Young workers and their dispositions towards mathematics:

Tensions of a mathematical habitus in the retail industry

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This paper presents a case study of contemporary retail industry and the ways in which young workers participate in that field. Public perceptions of low numeracy among young people provided the catalyst for the study. Drawing on a mixed method approach involving survey, case studies, stimulated recall, observations, and interviews, it was found that young workers approach their numeracy in ways that have been shaped by their experiences, in particular, digital experiences. In contrast, older generations hold different views of young people's numeracy levels and skills, often perceiving them as poor and deficit. The study challenges the orthodoxy of older generations and argues that young workers have developed new ways of working, which align strongly with the post-industrial workplace. As a result, there are considerable tensions between the generations which need to be considered. The paper uses the work of Bourdieu and draws on his notions of habitus, field, and capital to theorise the outcomes.

Current popular discourses, as mediated through public press and media, often portray young people as having difficulties with literacy and numeracy, poor dispositions to work, and high expectations of work conditions and pay scales. Within this context, this paper seeks to challenge these myths by drawing on two key literatures. The first is on the intergenerational literature, which is used to frame the ways in which social conditions create different opportunities for young people to develop particular dispositions and views of the world. This is juxtaposed with the theoretical framing offered by Pierre Bourdieu. Drawing on his comprehensive theoretical position, it is proposed that young people create a particular habitus as a consequence of living in particular fields or social spheres. This habitus provides the lens for viewing and acting within the social world; the social worlds that are the focus of this paper are seen collectively as the world of work. By examining the ways in which young people participate in these fields of work, a theory of their mathematical habitus can be drawn from the data. It is proposed that young people have developed novel ways of working in relation to numeracy, which are often different from those of past generations. In part, this is due to the changing social worlds, where digital technologies have radically changed work practices in the past 20 years.

Change has been an integral part of the latter parts of the 20th century, largely brought about by innovations in digital technologies. If one considers the ways in which communication has changed - from letters to email and instant messaging services, from fixed phones to mobile phones and short message services – one can see that these technologies have had an impact on every aspect of our daily lives, including the workplace. For young people, such technologies are a part of their world, and have significantly shaped their ways of working and thinking. In terms of mathematics teaching and learning, the changes brought about through technology may arguably be slow, but they are evident. The slide rule and logarithmic tables used

through to the 1970s are now a memory for many learners and teachers of that era, having been replaced by various electronic devices – calculators, scientific calculators, graphing calculators through to computers.

Young people now entering the workplace have grown up in times where they perceive themselves as expendable commodities; these perceptions are the result of an insidious economic rationalist discourse that has permeated much workplace reform for the past two decades or more. For young people, the reality of work is one in which they will have a number of careers over their lifespan; where part-time, casualised work is commonplace; and where self-employment is a growing phenomenon (ABS, 2005). This is in stark contrast to their Baby Boomer parents, who were more likely to remain in one job for a significant part of their lives (Mackay, 1997). These differences of experience create new possibilities for thinking and seeing the world of work for young people, which may conflict with that of older generations, for whom life offered alternative experiences and opportunities. Collectively, these different world experiences create different habitus-forming possibilities.

In considering how dispositions to work and employment are shaped, there is considerable potential for very different attitudes towards work to emerge from these stark comparisons. In recent literature (Howe & Strauss, 2000; Zemke, 2001) that compared the three generations since the end of World War 2 – Baby Boomers, Generation X, and Generation Y – there are clearly very different social, economic, and political conditions that created alternative opportunities for the construction of a generational habitus. These changing conditions create new and diverse learning opportunities for young people, which, in turn, shape their dispositions to work and working. A more specific distinction is made by Prensky (2001) who differentiates between Generation Y and previous generations due to the vastly different spaces they have occupied. For Prensky, the impact of digital tools has shaped this later generation in ways that have not been possible for previous generations. His arguments align strongly with the discourse on post-industrial societies. He proposed that there were two very dissimilar generations, highlighting the differences between digital immigrants and digital natives by comparing them with first language speakers. Digital natives have grown up in digital worlds, and have dispositions and ways of seeing and thinking that have been shaped by that medium. For digital immigrants (Baby Boomers and Generation X), coming to learn about and through digital media is akin to learning a second language – it is possible, but does not come naturally and needs considerable work. These very different worlds have created very different habitus for digital natives and digital immigrants, in terms of their relationship with digital technologies.

