agency’ (Edwards, 2005, 2007, 2011), we propose a framework for conceptualising and enacting this approach to learning. As part of an Australian Research Council project, Improving Regional Secondary Students’ Learning and Well-being (IRL), we analyse an attempt to introduce personalised learning as one strategy, among several, to achieve these goals in four regional low SES Years 7–10 secondary schools in Australia.

**Origins, definitions and rationales for personalised learning**

Educationists broadly agree that the construct of personalised learning, particularly in the United Kingdom, derived from a policy emphasis on personalisation in public services (Campbell et al., 2007; Pykett, 2010). In 2004, David Miliband, Secretary of State for Education and Skills, sought to clarify the intent and novelty of this approach by claiming that it entailed:

... high expectations of every child, given practical form by high quality teaching based on a sound knowledge and understanding of each child’s needs. It is not individualised learning where pupils sit alone. Nor is it pupils left to their own devices—which too often reinforces low aspirations. It means shaping teaching around the way different youngsters learn; it means taking the care to nurture the unique talents of every pupil. (DfES, 2004)
This account implies that personalised learning depends on both effective teacher differentiation of a set curriculum to address diversity of learner needs, and the development of independent learner capacities. However, the exact roles and practices expected of teachers and learners are not specified, other than to claim it is not about individualised student coaching, nor teacher abdication of their role as teachers, nor student development of their own curriculum independent of teacher guidance. From a combined sociocultural/psychological/economic perspective, Paludan (2006, p. 98) argues that personalised learning is an appropriate solution to the challenge of motivating and supporting students this century, and can lead to both personal and national economic benefits. He represents this approach as a necessary reform to the ‘fixed content and fixed timing’ of traditional curricula. He reasonably notes that teachers are comfortable with a call for education to address individual learner needs, particularly where students are increasingly disengaged, even if the details of implementation remain vague. He suggests that student choice in ‘schedule and methodology’ (p. 94) will be easier to implement than opportunities for students to choose or devise their own subjects. From a sociocultural/pedagogical perspective, Hargreaves (2005, p. 34) asserts that personalised learning is the necessary ‘mass customization’ of education, already widespread in other areas, such as in health and other services provision, and in business practice. He claims that several key features are evident when learning is being successfully personalised: students are engaged in learning and schooling, they show responsibility for and independent control over their learning and behavior, they demonstrate maturity in relating to peers and staff, and they co-design learning and teaching experiences. However, subsequent support for personalised learning has tended to remain vague about its distinctive features, representing it simply as a way to improve student motivation and learning outcomes (Department for Education, 2006; Sebba et al., 2007; Meyer et al., 2008; Duckworth et al., 2009).

Not surprisingly, this definitional vagueness has spawned various overlapping accounts of the pedagogies, environments and components reputedly required to optimise personalised learning. For Campbell et al. (2007, p. 140), this approach entails a range of pedagogies that cater for individuals, such as ‘cooperative learning, mentoring, valuing experiential learning, incorporating learners’ personal and social experience, using ICT, and providing individual support’. Various commentators broadly endorse these strategies as likely to promote personalised learning (Leadbetter, 2005; Department for Education, 2006; Sebba et al., 2007; Meyer et al., 2008; Duckworth et al., 2009). Because current mainstream pedagogical practices easily fit this approach, this raises questions about what is distinctive in these teaching and learning strategies. According to Sebba and colleagues (2008) personalised learning comprises five key components: assessment for learning (AfL), effective teaching and learning (including grouping and ICT), curriculum entitlement and choice, school organisation (e.g., workforce remodelling), and beyond the classroom (e.g., extended schools). The UK Department of Education (nd) specified nine elements as features of good practice in personalised learning.
pedagogies. These were: high quality teaching and learning, target setting and tracking, focused assessment, intervention, pupil grouping, the learning environment, curriculum organisation, the extended curriculum, and supporting children’s wider needs. Particular features are not defined, suggesting personalisation could possibly include a return to student streaming, or much more student choice about curricular focus. From a pedagogical/economic perspective, Leadbetter (2005, p. 8) claims that personalised learning should equip children to make ‘choices about which subjects to study, what settings to study in, what styles of learning to employ. But choice is just a means to turn children into more engaged and motivated investors in their own education’. Leadbetter’s account also raises the question of how much agency or executive control should be given to, or assumed by, learners or teachers. With such a wide range of versions of personalised learning to choose from, it is not surprising that Sebba and colleagues (2008, p. 18) reported that ‘there was widespread uncertainty as to what was meant by personalised learning’ in their review of the personalised learning approaches used in UK schools.

