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THE SILENT DEATH OF FOOD TECHNOLOGY RIGOR IN SCHOOL CURRICULUM

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Abstract

There is a major concern in the world supply of food (Martin, 2007; World Health Organization, 2008). The main response to this world problem is more likely to come from food science and technology innovation, rather than from food hospitality skilling. In acknowledging the scale of this very real issue, we need to ask, are we getting intoxicated with the skills rhetoric given that the social, environmental and technical world students face is increasingly complex, and involves systems whose interactions are difficult to predict? An emerging concern throughout some states is a politically driven lack-lustre vision that fosters a comfort zone for what is thought to be the study of food technology. There is a need to critique the associations between teaching practice, syllabi design (particularly as a continuum of learning) and design as a problem-solving platform. Where once curriculum was written as the instrument of social and knowledge reform for the benefit of the student, it now appears to be the instrument of convenience for the benefit of social reproduction and a highly filtered view of the external world students will face. With the emerging links between climate and technological choices, there is cause to question how well a 'no change decree' by Food Technology syllabus custodians remains adequate in curriculum presentation and representation in schooling. This paper will focus around the area of food technology, and given its confusion with the field called food hospitality, the paper seeks to make a contribution to the issues around skills and innovation. While discussion centres on the Australian context, the study of food technology and science (and its confusion with back-of-house hospitality studies) has international relevance in education, particularly given the challenges of feeding the world and developing innovative new food products and production methods.

Introduction

Traditional technology education has been constrained to a primary function of skilling. However, a quality technology education is not about just skills at the kitchen worktop, computer keyboard, or workshop bench. Skills *education* is a part of any quality education. Uncritical skill replication is not. Skilling taught as empowerment, as part of personal

potential or cultural heritage, skilling explored as a part of one's being, skilling as exploration of mind-body and self-environment relations, skilling as community asset-these are some understandings of *skill as education*. Skilling "to get a job" is simply not enough (Keirl, 2006, p. 96).

This paper explores the scenario that, if Food Technology is confused with, perpetrated as, or diminished in curriculum and teacher education to that of predominately 'class-room cooking skills', and at the expense of innovation and design knowledge and skills, then the collective effect on society would be undesirable and risky. Just when food innovation and supply demands ideas to address a real world emerging crisis, the prospect of Food Technology curriculum not responding to this context and favouring the luxury of a café lifestyle or restaurant skilling culture in the classroom raises a real ethical if not job prospects dilemma. Of course school curriculum ought continue to provide food hospitality skill development, but have we, and are we 'dropping the scones' when it comes to the teaching and learning of food technology, science and innovation in school curriculum?

To address the problems raised above, two issues are examined. Firstly, the issue driving much rhetoric in technology studies that we will refer to as "feeding the skills debate". The second is the issue of evolution, relevance and opportunity for food technology and innovation education, not to be confused with the food hospitality field, which we will only refer to on occasions but which is not the centre of our concern. We will refer to this second part as "feeding the innovation debate". In both cases, we make reference to the implications that may arise for Food Technology (not Food Hospitality) curriculum futures.

Feeding the skills debate

What exactly do we know about what is meant by the rhetoric surrounding the so-called industry *skills crisis*? According to the Department of Education, Science and Training (now Department Education Employment and Workplace Relations), there are three definitions of skill from an industry employer perspective. However, there appears to be great variance about what each of these represent by competing stakeholder interest since 'skilling' is a politically and educationally disputed expression. Firstly, "skill shortages" involve jobs that are *unable to be filled or have considerable difficulty in fulfilling vacancies for an occupation*. Secondly, "skill gaps" involve *existing employees who do not have the required qualifications, experience and/or specialised skills* and thirdly, "recruitment difficulties" is a *characteristic of the industry, occupation or employer* (2002, p. 3). Without a doubt the *skill crisis* has engaged much discussion and rhetoric (Business Council of Australia, 2008; Commonwealth Government of Australia, 2008; Department, Education, Employment, Workplace and Relations, 2008; McKinsey and Company, 2008; Department, Employment, Workplace and Relations, 2005; Department, Education,

Science and Training, 2003; Department, Education, Science and Training, 2002; Innovation, Summit, Implementation and Group, 2000). While there is a shortage in labour and traditional trade skills, the overall employment demand is low, principally due to the boom bust cycles in construction, the long-term demise of manufacturing, and the geographic niche demand in the resources sector that has distorted the general demand across most urban job markets.

