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Organisational Innovations in Senior L/earning:
An exploration of the 'hub and spoke' organisational mode for integrating schooling and work

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Bernstein's (1977) conceptualisation of relationship between school and work in terms of contestation over their isolation versus integration can be questioned for excluding environmental considerations from concerns about education and production. This paper uses a case study of an Australian 'hub, spoke and zonal' mode of organising *Vocational Education and Training in Schools* (VETiS) to explore this question. Policy-driven, organisational innovations that link learning and earning promise to improve the curriculum offerings and outcomes for young adults in Years 10-12. Publicly available statistics and documents from the Queensland Mineral and Energy Academy (QMEA) and its constituent schools have been analysed. The ambivalent positioning of vocational education and training in the core curriculum and variability in key outcomes for young adults provide insights into the correspondences and contradictions in combining learning and earning, while neglecting environmental issues.

Introduction

The 'hub, spoke and zonal' mode of organising collaboration among schools, and between them and industry represents a potentially significant innovation likely to benefit young adults in Years 10-12. Bernstein's (1977) conceptualisation of an integrated relationship between education and production provides grounds for Australian Governments' (MCEETYA 2009) reforms which are institutionalising Vocational Education and Training in Schools (VETiS). Whether Bernstein's (1977) conceptual framework for organisational innovations such as this provide any added advantage to students in terms of curriculum offerings and outcomes requires further investigation. This paper takes the Queensland Mineral and Energy Academy (QMEA) as a case study of 'hub, spoke and zonal' model for organising provision of VETiS. To explore the potential of this organisational innovation in realising national policy goals it analyses the QMEA's constituent schools involvement in VETiS. The data collected for this study comes from the 2007 Annual Reports by schools and the 2008 Next Steps survey into the post-school destinations of Year 12 completers. This evidence has been analysed for what it reveals about organisational innovation in linking earning and learning through VETiS.

Conceptualising the relationships between school and work

Bernstein's (1977) seminal account of the relationship between education and production is useful for conceptualising organisational innovations in VETiS. A rigid classification exists wherever the principles, contexts and possibilities of education are not integrated with those of production. If the classification governing the context, processes and possibilities for education and production is flexible, integration occurs. The linking of learning and earning in Australian polices (MCEETYA 2009) via the concept 'Senior L/earning' speaks to this flexible integration of schooling and work. Australia's Federal, State and Territory Governments are 'working with all school sectors to support the senior years of schooling and the provision of high-quality pathways to facilitate effective transitions between further study, training and employment' (MDEGYA 2008, 12). VETiS is now a major element of Senior L/earning:

> The next major stage in the development of this pathway is to ensure that VET in Schools programs become a fully integrated and sustainable feature of senior secondary schooling. (MCEETYA 2009, np)

Schools now encourage young adults to pursue vocational qualifications to increase their opportunities for employment. This is a challenge because work and learning were once largely cut-off from one another. The historical separation between production and education created a sense of autonomy for Years 10-12. This rigid classification between the two creates 'a division of labour between those who are located in production and those who are located in cultural reproduction (education): that is, between power and control' (Bernstein 1977, 175). Moreover, the autonomy of education, which is more apparent than real creates 'the appearance of objectivity, of neutrality, … of altruistic purpose and dedication' (Bernstein 1977, 190).

Where there is a strong organisational divide between the producers and reproducers of knowledge this ensures that 'the creation of … schools is carried out by reproducers, not producers' (Bernstein 1977, 186). If this apparent autonomy can be fortified, then it reduces the direct penetration of production. A distinction can be made between and within 'societies where education no longer possesses apparent autonomy and societies where education does' so (Bernstein 1977, 189). Increasingly, Australian schools are broaching this divide. Most VETiS is now integrated into Australia's National Quality Training System, meaning that it is

> part of a system of vocational education and training, which was developed by and for industry. VET structure and philosophy is very different from that which has dominated secondary schooling in Australia and could be expected to substantially challenge the organisation and culture of secondary schools. (Dalton and Smith 2004, 508)

Changes in the mode of production emerge before changes in the organisation of education, suggesting 'the dependency of education upon the mode of production' (Bernstein 1977, 186-7). Schooling began to take its present organisational form in the Middle Ages (Hamilton 1989), and has been the object of innovation ever since. Over time schooling has been re-organised in accordance with changing ideas about equality, inequality and quality, as much as the mistaken belief that 'education can do everything' (Hamilton 1989, 152). Changes to the organisational structures such as

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creating classes, classrooms and multi-classroom schools affect their pedagogy and philosophy. Today we take for granted the idea of 'class' as being part of schools, but this was not always the case (Hamilton 1989, 36). The formation of classes was weakened both by irregular pupil attendance and frequent teacher turnover therefore there was not any direct organisational connection between instruction and the use of classrooms.