**Further critiques of personalised learning**

Some critics charge advocates of personalised learning with conceptual fuzziness (Fielding, 2006; Cutler et al., 2007; Carr, 2008; Hartley, 2009; Mahony and Hextall, 2009; Needham, 2011). Others argue that this approach rests on suspect ideological underpinnings (Beach & Dovemark, 2009; Hartley, 2009; Pykett, 2009, 2010), and fails to address educational disadvantage or equity concerns (Meyer et al., 2008; Pykett, 2009, 2010). Hartley (2009, p. 432) claims that it dubiously combines marketing theory’s interest in selfish consumerism with a nostalgic nod to child-centred education from the 1960s, and that, despite all the rhetoric, ‘little to do with pedagogy or with curriculum has changed’. For Beach and Dovemark (2009, p. 689), this form of learning intensifies a market logic of strategic consumption for able consumers, mobilising ‘material and social resources in schools that support new forms of individualistic, selfish and private accumulations of education goods from public provision’. They claim that the learner is cast as a rational, neoliberal individual who should become a ‘creative, self-reliant and discerning consumer and producer of knowledge’ (Beach & Dovemark, 2009, p. 701). In other words, this model recasts education as a market for exploitation by knowledgeable consumers who operate on self-interest and informed private choice, thus continuing or exacerbating undemocratic educational disadvantage for some groups (Campbell et al., 2007; Meyer et al., 2008; Pykett, 2009). Campbell and colleagues (2007, p. 138) further note that self-motivation and self-regulation are ‘not equally distributed’ across society, and therefore this approach could increase disadvantage for some cohorts of students. For Pykett (2009, p. 393), personalisation turns questions of social justice or fairness of policy into problems about learner attributes, thus avoiding ‘political contestation and critical analysis’. Others criticise it as a misguided alternative to more nuanced
sociocultural theories for how the needs of different learners can be understood and catered for in school (Campbell et al., 2007; Cutler et al., 2007; Beach & Dovemark, 2009; Mahony & Hextall, 2009; Pykett, 2010).

Various critics have also pointed out the lack of fit between a highly prescriptive curriculum and claimed freedoms for learners in personalised learning. Campbell and colleagues (2007) commented that a highly prescriptive age-related curriculum denies real scope for student choice. Cutler et al. (2007) also note that personalised learning is equated with improving test results in the UK, implying that this approach to learning is as much about changing aggregated standards of performance as addressing individual learner needs or goals. These researchers also noted problems around questions of learner choice in the effective co-production of knowledge between learner and teacher, where both learner perspectives and teacher expertise and responsibility interact to address learning goals.

These points bring into sharp focus the question of what degree of student freedom or choice is desirable or necessary in the enactment of personalised learning. We argue, following Moje (2007), that a socially just curriculum needs to provide access for all students to a quality mainstream curriculum, and that this implies necessary productive constraint on both the content and appropriate teaching and learning methods of the curriculum. We agree with Cutler et al. (2007), Mahony and Hextall (2009) and Meyer and colleagues (2008) that there are challenges in implementing personalised learning approaches, particularly around the skillset required of teachers, as well as teachers’ beliefs about flexibility in teaching approaches and student grouping. In questioning various accounts of what personalised learning might mean, these critics raise reasonable questions about the extent to which all or some students might be expected to make personal informed choices about what they learn, how they learn, why they learn, when and where they learn, and whom they learn with or from.

From a philosophical perspective, Fielding (2006, p. 356) argues that an agenda of personalisation can result problematically in various negative effects, such as the manipulative subservience of individuals to ‘high performance’ demands, where organisational purposes override individual needs. However, he also suggests that, appropriately conceptualised and enacted, a focus on developing individual personhood can lead to a desirable ‘person-centred learning community’ (p. 360) with a ‘felt necessity of care’ (p. 366). Such a community will demonstrate relationships between staff, students and parents that are ‘reciprocal, emergent and inclusive’ (p. 364), where a ‘permanent provisionality’ of practices is always responsive to ‘student voice’, and where teachers and students are ‘working and learning together in partnership’ (p. 364), as ‘co-enquirers and co-contributors’ (p. 365). At the same time, he also acknowledges critical commentary around potential blind spots in this kind of community, where flexibility and communal purposes may oppress some members, where the call for productive relationships may fail to mask ‘contested realities’ (p. 362), and where such a community fails to understand its embeddedness in, and dependence on, larger cultural and political contexts.
Outcomes of personalised learning

Very few studies have evaluated the nature of the activities implemented as personalised learning initiatives in schools, or the impact of attempts at personalised learning on student achievement. The largest study of personalised learning in the UK to date was conducted by Sebba and colleagues (2008), who oversaw the collection of questionnaire data in 347 schools and performed in-depth case studies of 13 schools nominated as having effectively implemented personalised learning.