Boosting the number of people into traditional basic trades is at least partly misplaced given the data clearly reveals that broad and steady job demand is more significant in the associate and professional skills domains: this includes the fields of science, technology and engineering and other services that require higher level applications such as university or vocational education and training (VET) in combination with the higher education sector rather than traditional VET skills alone. The rise in demand for more professional level skills and the flat-lining or slow steady decline in traditional trade skills are well presented in recent studies (Figures 1 and 2). Even at the VET level, growth is greater for the higher qualification end such as associate diploma or diploma level. Ironically Australia is facing shortages in university-trained professions that rival, if not exceed, the nation's perceived trade skills crisis (Healy, 2008). The market demand shifting towards the high end trades, and particularly to more professional skills, has been a steadily rising statistic for many years as evidenced in many business surveys (Wood, 2008). One of the main reasons for this trend in the developed world is the growing impact of the knowledge and innovation economy (Seemann, 2003; 2006). The term *skill* should therefore be broadly interpreted to not simply embrace both VET training and university sectors, but based on trend statistics that favour an alert for increasing major shortages in the associate and professional markets (Department Education and Workplace Relations, 2005; Hart, 2005; Professor Richardson and Withers as cited in Healy, (2008).

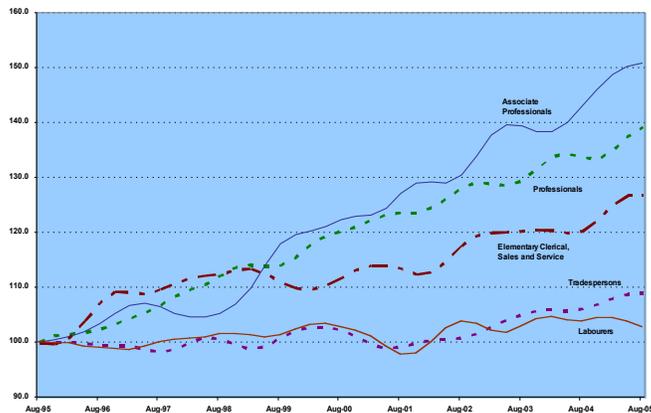


Figure 1: Employment growth by skill level 1995-2005.
(Department Education and Workplace Relations, 2005)

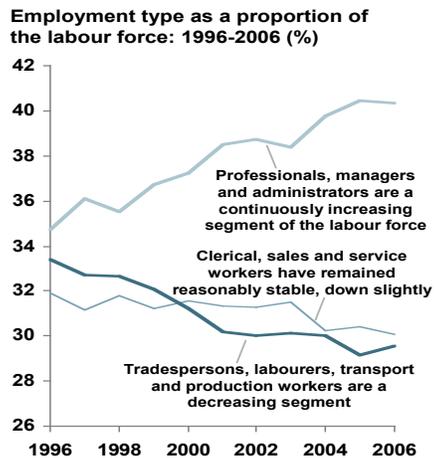


Figure 2: Labour force by employment type. 1996-2006.
(Australian Government as cited in Christen, 2008)

If the VET sector is directly implicated in the *skilling Australia* scenario, then as Anderson (2003, p.1) points out, the VET sector has failed to position themselves during the past 30 years in the policy and practice of an ecologically sustainable future and as such remains ‘flawed in an ideology that is no longer economically rational or socially sustainable’.

National economic interests are valorized over global ecological concerns. The list of ‘forces for change in VET’ saturated with the language of productivism: ‘growth in global markets’, ‘intensified international competition’, ‘consumer expectations’, and so on. At no point does ecological sustainability figure in this narrative. Instead, a sense is conveyed of ever expanding circuits of production and consumption, in which VET fuels industry and enterprise demand for skilled labour (p.5).