Then how was teaching and learning organised? A strong organisational separation arose 'between small group individualised instruction (in classrooms) and large-group simultaneous instruction (in schoolroom galleries)' (Hamilton 1989, 105). In 1836, a schoolroom was described as having 'seats all round and a rising platform or gallery at one end … for the purpose of teaching the children in classes' (Hamilton 1989, 105). A key organisational driver for class-based 'instruction' was to orchestrate the presence of teachers and to provide a basis for closely observing students. It was these organisational advantaged – managerial and pedagogic – that eventually brought the 'classroom system' into being (Hamilton 1989).

The mode of school organisation we have today is a product of the technological and ideological changes of the late 18th century (Hamilton 1989). The organisation of classroom-based schools seemed to solve the problem of giving form and function to schooling in increasingly industrialised societies. Organisationally the multi-room schools brought teachers, classes and rooms into a one-to-one relationship. Each room was intended to house a single class; and each class was in the overall charge of its own certificated 'class' teacher. Multi-room schools, built on more than one level, did not just happen. They developed out of debates about education and its relations with society, especially production. For instance, it was held that the 'civilising influence' of schooling would be weakened if more than 250 pupils occupied the same institution (Hamilton 1989). This thinking produced the comprehensive high school, the purpose of which was to form 'citizens' and effect structural harmonisation.

The rigidity and/or flexibility in the connections between learning and earning in Years 10-12 is linked to patterns of schooling and work that persist from previous years. Technical and Further Education (TAFE) was once 'the near monopoly provider of VET' (Chappell 2003, 24), but now there are many agencies competing to provide vocational programmes and services, including secondary schools. The increasing retention of students to Year 12 requires schools to change the way they organise 'the delivery of programs to meet the needs of all students' (Dalton and Smith 2004, 518). VETiS emphases learning skills, capability-based training and competency frameworks based on industry-oriented training. VETiS programmes are organised for delivery both on and off-the-job; by public, private and non-governments providers; in workplaces and in classrooms; in schools, colleges and in-house; face-to-face, on-line and by distance, and by education and training practitioners with different qualifications and work experience. These changes have increased 'the organisational complexity of the VET system' in Australia (Chappell 2003, 25). Not surprisingly, VETiS poses significant challenges for the organisation of secondary schools. Chappell (2003, 25-6) notes that

> capability-based training, recognition of prior learning, the extension of public accreditation and other regulatory processes to industry, enterprises and non-government providers, the development of a qualifications framework and the production of training packages have all been measures designed to facilitate this integration.

School-to-work transition (STWT) was the first focus for re-organising education/production relations. The success of STWTs is integrally related to organisational changes in schools. Stokes and Wyn (2007, 503) found that young people's schooling was not organised to recognise their part-time work. While they were employed during the earlier years of secondary school they had often given it up in the final years to focus on study. Now work-integrated learning promises to help young adults obtain the Senior L/earning that can position them favourably in increasingly complex labour markets. Students are now offered three interrelated pathways: 'Overall Position Pathway (OP), Employment Program Pathway (EP) and Integrated Program Pathway (IP)' (Senior School EXPO 2009, np). OP is for students interested in 'pursuing entry to university anywhere in Queensland or Australia directly after Year 12 … [EP] is best suited for students interested in pursuing a trade … [IP] is for students who have an interest in BOTH academic subjects and vocational subjects' (Senior School EXPO 2009, np).

The mode of education under conditions of advanced, global capitalism is now becoming more complex. To effect the organisational integration of selected Queensland schools with that State's minerals and energy industry, and to provide students with improved transition from school to work in this area. Now schools are being re-organised to form an extended learning/earning community through initiatives such as the QMEA and its constituent schools. The intention is to create better pathways for students into tertiary education, or full-time work or both. While this may make the organisation of Senior L/earning more complicated, it promises to be effective and beneficial for students.