When asked about the initiatives that had been implemented to reflect the school’s philosophy of personalised learning, 54% of secondary schools indicated that most classes were grouped by ability, and 69% of all schools indicated that they used open-ended learning challenges, while 64% indicated that pupil autonomy and choices are encouraged at their school. A large proportion of schools also indicated that they utilised interactive whole-class teaching in order to facilitate personalised learning (Sebba et al., 2008). Targeted interventions (88%), enrichment and extension for all (77%), gifted and talented programmes (71%) and topic days/weeks (71%), were the most frequently cited curricular initiatives to achieve personalised learning (Sebba et al., 2008). New roles for support staff (72%), distributed leadership (68%) and pupil representation in policy making (63%) were the most frequently cited changes to school organisation as a result of personalised learning initiatives (Sebba et al., 2008).

Of initiatives ‘beyond the school’ that were specific to personalised learning, partnerships with parents and the community (92%), working with other education institutions (89%) and ‘the extended school’ (76%) were the most frequently cited (Sebba et al., 2008). Finally, School Council (89%), mentoring (77%) and advice and guidance (77%) were named as the most common personal and social development initiatives that reflected the schools’ philosophy towards personalised learning. In their survey responses, most schools and teachers agreed that the implemented personalised learning strategies had ‘some’ or ‘considerable’ impact on student attainment and engagement at school (Sebba et al., 2008). However, Sebba and colleagues’ study suffers from several limitations. It limited participant schools to enumerating specific strategies for implementing personalised learning from a range of strategies promoted by the UK Department of Education and Skills. Assessment of student attainment and engagement depended on teacher opinion rather than any quantitative measurement, and some participants experienced difficulty in understanding what was meant by the term ‘personalised learning’.

More recently, Stockhill (2011) conducted in-depth interviews with five head teachers in secondary schools in the UK to obtain their perceptions of the curriculum innovations, impact on teaching and learning, and increased knowledge of students that resulted from personalised learning. Head teachers indicated that curriculum innovation, setting targets and the focus on tracking students had the greatest impact on student learning, and that these strategies were more effective than the explicit teaching of learning skills, and a focus on literacy and numeracy.
Although this study was very small and focused, it was interesting to note that not all heads of department believed in personalised learning as a philosophy. In fact, one head suggested that ‘personalised learning is one of these things that comes and goes. It’s a bit of jargon’. However, all were able to identify the benefits of innovations that had taken place in their schools as a result of this approach.

This brief review indicates ongoing challenges in conceptualising and implementing a personalised learning approach.

Conceptualising and enacting personalised learning

A personalised learning approach need not imply a naïve return to student-centred freedom and a student-generated curriculum, nor crass marketisation of individualistic education, nor depersonalised regimes of standardised testing. Rather, its particular character depends on the understandings, practices and outcomes for teachers and learners in schools enacted in its name. In seeking to contribute to conceptualising personalised learning, drawing on philosophical, sociocultural and pedagogical perspectives, we are aligned with Fielding’s (2006) account of the centrality of developing personhood for all participants in this approach, and also share Hargreaves’ (2005) view of the need to change how students experience learning and the defining features of personalised learning in action. However, we suggest that personhood and academic attainment need not be uncoupled, provided that teachers can engage and guide individual students in a meaningful curriculum. We would also want to acknowledge differences as well as similarities in the responsibilities, goals, constraints, learning needs and roles of teachers and students in this approach to education, specifying more precisely their roles as ‘co-enquirers and co-contributors’ (Fielding, 2006, p. 365). We also view personalising responsibility for learning as necessarily developmental, and therefore requiring a range of teacher and learner strategies, experiences and understandings over an extended timeframe, leading to eventual student capacity to co-design their curriculum with their teachers.

From our perspective, the capacity for a school curriculum to enact a personalised approach to learners and learning depends on many factors, including school leadership, teacher skill sets and practices, and learner capacities and goals. Teachers need the expertise, time, resources and teamwork to develop a flexible curriculum that is adequately structured in content, learning tasks, and adaptable classroom practices to engage all learners and address contrasting learner needs. This need not imply fixed labelling of learner capacities and long-term streaming, but rather ongoing responsive flexible programming to each student’s needs. We would argue that a further critical element in this approach is the ‘relational agency’ (Edwards, 2005, 2007, 2011) among teachers, and between teachers and students, to achieve teaching and learning goals. We also suggest this relational agency operates within a ‘nested agency’ in the development of differentiated curricula and learners’ self-regulatory capacities. From this perspective, learning can be personalised for students when there is a productive
interplay between (a) teacher expertise in identifying and addressing students’ ongoing individual curricular needs, and (b) student capacity to develop, over an extended timeframe, increasing independence as learners (see Figure 1). The construct of ‘nested agency’ recognises that the agency of both groups as they interact is constrained by structural, cultural and pedagogical assumptions, regulations, and practices, including prescriptive curricula, and actual and potential roles and responsibilities of teachers and students in school settings.