Additionally, Dawe (2004) presents a rather incongruous claim with regard to higher technology and science-knowledge training in that the VET role is more of a ‘broker’ than a sector that is open to re-envisioning itself for an ecologically sustainable future. It appears little has changed in the last 30 years.

It is acknowledged that the VET sector is considered by some managers of emerging industries as being providers of more traditional training and having little relevance to ‘high tech’ industries (Ferrier, Trood & Whittingham 2003, cited in Dawe, 2004, p. 162)

Given the current era of ‘manufacturing risk and ecological crisis’ (Anderson, 2003, p. 2),

Trade Training Centres in schools appear set to be established with the primary aim to help address the skill shortages in traditional trades and the perceived skill gap in emerging industries. However, the purchase or replacement of a range of equipment is questionable to the type of 'skilling' that will be set up in schools, particularly for emerging industries. Some examples include soldering and welding equipment; ovens; wood and metal turning lathes; grinders and drills (Department Education Employment and Workplace Relations, 2008, p.4). Of course this type of equipment aims to provide students with experiences that are workplace relevant, but at what level, what relevance and at what expense to quality time for learning new knowledge and systems to future proof citizens in a world whose ecology and economies are increasingly reliant upon sophisticated technologies? The assumption that skills is about conventional tool expertise as perceived in the classroom of schools seems to be inconsistent with national statements that refer to skills as more inclusive to doctors, lawyers, engineers, para-professions (of which the government has supplied through the Migrant Program to date) and high end TAFE graduates (Wood, 2008). How can larger than normal matchboxes that resemble reincarnations of pencil boxes from the 1800's (exemplar secondary school and undergraduate technology teacher lab projects); quilts and fluffy cushions; serviette folding, table decoration and New Idea recipe racing (you know the drill) map against the descriptions of skills noted in the literature?

The old pedagogies persisting into the 21st century are no longer relevant. They ignore the capacity for schooling to take place in both a physical and virtual learning space. If we are to embrace these new opportunities, we need 21st century pedagogy – a paradigm that reflects a bold and creative commitment to relevance and quality learning and teaching (Whitby, 2007, p.2).

As schools scramble to apply for workshop upgrades one should question if this is the right direction to take and ask, tools to what end? Added to this discourse is the recent 'computers in schools' issue where NSW had threatened to pull out of the proposal if the installation, energy use and maintenance costs were not met by the federal government (Curtis, 2008). It is argued that this scenario resonates well with workshop upgrades. If supplying computers for every student in schools is advocated as the way forward for improved educational opportunities, it is not the complete 'panacea'. It could be concluded that the rapid technological change that has occurred over the past 20 years has certainly changed the way students engage both socially and in a teaching and learning context. The nature of how students learn and what students need to learn for the 21st century has yet to be realised (ibid, 2008).

Feeding the innovation debate

Given the Department Education Science and Training (2003) believes schools sit at the forefront of determining Australia's future, particularly with regard to the domains of

science, technology and mathematics, we may ask *which* skills and attributes do our children need for our future compared to our established traditions? Literature suggests that although traditional vocational learning remains viable for some sectors with regard to physical skilling in technological processes, "Influence skills" are closely correlated as skills associated with communication and design, systems, creativity, cultural awareness, team working, leadership, adaptability, improvisation and the higher order skills level of achievement as being much more the new desired attributes - these are the new skills of a knowledge and innovation economy outside the gate that school leavers now face. These skills are not 'future skills', nor 'emerging skills', but 'now skills' and even a 'little dated skills' (Commonwealth Government of Australia, 2008; Felstead, Gallie, Green and Zhou, 2007; Business Council of Australia, 2006, 2008; Department of Education, Science and Training, 2003, p. xix; Gillinson & O'Leary, 2006). The findings above support innovation in the job market, including the green collar jobs, that represents a new era of skills demand in the areas of renewable energy, green building and construction, appliance and developing alternative transport (CSIRO cited in Alexander, 2008). Thus, 20th century pedagogy in technology studies is at risk of serving "stale scones" to today's learners. It seems no longer ethical if some schools continue to defend a predominately 20th century menu in the curriculum (Gagel, 2006).