However, we can still find 'at different levels a broad correspondence, but also apparent contradictions' in Bernstein's (1977, 184) theory. In this way, school-industry knowledge of minerals and energy may be different from the knowledge produced from an environmental perspective. While education is dependent upon production, what degree of autonomy do they possess from the natural environment in constituting them? The contradictions in the relationship between education and production in Bernstein's (1977) theory are now evident in the absence of the natural environment in his account. Around 2.5 million 'green' jobs will be created in Australia over the years to 2025, and 7.5 million by 2050 (Hatfield-Dodds, Turner, Schandl and Doss 2008). However, the distinction and separation of education and production from the environment is evident in Australia where "there is no overall picture of the types of jobs graduates in this sector have undertaken, which has limited the advice that can be given about environmental careers" (Thomas et al 2007, 97). Hardy (2008, p.168) contends that Australia's green jobs 'may be ranked among the most precarious work in the OECD'. Thinking about the apparent autonomy versus systematic relationship among education, production and the environment can help to identify associated contradictions and correspondences in the re-organisation of the relations between learning and earning.

Research method

The "hub, spoke and zonal" model is derived from the air transport industry (Alderighi and others 2007). It is being used in Australia to conceptualise the establishment of a range of VETiS organisations including the Queensland Mineral and Energy Academy (QMEA). These are different from those Queensland Academies which are located at a single site (Hay and Kapitzke 2009). The QMEA was selected to make

this case study of the "hub, spoke and zonal" model because of the importance of the minerals and energy to Australia's post-carbon economy. Arguably, this industry has been the mainstay of Australia's economy; a significant contributor to the socio-economic well-being of Australians and a key informant in policy-making by Australian Governments. However, global climate change and Government policy interventions are likely to impact on this industry and its jobs. Established in 2007, the QMEA was developed in response to the then skills shortages in the minerals and energy sector, which was then experiencing significant growth, particularly in the face of increasing demand for resources from countries such as India and China. However, the globalisation of the 2008-9 US. American financial crisis led to job-shedding in this industry which retracted with the decline in demand for resources. China's direct investment in Australia's minerals and energy sector mitigated this downturn, although the challenges of global climate change remain.

The QMEA represents an instance of a 'hub, spoke and zonal' model for organising learning and earning across Years 10-12. Its head office or 'hub' is in Brisbane. Its spokes create links to eighteen schools, from both the public and government subsidised sectors. Given the huge distances between the hub and the points, three zones have been created making shorter 'spokes' for encouraging inter-school collaboration. There are six schools in southern Queensland; nine in central Queensland, and three in northern Queensland. Of the eighteen QMEA schools, only twelve schools had publically accessible and/or comparable annual reports. The others were either unavailable or were not analysable due to their content differing markedly from the other schools. All of the eighteen schools have core curricula reports, but not extra curricula offerings. Among those with extra curricula reports, we randomly selected one school from each region for the purpose of comparison. We collected and analysed the Annual Reports and Newsletters of twelve schools for 2007, Queensland's Next Step Report (2008), and the QMEA's public representations of the Academy. The data were analysed to identify what the QMEA and its constituent schools have to say about the place of VETiS in the development of this organisational innovation.

To develop our analytical tools for this case study we created a concept map using nine of Bernstein's (1977) key constructs which sensitised our initial analysis of the QMEA data. We used open coding to break down 'the data into discrete parts, closely examining them, and comparing them for [thematic] similarities and differences' (Saldana 2009, 81). Following this analysis of the evidence we undertook a focused analysis of the relationship between key concepts and the evidence in order to get a better sense of the QMEA's organisation of the relationship between education and production, and any contradictions and correspondences between the two. Our focused analysis involved searching the coded data to identify 'the most salient categories' in the corpus to decide which 'codes make the most analytic sense' (Charmaz cited in Saldana 2009, 155). The most salient categories related to the students' core and extra curricula offerings in VETiS, and their key outcomes in terms of retention rate, Year 12 achievement and post-school destinations.

The findings of this study are limited by two significant factors. First, 2007 was the first year of the QMEA's operations. Thus, this paper can only point to the issues this organisation might address as it becomes 'fully integrated and sustainable' (MCEETYA 2009, np). Second, there may be connections between the QMEA and its constituent schools, as well as between education, production and the environment that have not been signalled in the data set analysed in this study. Analysis of data for coming years and future interviews with principals and QMEA officials will give

insight into both issues. The next section begins with an account of the QMEA's student pathways, the QMEA projects, excursions and activities for 2007-2009.