Relational and nested agency, differentiated curricula and self-regulated learning

For Edwards (2005, 2007, p. 4) ‘relational agency’ refers to a capacity for professionals to work with other professionals to develop a ‘network of expertise’ to serve shared goals, where the agency of individuals is built around distributed intelligence and diverse expertise across the group. Rather than emphasise individual action, Edwards (2007, p. 6) foregrounds ‘responsibility to and for others’, where a shift to the relational is ‘an important move in the development of meshes of mutual responsibility’. Edwards (2011, p. 39) does not deny the importance of individual expertise, but argues that confidence in one’s own expertise in combina-
tion with recognition and understanding of the perspectives of other practitioners builds an expanding common knowledge (in this case of teacher professional needs and student curricular needs) that ‘mediates responsive professional action’. In enacting this mutual responsibility, Edwards (2011, p. 35) notes the need for participants to (a) demarcate power in decision-making to both clarify and ensure spheres of influence, (b) focus on ‘the whole child in the wider context’, (c) create and develop better tools for collaboration, (d) refine processes for sharing knowledge, and (e) continuously review socially-constructed boundaries to ensure that they serve shared long-term goals effectively.

While this construct of relational agency is clearly applicable to teachers working in interdependent teams to design, implement, and evaluate curricula, we consider that teachers’ interactions with students can be viewed similarly. From this perspective, personalised learning entails mutual responsibility among teachers, teachers and students, and among students, where teachers are responsible for designing and implementing a curriculum that (a) engages all students, (b) provides opportunities for differentiated teaching and learning that addresses group and individual student needs, and (c) motivates and develops students’ capacities to become independent learners. For their part, students are responsible for their learning through participation in these curricular tasks, connected experiences and opportunities. This account of personalised learning does not imply that teachers abdicate their roles, or that students develop independent curricula, or that they operate as individualistic ‘consumers’ of educational smorgasbords. Rather, a relational agency of mutual responsibility is developed between teachers and students.

At the same time, this agency is constrained by various factors, including prescriptive curricula, particular assessment regimes, the organisation of the curriculum, perceived and actual teacher and student roles and responsibilities in and beyond the school setting, and broader social and cultural expectations about norms for teaching and learning processes. Low SES students are also constrained typically by low aspirations, histories of modest academic achievement, and low self-efficacy that may hinder their willingness and capacity to participate in co-regulated learning (Domina & Saldana, 2011). Students have nested agency within the constraints on agency operating on teachers around their practices within school and larger education systems. Whether these constraints function productively or otherwise for both teachers and students depends on the practices that can be perceived and developed within this nested agency. We argue that well-designed curriculum differentiation coupled with a developmental approach to learner self-regulation and growing independence can support relational agency within these constraints.

Differentiating the curriculum in order to personalise learning

This approach aims to motivate students and produce more effective learning by developing a curriculum that acknowledges and addresses individual differences (Stradling & Saunders, 1993; Tomlinson & Kalbfleisch, 1998; Tuttle, 2000;
Strong et al., 2001; Tomlinson 2001; Subban, 2006). Jackson and Davis (2000) and Tomlinson (1999) claim that differentiation can occur across three dimensions: content (what students should know and be able to do, and the materials that will support them in their learning); processes (the activities that help students make sense of their learning); and products (the range of evidence students provide of their learning). Features of a differentiated classroom according to Tomlinson (1999) include:

- concentration on understanding key principles and critical concepts;
- integration of assessment and instruction;
- modification of content, processes and products where necessary to ensure that learners grasp key knowledge or skills;
- participation in respectful, meaningful and challenging work in the students’ zone of proximal development (Vygotsky, 1986);
- establishment of a collaborative and student-oriented atmosphere where teachers and students plan, set goals and learn from their efforts together;
- balancing of group and individual goals to ensure personal development, and use of a wide range of instructional strategies in a flexible classroom environment that moves between individual, small group, and whole group activities based on need.

By contrast, various critics have long regarded differentiation as creating and legitimating the very differences it claims to accommodate by creating a pedagogical imperative to reify student differences, and adopt a style of selective, streamed teaching at odds with mixed ability teaching (Dowling, 1990; Goldstein & Noss, 1990; Hart, 1992). However, Jackson and Davis (2000) argue that Tomlinson’s concept of a flexible classroom environment refers not to long-term streaming or tracking, but to short-term differences in content or strategies specific to particular units, based on responses to students’ performance (Jackson & Davis, 2000, p. 83; Tomlinson, 1999). The goal of differentiated instruction for all students is to enable them to meet high academic standards and develop their full academic potential (Jackson & Davis, 2000, p. 83). Jackson and Davis (2000) and Tomlinson (1998) acknowledge two significant challenges with implementing differentiation: teacher time, skills and resources to implement differentiation; and parental belief that equity requires educational sameness in the treatment of students. Tomlinson et al. (2003, p. 135) suggests that this approach can only work if there is ‘persistent, sustained leadership and support’. Susan Hart (1992) notes that achieving equality and excellence for all children should depend on the quality and characteristics of the curriculum rather than learners’ abilities and characteristics. Stradling and Saunders (1993) report that teachers can develop an effective differentiated curriculum when they know how to use diagnostic assessment as a resource for analysing student performance to guide design of future learning tasks, and where they regularly exchange ideas on successful teaching and learning methods.
A personalised learning approach entails constructing a curriculum that is robust enough to meet the needs, and develop the capacities, of all students. Tomlinson (2005) suggests that course content needs to accommodate individual differences within a set of learning activities that ensures all students learn in ways that match their readiness, interests and learning profiles, with support from peers and teachers. Recent contributions to this agenda include the development of universal design for learning (UDL) and backward design of the curriculum (McTighe & Brown, 2005). UDL was first coined in the field of architecture around the issue of improving accessibility for people with or without disabilities (Messinger-Willman & Marino, 2010), and then adapted to educational purposes in the US. Based on brain function research, this approach to learning entails nine guidelines to develop flexible learning environments to address learning differences (National Centre on Universal Design for Learning, 2011). Drawing on cognitive psychology, backward design seeks to integrate standards-based education and differentiated curriculum as ‘two sides of the same accountability coin’ (McTighe & Brown, 2005, p. 235). McTighe and Brown (2005, p. 236) suggest that research studies by Marzano (2004) and others support the use of four key principles to differentiate approaches to learning and assessment:

- curriculum standards need to be unpacked and revisited multiple times to ensure that students understand the key concepts underlying their learning;
- students learn best from purposeful, inquiry-driven activities in which they are situated at the centre of the learning process;
- assessments should require students’ explicit demonstration of understanding in multiple ways;
- effective instruction accommodates differences in learners’ readiness levels, interests and learning profiles.

McTighe and Wiggins (1998, 2004) claim the need for a three-step planning sequence for curriculum should begin with identifying the desired results, then determining the assessment evidence, and finally planning the learning experiences that will lead to the desired results. They claim this approach ‘provides the structure to support flexibility in teaching and assessing, to honour the integrity of content while respecting the individuality of learners’ (McTighe & Brown, 2005, p. 242). They also claim this approach preserves standards without standardisation by respecting both curriculum and learners. However, Subban (2006, pp. 942–943) notes that research on student learning outcomes for programmes that attempt to differentiate learning goals, methods and assessment, according to student need, reveals only mixed success. This may further reflect the significant challenges for teachers in developing more flexible curricula, and changing to more responsive teaching styles. For their part, students need to learn how to become ‘self-regulated’ learners in order to motivate, monitor and manage their own learning.
Self-regulated learning

Self-regulated learning (SRL) had its origins in cognitive models of key enablers of learning, namely student ‘will’ and ‘skill’ to succeed (Pintrich & de Groot, 1990, p. 38). Students need to be both motivated to learn and know how to achieve worthwhile curricular goals. These starting points for SRL have been augmented by accounts of contextual factors and their interplay as crucial to improving academic success. SRL is now broadly defined as the constructive and intentional use of personal strategies to achieve academic and well-being goals (Butler & Winne, 1995; Boekaerts & Corno, 2005). Students should be provided with opportunities to self-assess as a basis for developing a repertoire of regulatory learning strategies (Zimmerman, 2002). They should be asked about what strategies they use, as well as how and when they are used, or how they would describe what they do before, during and after a task. Metacognitive development is understood as gains in knowledge, awareness and control over an individual’s learning, leading to purposeful improvement of performance. Duckworth and colleagues (2009) recommend that the two integral elements of SRL, thinking strategies and self-efficacy through self-esteem, are best incorporated explicitly into the broader curriculum. Regulation of cognition is understood as conscious learner monitoring and control of learning processes (Pintrich, 2002). Pintrich’s (2004) widely adopted model of SRL involves: (1) forethought, planning and activation (planning and enacting behaviour such as effort and persistence); (2) monitoring (such as tracking task requirements); (3) control (such as adapting behavioural strategies to ensure task completion); and (4) reflection (such as use of self-assessing strategies achieve task requirements). Self-regulating learners therefore take responsibility for what and how to learn by self-directing or self-steering their thinking and actions (Boekaerts & Cascallar, 2006). For Zimmerman (2008), independent learning or self-regulated learning refers to the degree to which students are metacognitively, motivationally and behaviourally active participants in their own learning processes.

These capacities are now clearly understood as developmental, requiring initial and ongoing explicit guidance, meaningful modelling, and co-regulation by teachers to develop student independence and self-reflection skills over time (Veenman et al., 2006; Duckworth et al., 2009; Hadwin et al., 2011). In this way students can learn how and why to differentiate their own strategies as they engage with different learning curricular tasks. The need for an explicit teacher focus on how and why SRL matters and its contribution to academic attainment seems particularly justified with low SES students who are likely to be disengaged from school, unclear about effective learning strategies, and struggling to meet expected year-level progression standards (Domina & Saldana, 2011). At the same time, despite extensive research, SRL remains a meta-concept with no definitive fine-grain model of implementation (Greene & Azevedo, 2007). This suggests that each aspect of implementing SRL requires context-specific research, including examination of (a) how teaching strategies enable self-regulated learning processes and...
activities, and (b) the way students select and regulate their learning strategies within different self-regulatory contexts and opportunities.