The obsessive claim to 'skills and labour shortage' as the subject's prime directive has displayed all the symptoms of an abusive addiction: a rhetoric that advances neither the study of technology for our civilisation's future, nor the career diversity and richness for the guild or the school leaver. This abuse of the skills rhetoric to justify its place may well prove to be as empty and as destructive as any obsession for technology studies. It may well erode the potential of the subject in schooling and teacher education futures. The rational discourse about what the word 'skills' really means has not yet been had (Seemann, 2007, p.2)

If globalisation is a concern to human activity, with human activity clearly being one of a technological nature that contains extensive social and ecological factors, a central question becomes one of how we educate and produce clever and creative people for a sustainable future where all are fed? What is the explicit philosophy when writing syllabi and what vision of the future motivates syllabus design? What ought be the bread-winning formula for Food Technology education that can base itself "not on what worked in the past but on what is a relevant schooling experience today?" (Whitby, 2007, p. 2). If we accept the essential contexts in which Technology Education must succeed, we then should ask what might be the successful terms and conditions for a more sustainable education in Food Technology?

The need to sift through the rhetoric of 'life skills' is long overdue given that there appears to be a "science-aversive culture endemic among education policymakers and teacher

education faculties” (Hempenstall as cited in Ferrari, 2007). Further, a no change decree (akin to rearranging scones on a plate) for the NSW Stage 6 Food Technology syllabus by authorities, signals a tread water position. Such a decree may well be justified due to insufficient funding, but also from the 2003 National Food Industry Study, which mentioned the syllabus retained a stronger link with food science industry practices, from a theoretical context. However, the subject is increasingly slipping behind and becoming skewed in its ability to accommodate the changing knowledge of food innovation research and the realities of the emerging economic climate. As such, the study of Food Technology has had a relatively low esteem in the curriculum as a job pathway into the food science and technology industry. Further, discussions with teachers during field research in 2007 revealed many students do not choose Food Technology in stage 6 as the subject is too theory laden with legislation and policy (rather than food science lab activities). Data provided from the Board of Studies (2008) support this theory as the course choice statistics in 2007 exhibit Food Technology having 3,372 students enrolled while 7,747 undertook Hospitality, with 6,716 sitting the Higher School Certificate exam (Turner, 2007).

As a continuum of learning, what the 7-10 Food Technology elective syllabus (NSW Board of Studies, 2003) has managed to achieve is a very successful pathway into the Hospitality curriculum, seemingly at the expense of Food Technology enrolments, largely due to the view projected about the subject. The view in these cases appears to project Food Technology, not as a science, innovation or design domain of learning, but as being about the development of culinary skills and nutrition. Apart from the appropriate focus on nutrition, the subject now presents as having a loose association with the food technology genre as an area normally aligned to food science and food innovation industries. Because of this, Food Technology has for some time now been a syllabus that is highly vulnerable to suffering succession demise in valuing the necessary academic culture of its true study. As a continuum of learning, what the Technology (Mandatory) syllabus has managed to achieve is a very object-and-skills focused perception of technology studies often at the expense of deep innovation and design.

Although the Mandatory syllabus lists 11 design and innovation learning outcomes, they together are only given 5 pages of content (Board of Studies, 2003, pp. 20-25), while one learning outcome that refers to essential technology equipment skills is dominated by 14 pages of content (Board of Studies, 2003, pp. 26-40). The effect of this is a pressure on teachers, who are time-poor in the school timetable, to distort and dismiss the 11 learning outcomes in favour of racing through and checking off tool skill activities listed among the 14 pages of content. From a student's perspective, their continuum of learning from the primary Science and Technology K-6 syllabus to year 7-8 Technology (Mandatory) suggests a somewhat incongruous presentation of values and approaches to technology

education. Where classroom activities promote the manipulation of resources in order to understand scientific understandings of the natural world through 6 key learning areas such as the Built Environments; Information and Communication; Living Things: Physical Phenomena; Products and Services and The Earth and its Surroundings (Board of Studies, 1993, p. 10) - one needs to question the direction taken for the study of technology at the secondary level. The predecessor to the current Technology (Mandatory) syllabus, the 1991 Design and Technology syllabus, was created as a core vehicle for interpreting design and innovation education, and one that provided an excellent continuum of learning into secondary technology education studies: its flaws were structural at worst, but its content and presentation was foresightful. It could be argued that on some count, aspects of the current Technology (Mandatory) syllabus presents a narrow view for what the study of technology is about.