Outcomes from the QMEA's 'hub, spoke and zonal' organisation

The QMEA is a partnership between the Queensland Resources Council (QRC), the Queensland Government, and training and academic providers. Established in 2007, the QMEA's educational mission is to integrate learning and earning of its constituent schools by encouraging students to enter the minerals and energy industry. The QRC is a not-for-profit peak industry association representing Queensland companies engaged in mining, mineral processing, oil and gas production, and electricity generation. The QMEA schools enable students to enrol in subjects that focus on minerals and energy, and to participate in live-in experiences, mine and power station tours, and industry-based work experiences, traineeships and apprenticeships. The QMEA encourages young adults from its constituent schools to seek careers in the resources sector so as to ensure that it builds Queensland's wealth and security into the future. It offers students four interconnected l/earning pathways from which to choose (see Figure 1).

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                          │ Student l/earning pathways │
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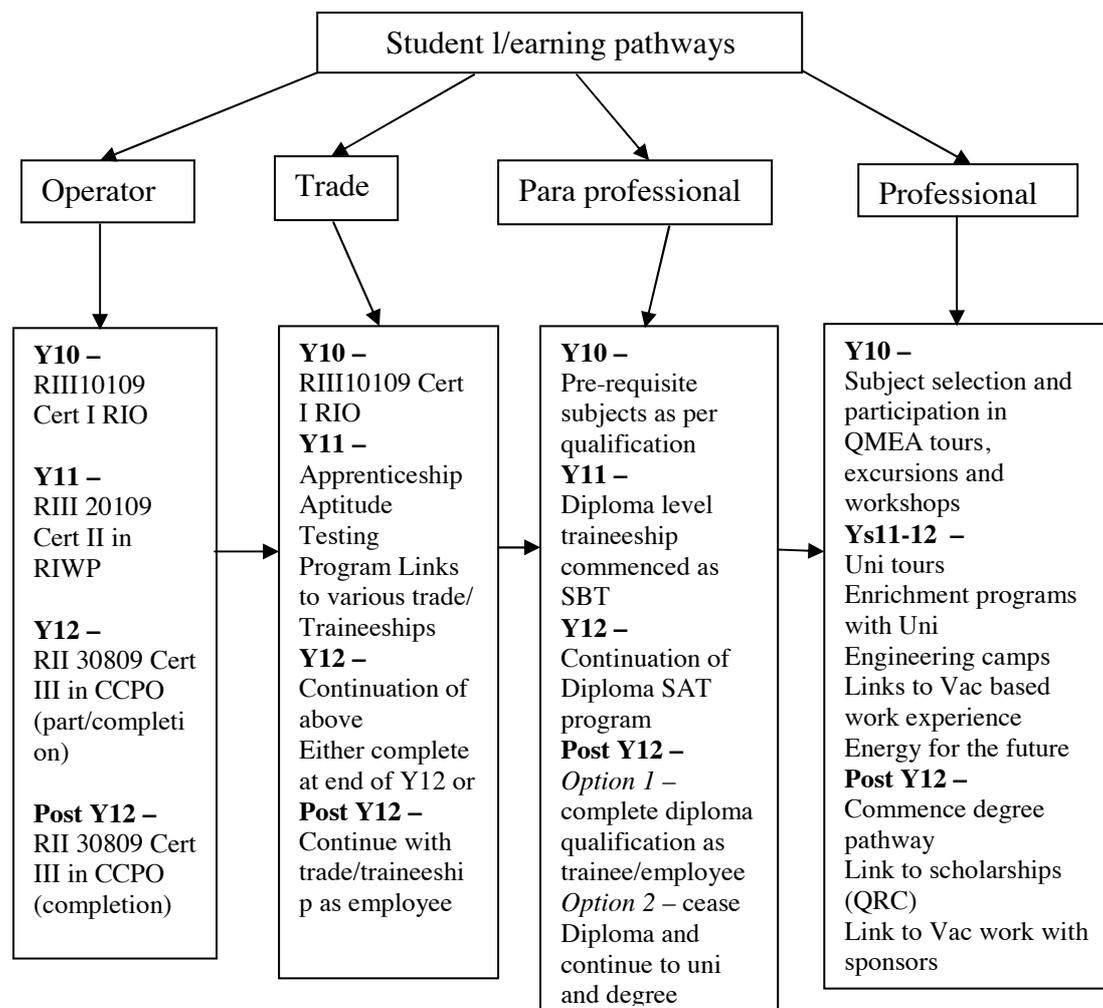| Operator	Trade	Para professional	Professional
Y10 – RIII10109 Cert I RIO	**Y10 –** RIII10109 Cert I RIO	**Y10 –** Pre-requisite subjects as per qualification	**Y10 –** Subject selection and participation in QMEA tours, excursions and workshops
Y11 – RIII 20109 Cert II in RIWP	**Y11 –** Apprenticeship Aptitude Testing Program Links to various trade/ Traineeships	**Y11 –** Diploma level traineeship commenced as SBT	**Ys11-12 –** Uni tours Enrichment programs with Uni Engineering camps Links to Vac based work experience Energy for the future
Y12 – RII 30809 Cert III in CCPO (part/completi on)	**Y12 –** Continuation of above Either complete at end of Y12 or	**Y12 –** Continuation of Diploma SAT program	
Post Y12 – RII 30809 Cert III in CCPO (completion)	**Post Y12 –** Continue with trade/traineeshi p as employee	**Post Y12 –** *Option 1 –* complete diploma qualification as trainee/employee *Option 2* – cease Diploma and continue to uni and degree	**Post Y12 –** Commence degree pathway Link to scholarships (QRC) Link to Vac work with sponsors