**Research context**

This study was conducted in 2011 in a cluster of four Years 7–10 schools in a large regional city in Victoria, Australia. Each school conducts teaching and learning programmes in newly designed buildings with a mix of open learning areas and designated curriculum areas for particular subjects such as science and art. Schools in the cluster are organised into learning communities of about 150–300 students, with some schools mixing year levels in these communities, and others focusing on a single year cohort. The schools aim to introduce personalised student learning plans and a more flexible approach to learning pathways and choices for students in Years 7–10 (Bendigo Education Plan, 2005). In addition to teaching the curriculum in timetabled classes, teachers are expected to function as individual advisors to groups of 16–25 students to support their approach to academic goals and wellbeing needs.

The design of the schools assumes that students will work in a range of actual and virtual contexts, including formal lessons, informal work areas, and larger open spaces for presentations and performances as well as virtual communities. Teachers are expected to identify and address the learning needs of individual students, and to develop a personalised curriculum that combines a planned curriculum programme of teaching and learning opportunities with more individualised and group-negotiated learning tasks of varying degrees of duration. The schools’ student population is drawn predominantly from low socio-economic groups with most from an Anglo-Celtic background.

**Research aims and methods**

The research aimed to identify enablers, constraints, and outcomes in implementing a personalised approach to learning in these schools. The research used a case study approach, incorporating analyses of quantitative and qualitative data (Yin, 2008; Greene *et al.*, 2006; Tashakkori & Teddlie, 2010), entailing analyses of (a) a survey of the whole student cohort, and (b) the application of a personalised learning approach to mathematics in one school. The survey (Personalised Learning Questionnaire, PLQ) was developed to evaluate students’ perceptions of their readiness to learn, assessment processes, engagement, extent to which their learning is personalised, and to relate these to academic efficacy, academic achievement, and student well-being. The survey was intended to identify current students’ perceptions of these aspects of personalised learning as a basis for designing interventions. Survey items were developed following an extensive literature review involving the analysis of over 50 policy and research papers on personalised or individualised learning practices, characteristics, principles, and techniques, as
well as aspects of self-regulated learning. This instrument employed the latest scales to assess a range of personal learning plan indicator variables, with all scales modified for use in an Australian context, and the total number of items kept to a minimum. Based on this review of policy and research papers, the following dimensions were deemed salient to the present instrument: self-directed learning (including self-management, desire for learning and self-control) (Fisher et al., 2001), teacher support (Fraser, 2007), personal relevance, shared control (Taylor et al., 1995), student engagement (emotional, cognitive, behavioural) (Wellborn & Connell, 1987; Pintrich & de Groot, 1990; Gonida et al., 2007), congruence with planned learning, authenticity, student consultation, transparency (Waldrip et al., 2009), academic efficacy (Midgley et al., 2000), peer relationships, self-report on disruptive behaviour, individualisation and the opportunity for personal and social development (Engels et al., 2000, 2004; Aelterman et al., 2002; Van Petegem et al., 2007).

Sets of items that were conceptually linked with each salient dimension identified above were then written. Because of the need to limit the length of the instrument, it was decided to write a set of five items for each dimension and subject these to measurement scrutiny with a goal of having three or four per scale in the instrument. Accordingly, a pool of 110 items was checked for faults and ambiguities by a group of academics with expertise in educational and psychological measurement and school assessment. Particular attention was paid to the face validity and the scale allocation of each item. The result of this review process was a 66-item instrument with 19 scales. The PLQ (trial form) was field-tested with 230 students. The internal consistency reliability (Cronbach Coefficient $\alpha$) of each scale ranged from 0.69 to 0.90 and the discriminant validity (mean correlation of each scale with the remaining scales) ranged from 0.15 to 0.42. Discriminant validity data indicated that the scales overlapped. The instrument was then shortened so that it could be administered within class pastoral time to younger students. A consequence of this was that for some scales, the reliability was reduced. The final version of the survey was administered to over 2400 students, from Years 7–10 in the schools, with equal gender representation and grade level. The reliabilities ranged from 0.76 to 0.91. Figure 2 shows scales that measured students’ perception of personalised learning, including scales that reflected personalisation of the environment.