There is a need to involve key stakeholders in syllabus design such as food science personnel and academics that may bring to the mix a more contemporary and relevant view for the area of study. For example, there is not enough depth or immersion of design and innovation studies around agriculture/horticulture sciences, human sustainability, particularly remote settlements; resource reliance; climate change; new-food innovations, and associated food contexts such as packaging development through computer aided design or the deep emersion of a cradle-to-grave analysis of materials. Key economic drivers in the food industry for over the past ten years have been innovations in the indigenous bush food industry, links between nutrition, naturopathy and food and the strengthening of values that link eco-sustainability with synthetic foods. In terms of keeping the school study of Food Technology contemporary, we can no longer afford to continue presenting the subject as a narrow endeavour of using cooking tools, or just culinary skilling. Economic, societal and environmental factors demand a more comprehensive understanding, as do our capacities for informed judgement about everyday aspects of our material culture. In short, we need new ways of knowing and learning that offer insight into how technology works and functions in various contexts, such as technacy education and methods in innovation. We require these new approaches to help advance the study of food technology in the interest of students. Fler and Jane (2004, pp. 13,14) recognise the importance of teaching, learning, researching and developing technological understanding holistically rather than teaching 'technical skills defined independently of the social and environmental context'. This is supported in the literature, especially with the position that accommodates the 'demand-driven' view of jobs or *judgement making* beyond the school gate (Australian Science Technology and Engineering Council, 1996; Business Council of Australia, 2006, 2008; Department of Education, Science and Training, 2003; Innovation Summit Implementation Group, 2000; Fee & Seemann, 2002; Seemann, 2000, 2003, 2004, 2006; Slaughter, 1999; Walker, no date). As Dator notes,

The world before me, and many others was a piece of cake. Unfortunately for future generations, we ate it (1999, p. 4).

Conclusion

It is clear that Food Technology is well taught by many teachers, but it is also clear that the design and content of its curriculum in years 7 to 10 is due for a rethink. From the discourse above the following core themes appear to emerge and provide us with a designed brief for key success criteria. Students should not only work with their hands, but should contribute human agency in terms of understanding the phenomena we call technological activity as one that involves design and technical experiences within authentic settings (Seemann, 1995, p. 9).

The review has also identified the importance of developing technacy skills - critical for negotiating the varying and ever changing technologies increasingly integral to daily life, even on remote communities. Our social lives are becoming more and more technologically textured and this demands teaching and learning pedagogies that allow students to engage authentically with our technologically constructed worlds (Ramsey as cited in the Northern Territory Government 2003, p. 57).

This wider context presents a compelling case to rethink the future and content of food technology education as a supplier of graduates into society. The traditional approaches to teaching appear to be 'stuck-to-the-pan' and misplaced in today's society. It is made all the more difficult for teachers when stakeholders choose to use the word '*skill*' in rather reckless ways. We do not teach well 'what-the-head-has-to-do', to make the hands 'work-ably' in a design and innovation project. Similarly we don't assess or regard well 'what-the-head-has-had-to-do' to make the hands work as well as they have on projects of study. Design and innovation in the context of Food Technology education has largely been relegated to garnishing, decoration and presentation techniques. As such, Food Technology syllabus design and content requires a new thinking to stimulate more updated and relevant ideas in teaching. Skill as practice is perceived as requiring little or no thinking. Is this the message schools want to provide? There is a need to understand the knowledge that shapes our practice because '*Skilling "to get a job" is simply not enough*'.

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