Figure 1. QMEA student training pathways
(Source: adapted from QMEA (nd) on line document)

The QMEA engages in a range of projects, programs and events (Table 1). It designs and delivers training courses that align with the school curriculum with providing a smoother transition for students into the workforce. Industry/school links are created via school-based apprenticeships and traineeships (SBAT).

Table 1 The QMEA projects, excursions and activities 2008-2009

Programs	Activities
In-school training	- Apprenticeship Aptitude Testing - Maths/Science course for trade focused students - Cert I RIO - Cert II Mine Readiness - BRAKE Program
SBAT work experience	- Resources Head Office SAT Cert II in business - Dip Engineering CAD
seminars workshops forums	- Women in mining (Year 9-10) - "Energy – Your Future" - Mt Morgan – the history of mining - SIMTARS – mine safety and research - class excursion/event support program
camps	- Engineering camp - Australian students minerals venture
OP Eligible student support	- Bonus ranking points - Enrichment courses/extension subjects - Promotion and linkage to university grants/scholarships - 'Get set' university program
Teacher support	- Professional learning - Awards - teacher site familiarisation - Mining industry skills centre workshop - Teacher relief support
Scholarships awards	- Student prizes - Student scholarships

(Source: adapted from QMEA (nd) on line document)

Core and extra curricula VETiS offerings

Among the six out of eighteen schools reporting their core or extra curricula offerings, all had core curriculum VETiS offerings. In addition NQ1, CQ2 and SQ2 offered extra curricula VETiS activities. These three schools have chosen to compare curriculum offerings. Our analysis focuses on whether schools represented VETiS offering as part of their core or extra curricula program. For the core curriculum offerings, NQ2 offered Certificate I, II and III courses, albeit with many of these courses being provided through TAFE. Industry bodies provided block training for students. NQ1 identified school-based apprenticeships and traineeships as extra-curricula offerings along with structured industry placements, bursaries, and an engineering camp.

Working in collaboration with a mining company, CQ4 offers students as part of their core curriculum VET Certificates, school-based apprenticeships and traineeships, generic open-cut mining courses, the 'blue card' (a safety course needed by workers entering a construction site) and a careers camp. CQ2 listed as extra-curricula offerings a Certificate I in Resources and Infrastructure Operations (RIO) and another in Automotive, and a Certificate II in Retail and Beauty. The school training centre offers extra-curricula activities in animal care and hospitality.

In Southern Queensland SQ3 offers vocational English communication, pre-vocational mathematics, horticulture, industrial skills and tourism in its core curriculum. These nationally Recognised Certificate Courses are delivered at SQ3 or through a college of Technical and Further Education (TAFE). SQ2 extra-curricula offerings include career skills preparation, competencies in work education, development of close linkages with work and a Careers Expo. This school also has strategies to monitor VETiS so as to increase opportunities for its students; to ensure all teachers are up-skilled to deliver VET competencies; to increase links with external partners, and to secure and monitor traineeships (see Table 2).