Quantitative and qualitative data were collected for the mathematics study, incorporating analysis of student mathematical achievement and five one-hour interviews with the principal, the educational consultant, and three teachers at the school involved in the case study. Student perspectives were also identified through surveys and focus group interviews with students at each year level (two groups of five students per level). Analysis of the interviews focused on identification of patterns in participant responses (Merriam, 1998; Denzin & Lincoln, 2008; Yin, 2008), leading to the development of themes in the light of relevant literature.
Findings

The PLQ survey provided baseline data for each school to consider over the next few years as well as stimulating a forum for teachers to discuss responses to scales they wanted to sustain, and those they wanted to modify. The scales revealed a general decline in perceived levels of personalised learning from Years 7 to 9 and then a distinct increase in Year 10, where students were encouraged to consider their future options in relation to work and study. However, these positive responses did not match the commencing level of the Year 7s. The more positive scales in students’ perceptions were the self-directed learning scales of self-management, desire for learning, and self-control of learning, as well as the scale that examined the extent of teacher support. This suggests that many of the students felt motivated, able to learn, and recognised their teachers’ efforts to support them. The least supported scales involved shared control between the teacher and students in guiding learning, and the assessment subscales of authenticity of tasks, student consultation with teachers about their work, and the scale of individualisation that focuses on differentiation of learning tasks.

Student perceptions suggest that although teachers are committed to providing a personalised, supportive learning experience, they are uncertain about the degree of control and choice to be offered to students. This suggests that teachers need to find ways to encourage and enact student ‘voice’ in addressing this issue (see Fielding, 2004). Teachers are concerned about students meeting curriculum demands and assessment standards, and have doubts about students’ abilities to make appropriate decisions about their learning. We argue that the least supported
scales offer an opportunity for teachers to reflect on ways they can increase student participation in planning and executing their own learning. Staff members at each school were given feedback on these data and they identified components of students’ responses to the survey that they wanted to address.

In each school, teachers have worked in teams to design, implement and evaluate programmes that explicitly focus on a personalised approach to the curriculum for students. In the following case study we report on one such programme around differentiating the mathematics curriculum.

**Mathematics case study**

*Context*

Prior to the implementation of a personalised, differentiated curriculum, mathematics teachers in the case study school worked in traditional classrooms with students of wide-ranging abilities, using age-related textbooks with no common curriculum. Over 2010–2011, the school was rebuilt with four open learning spaces, organised into four Years 7–10 communities of approximately 150 students. Each community has a junior years (7 and 8) and a senior years (9 and 10) section, physically situated at each end of the building with common space between, led by a learning community leader. The timetable is organised into five periods a day. Students meet at the start of each day with two teacher advisors in year-based groups of approximately 25 for 20 minutes. The remainder of the day is structured into four 70-minute classes. The school's policy is to prioritise English and mathematics in line with state and regional objectives to improve learning outcomes for regional secondary students. To meet this objective, these two subjects are accorded four 70-minute lessons a week over four days.

National tests demonstrated that student performance at the college was well below national averages (see Table 1), while attitude-to-school surveys revealed students were disengaged with mathematics and unmotivated. The principal sought to improve mathematics achievement scores and student motivation through employing a consultant with expertise in learner motivation and mathematics education. This appointed consultant had extensive experience in mathematics education and guiding teacher professional development. She worked with the learning community leaders and teachers in a sequence of workshops that focused on improving teacher mathematics knowledge and diagnostic assessment skills to guide future learning, as suggested by Stradling and Saunders (1993). Through a consensual process the staff members established protocols around learning and behaviour in each community that they all agreed to reinforce consistently. Enablers in the process included principal enthusiasm and leadership, consultant expertise, positive staff attitudes towards adapting to change, and useful textbook resources to enable the curriculum to be differentiated. Constraints included: a lack of trained mathematics teachers; some negative staff beliefs about the degree to which they should be held accountable for student learning, given
their perception of student capacity and willingness to learn; negative staff atti-
tudes to change to team-teaching approaches in open learning environments; and lack of a common vision.

Implementation strategies

The consultant gathered student data from national tests, surveys and selective interviews to gain an accurate picture of student achievement, motivation, desires and needs, confirming the students’ desire to learn and progress. She presented the data to the principal and then worked further with coordinators and mathematics teachers to improve teaching and learning in this subject. Data were then presented to staff and, through a consensual process, staff members established protocols around learning and behaviour in the community that all agreed to reinforce consistently. The consultant then worked with the teachers to devise an effective differentiated curriculum based on use of existing textbooks. The curriculum was differentiated in practice by providing a programme where (a) students were placed in groups in appropriate levels, and (b) workshops were provided with explicit teaching to support student learning. All students worked on one unit at a time but at different levels. To motivate students and give them a goal to work towards, the consultant devised pre-tests with the teachers. Students were given feedback on actual and expected progression levels, with post-tests confirming progress.