Table 2. Representations of VETiS as a core or extra curricula offering in QMEA schools

Schools	Core curriculum offerings	Schools	Extra curriculum offerings
NQ2	- 14 Certificate I, II and III courses; - Courses offered through TAFE; - Industries offer blocks of training; - work experience program - industry placement program; - 70 school based apprentices and trainees in a variety of industry areas; - 300 school-based trainees and apprentices since 1998; - School-based and full time apprentices and trainees.	NQ1	- School-Based Apprenticeships/Traineeships - Structured Industry Placements - Xstrata Bursaries - Siemens Science - QMEA – Outback @ Isa excursions - Senior Engineering Camp
CQ4	- VET Certificates III in Early Childhood - Certificate II in Hospitality - Certificate I in Furnishing - Open Cut Mining Generics course, - Blue Card for Construction, - School Based Traineeships and Apprenticeships - students completing school based traineeships with a mining company. - Certificate 2 in Work Education - Careers Camp	CQ2	- Cert I RIO, - Cert I Automotive, - Cert II Retail, - Cert II Beauty - Animal Care, - Blue Card for construction, - Hospitality - *Adopt-A Student*
SQ3	- Vocational: English Communication, - Pre-Vocational Mathematics, - Horticulture - Industrial Skills - Tourism - Nationally Recognised Certificate Courses (offered at school) - NRCC (offered through TAFE partnership)	SQ2	- Strategies to improve VET - Career Skills preparation -Development of close linkages with Work links -Careers Expo - monitoring of VET -Increase the number of VET opportunities - Cert I in Work Ed -Ensure all teachers are up skilled to deliver VET competencies -Increase links with partners -Monitor VETiS students -securing/monitoring traineeships

There are differences in the representation of the *Core curricula offerings* and *Extra curricula offerings* in VETiS across these six schools. NQ1 which provides a higher percentage of VETiS offers these as extra curricula activities rather than as part of its core curriculum. In both CQ schools and SQ schools there is no noticeable difference between their core and extra-curricula offerings in VETiS. Apparently, it

does not matter whether VETiS is provided as a core or extra-curricula offering, but conceptually 'extra-curricula offerings' emphasise the autonomy of education from production rather than their integration (Bernstein 1977). That some schools do not recognise and acknowledge VETiS as part of their core curriculum may represent a contradiction that poses an organisational challenge.

Key student outcomes from Senior L/earning

One quarter of the twelve schools had a retention rate of over 80%, while for another one quarter it was around 60%. This retention rate is lower than the Australian Governments' target which is 'to lift the Year 12 or equivalent attainment rate to 90% by 2020' (MCEEYTA Action Plan 2008, 9). NQ1 had the lowest retention rate (59%). 46% of the students in this school gained a Senior Certificate and VET qualification, but more students chose to be apprentices, trainees or to work full time. Only 11.2% of its students went to university. NQ2 had the highest retention rate (85%), with 68% of the students gaining both a Senior Certificate and VET qualification. The 22.4% of NQ2 students who went to university was the similar to those who became apprentices or trainees (22%) and those who obtained fulltime work (25.4%).

Table 3. Key outcomes from Senior L/earning

Schools	Retention	Senior Cert + VET qualification	Uni degree	VET Cert III & IV	Apprentice & Trainee	Working FT	VET total	Not studying /NILF
NQ1	59%	46%	11.2	3.0	47.9	24.5	52	1
NQ2	85%.	68%	22.4	6.9	22	25.4	31	0.9
CQ1	70%	74%	12.3	6.7	49.3	13.8	56.9	1.5
CQ2	70 %	66%	10.9	6.2	23.5	31.3	31.3	N
CQ3	75%	64%	8.3	12.5	29.2	20.8	41.7	N
CQ4	66%	98%	12.8	5.2	41	12.8	48.7	N
CQ5	61 %	52%	16.2	5.8	29.4	27.9	41.2	N
CQ6	70%	49%	23.2	3.6	20.5	23.2	25.9	2.7
SQ1	84%	58%	14.1	7.0	18.3	26.8	32.4	2.8
SQ2	62%	56%	16.5	13.9	12.7	13.9	31.6	N
SQ3	70%	54%	30.9	11	15.7	20.9	30.4	2.1
SQ4	82%	29%	30.9	6.7	13.4	24.7	22.2	0.5

The retention rate for schools in Central Queensland was below the Governments' 90% aspirational target, ranging from 75% down to 61%. Most of the students in CQ1 gained both a Senior Certificate and a VET qualification (74%). 49.3% of students became apprentices and trainees. The 12.3% of students who went to university was similar to the percentage for those who entered work fulltime (13.8%). In CQ2, 66% of the students were eligible for both university and work, but students chose either apprenticeships or traineeships (23.5%) or decided to work full time (31.3%) rather than university (10.9%). The case for CQ3 and CQ5 is similar to that of CQ2. 98% of CQ4 students gained both a Senior Certificate and a VET qualification, suggesting that they had more choices for their future study/work trajectory. However, 12.8% of students choose to go to university, 12.8% chose to work full time, and 41% choose to be apprentices or to do traineeships. CQ6 was similar to CQ4.

The retention rate for schools in Southern Queensland ranged from 84% to 62%. SQ3 and SQ4 differed substantially in the percent of students going to university (54%/29%), albeit with similarities in those obtaining full-time work

(20.9%/24.7%), or becoming apprentices and trainees (15.7%/13.4%). In SQ1, more students (26.8%) chose to work fulltime than choose to be apprentices and trainees (18.3%), or go to university (14.1%). For SQ2, more students went to university (16.5%), while those doing a Certificate III and IV (13.9%), apprenticeships or traineeships (12.7%) or working fulltime (13.9%) were close.

NQ1 (47.9%) CQ1 (49.3%) and CQ4 (41%) are located in mining communities where the demand for apprentices and trainees is high, ranging from 47.9% through 49.3% to 41% respectively, in contrast to schools in Southern Queensland. Between 30.4% and 56.9% of schools graduates who undertake Certificate III and IV courses are employed as apprentices and trainees, whereas those going to university range from 8.3% to 30.9%. A larger percentage of students from schools close to universities tend to enrol in tertiary degrees: NQ2, 22.4%, CQ6, 23.2% and SQ3 30.9% and SQ4, 30.9%. However, there are two cohorts of young adults whose work/life trajectory appears potentially problematic. The percentage of students not obtaining a Senior qualification and not entering full-time study or full-time work ranges from 0.5% (SQ4) to 2.8% (SQ1). Further, 15% to 39% do not complete Year 12. It must be asked what is happening in terms of the work/life trajectory of these young adults. The next section provides a theoretically informed interpretation of this evidence.

Organising Senior L/earning

The increasing emphasis on vocational education and training in Australian schools is an organisational challenge. There has traditionally been 'an historical bias against vocational education within secondary schools, which has, among other things, resulted in a marked reluctance to promote apprenticeships and traineeships as desirable pathways for students' (Dalton and Smith 2004, 509). Not surprisingly, there are correspondences and contradictions in the QMEA's efforts to organise the integration of education and production due to divisions within education, and between it and production. The supposed autonomy of secondary schools from production is being interrupted by the QMEA and its constituent schools as they establish systematic relationships between learning and earning in the minerals and energy industry.

First, there appears to be a boundary between the QMEA and its constituent schools, with the Schools' Annual Reports, suggesting they are 'insulated from each other' (Bernstein 1977, 188). This separation between the QMEA and its constituent schools is such that the representation of the integration of education and production lies not with the Academy, but remains with individual schools. This might be expected given that 2007 was the QMEA's first year of operation and the year for which we analysed available data. Thus, while the 'hub, spoke and zonal' model of the QMEA might suggest that the Academy regulates its constituent schools, their self-representations in School Annual Reports indicate their apparent organisational autonomy. The connections that could exist are not, as yet represented in the schools' self-reports. For example, the QMEA I(2008) provides scholarships for students and awards for both students and teachers in its constituent schools:

> These scholarships apply to students in Year 11 with scholarships awarded
> at the beginning of Year 12. The six scholarships support students wishing
> to pursue trade or professional employment in the minerals and energy
> sector… The teacher award acknowledges a teacher who has provided

demonstrated leadership and innovation in the teaching and learning of minerals and energy in and across QMEA schools.

Schools offer some courses related to VETiS in the minerals and energy sector but do not mention the QMEA. However, even though the QMEA makes efforts to engage school in VETiS, the analysis of the School Annual Reports reveals little about their involvement in the QMEA. Specifically, the analysis of the core and extra curricula offerings did not reveal any courses which schools identified as related to the QMEA. This suggests an apparent autonomy among these schools with respect to the QMEA, indicating that the 'hub, spoke and zonal' mode of organisation is open to further development The schools construct their annual reports in ways in which the QMEA is absent and thus signal their organisational independence from the Academy. This suggests areas in which the Queensland Government, as the key driver for this 'hub, spoke and zonal' organisational mode could focus on resources to grow the potential of the QMEA.