This co-regulated learning through goal-setting, differentiated curriculum, formative assessment and feedback contributed to a sense of relational agency between the teachers and students. Teachers led small-group workshops to address individual student needs and build skills and mathematical knowledge, while students worked with a range of stage-appropriate resources, including ICT resources, to encourage independent learning. Providing a variety of mathematical experiences was seen as a motivating factor to meet diverse learning needs and sustain student interest. Staff members worked in teams where each had a role and responsibility for student learning, with each staff member responsible for devising a pre-test and post-test for one section of the unit. Classes were taught in blocks so that two or three teachers grouped with a large number of students enabled flexibility for teachers and students. Staff accountability entailed staff members consistently reinforcing protocols of community behaviour. Staff members assisted students to set appropriate goals. They revisited goals periodically, checked and signed off on satisfactory completion of work, and gave individual students feedback and encouragement. The mathematics coordinator and staff received ongoing professional development, with the consultant providing workshops and individual coaching to challenge their personal beliefs about teaching and learning, developing their expert knowledge and skills in teaching mathematics curriculum, and reinforcing key concepts and procedural knowledge. In this way, the programme was informed by relational agency among the teachers, and among teachers and students to develop an effective differentiated curriculum that was personalised to meet individual students’ capacities and needs in mathematics.
Outcomes

Outcomes noted by the principal, mathematics coordinator and the consultant included an improvement in student motivation and desire to learn, evident in increased homework, more self-directed learning, and more positive attitude-to-school survey and Australian Research Council survey results. There was also increased cooperation amongst teachers, operating at higher conceptual levels and planning together. In interviews students claimed to be more motivated, and expressed pride in their achievement gains. Significantly, these perceived qualitative gains can be measured quantitatively as improvement in academic attainment ensued, evident in gains in national testing data that were above state average gains for 2009 to 2011, Year 7 to Year 9 (see Table 1).

The Australian government introduced the National Assessment Program—Literacy and Numeracy (NAPLAN) tests in 2008 as a nationwide compulsory assessment of basic skills in literacy and mathematics. NAPLAN is a simple form of data with a ‘one size fits all’ approach to assessing and measuring students’ abilities and progress. The results place the students on a scale that compares them to all other Australian and Victorian students of their age group. The trial mathematics programme has run in this school for three years (2009–2011). Using the school’s NAPLAN (numeracy) data for Year 7 in 2009 and Year 9 in 2011, it was possible to compare directly the growth in the 2011 Year 9 cohort that has been participating in the trial mathematics programme for three years (2009–2011). As Table 1 demonstrates, the analysis of the NAPLAN (numeracy) data trends over these three years has shown that the cohort of 2011 Year 9 students who have participated in this intervention have demonstrated growth in Numeracy of 46 points since Year 7 that exceeds the average growth expected in Numeracy for this cohort of 39.7 points (when compared with the Victorian state-wide Year 9 (2011) NAPLAN Numeracy data trend from Year 7 to Year 9).

We are aware that personalisation is ultimately about the perceptions of students, and that a Hawthorne effect from the work of the expert consultant in the new settings may explain some of the gains. However, this outcome is promising. This result of exceeding expected growth in NAPLAN (Numeracy) indicates that

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<tr>
<th>Table 1. Victorian NAPLAN Statistics</th>
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<tbody>
<tr>
<td>Victorian NAPLAN Statistics</td>
</tr>
<tr>
<td>Average Raw NAPLAN Score</td>
</tr>
<tr>
<td>Matched Cohort Raw NAPLAN Score</td>
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<td>Victorian Average Raw NAPLAN Score</td>
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<td>Difference A–B</td>
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the trial programme has had a measurable effect on numeracy in this cohort where the deficit between this cohort of Year 9 students and the Victorian state average has been reduced by 6.3 points in two years, and therefore should be considered an effective framework for teaching mathematics in this and similar contexts. This learning outcome also concurs with Domina and Saldana’s (2011) findings that an intensive focus on the mathematics curriculum benefits low SES learners.

Implications and conclusion

In this paper, while acknowledging a range of reasonable concerns around past and current accounts of personalised learning, we have presented a framework for conceptualising and enacting teaching and learning programmes and practices that we consider align with this approach. We have argued that the core features of this approach entail strong teacher teamwork in devising, enacting and evaluating a differentiated curriculum. This approach is built around teacher expertise and mutual responsibility between teachers and students, with the long-term goal of developing student self-reliance and independence in learning. Personalised learning depends on the expertise of teachers to support students’ meaningful goal-setting, accompanied by the provision of an engaging curriculum that offers timely strategies and learning experiences to address student goals.

Our study of four Australian regional low SES schools indicates that there are challenges in achieving improvement in these students’ academic attainment and wellbeing. However a personalised learning approach has potential to address these goals if an effective curriculum is established that enables relational agency among teachers, among teachers and students, and among students. This is evident in the success of the differentiated mathematics programme at one of the schools, where students who are traditionally thought of as unlikely to succeed in this high stakes subject are showing evidence of improved performance. Matt, our Year 7 student, already has a strong sense of relational agency with his peers, teachers and family, and makes use of current resources for achieving independent learning. The challenge for his teachers, and teachers in similar contexts, is to contribute to the growth and distribution of this sense of relational agency more broadly across students in the school. We have argued that personalised learning, while also representing a significant curricular challenge for teachers, has the potential to support this goal.

References