Second, the QMEA is thinking beyond Bernstein's (1977) industrial era linking of education and production to integrate environmental considerations. For example, the QMEA (2008) conducted a workshop on world energy policy to develop:

> a consciousness in students of the challenges of a low emission future, taking into account the many competing interests in terms of energy alternatives, costs and energy security in different countries including Australia.

Rejecting Bernstein's (1977) education/production dualism, the QMEA extends student learning to earth and environment sciences. By systematically relating education, production and the environment this could better assist students in finding 'green' jobs. Thomas et al. (2007, 97) surveyed 600 Australians working in 'green' jobs. The majority of respondents indicated that in order to gain employment and be successful in many of these jobs prospective employees need to be highly competent in a range of skills developed through structured work experiences as well as academic studies. The respondents indicated that access to 'green' jobs is assisted by "work experience (paid or unpaid) [whereby students] enhance their employability—the vast majority of respondents had been involved in some form of work experience" (Thomas et al. 2007, 108). Reflecting a dated education/production divide, the suggestion is that 'throughout the time they are studying, those interested in environmental careers use spare time and holiday periods to secure intern or volunteer work experience' (Thomas et al. 2007, 108). There are numerous challenges for policy-makers to address to integrate education and training for the 'green' economy for students in Years 10-12 (see Table 4).

Table 4. A sustainable society, environmental performance and 'green' skills

Keys to transition to a sustainable society	Key areas for environmental performance	Green skills for future employment
policy settings for environmental performance	greenhouse gas emissions	planning and design, marketing and communication
green skills and training	energy efficiency	Leadership, entrepreneurship, project management, procurement
performance assessment and accreditation to inform action	water use, security pricing, quality and dry land salinity	assessment of project requirements (inputs, system specifications, finance, approvals) and outcomes (water, energy, efficiency, value)

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access to appropriate business inputs and components	waste management and disposal, including point source emissions	specific business management expertise (architecture, farming, fleet management, manufacturing, retail)
promotion of a stronger innovation culture	natural resource management	trade skills (green plumbing, construction of energy efficient buildings, renewable energy, low input gardening)

(*Source:* adapted from Hatfield et al. 2008, 22-23).

The contradiction between the regulation of schools and them working as part of the QMEA is a sign of the apparent autonomy which schools as organisational units have acquired since their invention in the nineteenth century (Hamilton, 1989). This organisational mode sanctioned schools' relative independence from production, something which VETiS and the QMEA are trying to change. If this apparent autonomy maintains its rigidity, then it is likely to diminish the prospects for establishing a direct relationship with the QMEA and the production and environmental issues associated with minerals and energy. Given the role of these industries in global climate change this is a significant issue, as it keeps education from addressing what is now required. It is in the context of global climate change that questions have to be asked about the incorporation of education with production as aspired by the 'hub, spoke and zonal' model of the QMEA. Will this reduce the apparent autonomy of schools? Will it increase the efficiency of production? Will it contribute to changing the social and environmental relations of minerals and energy production?

Conclusion

2007 was the first year of the QMEA's operation of this innovative 'hub, spoke and zonal' model. This paper has provided insights into what is being done to ground this organisational innovation in work-integrated education and training in QMEA schools. The evidence suggests that the QMEA has a platform for the implementation of this 'hub, spoke and zonal' model of organisational innovation. The schools have VETiS curriculum offerings which await further integration into and explicit articulation with the Academy. For schools to be involved in VETiS there is the possibility of them explicitly reporting on all those curriculum offerings and student outcomes which are related to the QMEA. For the QMEA, these moves could help integrate its constituent schools into the Academy, something which Bernstein's (1977) theory suggests is desirable. In the meantime the constituent schools might seek to enhance the representation of their membership of the QMEA in future annual reports. Contradictions between the regulation of education and production are an indication of the limits to the apparent autonomy of education, or the breeching of its apparent independence from production. As an organisational phenomenon the QMEA represents 'a particular structure of meanings' (Bernstein 1977, 175) that underlies the control, interactions and practices linking university entry and trade-training.

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