Many parts of industry have recognised the new habitus of young workers entering the world of work and have seen the need for changing current practices. For example, workplace trainers (Caudron, 1997; Ruch, 2000; Salopek, 2003) recognize the need to adjust selection and training to meet the needs and expectations of young employees if they are to be retained in industry. They recognise that there can be considerable differences between the views of senior (and older) staff and those entering the workplace. To this end, the work of Bourdieu is most useful in theorizing the ways in which social conditions – the field – provide different opportunities for shaping the habitus. For those whose habitus is aligned with the practices of the

workplace, there is greater opportunity for gaining rewards, which might include higher salaries or other economic bonuses, through to securing employment within that field. Thus, the habitus becomes implicated in an exchange economy, where dispositions can be exchanged for other goods. For Bourdieu, this is seen as capital. Such capital can come in many forms – cultural, symbolic, social, institutional and economic. Collectively these concepts allow for a rich theorization of the world of work and how particular mathematical dispositions may create new opportunities for workers, but within the constraints of the field.

Habitus, Field and Capital: Theorizing Contemporary Workplace Numeracy

In the remainder of the paper, I draw on the constructs of field, habitus, and capital to theorise the ways in which workplace practices shape the numeracy understandings and dispositions of young workers. I present a case of the retail industry to illustrate this position. Increasingly, there is also a need to recognize how the habitus of the young workers will shape the field. In this context, 'the field' is defined as contemporary work in which various structuring practices serve to recognize and validate particular dispositions and skills. Some of these will be historically located, while others are firmly located within a particular site or industry. Bourdieu (1990) draws heavily on games analogies in working through his theoretical position and argues that participants who come into a field - in this case work - are likely to have a 'feel for the game' when the habitus and field are aligned. For Bourdieu, this sense of presuppositions towards the field is what he refers to as doxa. Upon entering a field, – whether this is work or a classroom - those with a 'feel for the game' or doxa, have a sense of how things work and how to engage within the practices of that field. Consequently, the success rate for participants within a particular field depends upon the amount of doxa they have accrued, either from past histories as they enter the field, or from the capital they gain while participating in that field. For example, apprentices coming to know the field of work are dependent upon structuring practices and the ways in which the field is organized to recognize particular dispositions, in addition to the habitus they bring to that field and how it aligns with, or is reconstituted to align with, that field.

A Practical Example of the Nexus of Field and Habitus

In the context of this study, the field of work is defined by the objective relations imposed by those in power - in this case, employers and job placement officers - and the subjective relations that impact on the participants. In terms of objective relations, it is those people within the field who are able to determine who will be appointed to positions, and who are retained in positions. For example, to gain access to some positions, such as checkout operators in a supermarket, young people needed to sit a suitability test. Whether implemented by employers or placement officers or on-line, the tests used to select potential employees consisted of a range of questions, most of which were mathematically orientated. The test questions had little to do with the work to be undertaken, including spatial pattern matching, ratio, and operations with fractions and percentages. Thus, access to the field work was constrained by particular objective relations – numeracy skills and knowledge. For the potential employee, coming to sit these tests often created feelings of anxiety and disempowerment brought about by their school mathematics habitus, which had positioned them as marginal students. Thus, subjective structuring practices also impacted on the field,

and who and how access was gained. Particular forms of mathematical knowing were being used to convey status within the field. For those potential employees, the habitus with which they entered these testing situations acted as exchange items, so that they became forms of capital, which could be exchanged for other goods. In this case, young people with a strong mathematical habitus were able to exchange this for a position in the company and the concomitant remuneration associated with gaining employment. Thus, the habitus becomes a form of capital in an exchange economy where the amount and type of knowledge and dispositions can be traded for other goods (such as a position) within the nominated field. In this case, the mathematical dispositions assessed on the on-line test only hold power within this field but may not have the same value within another field, where other objective and subjective structuring practices are enacted.

As the field currently exists, those in positions of power control and constrain the field so that particular dispositions, skills and attributes are valued, while others are ignored. Historically, those dispositions that were valued aligned with the modernist workplace and participants who displayed the desired dispositions were likely to be rewarded. However, with the changes in the wider social and global contexts, questions as to what constitutes valued knowledge within the field may be under challenge as the field moves towards post-industrial times. That is not to say that the field has changed to these new patterns of work; only that there is considerable movement in that direction. As this study shows, currently, those in positions of power within the field are participants, whose own dispositions to work and the values they hold, have been shaped by their social conditions, which, by and large, were those of the modernist workplace. The social conditions to which those in power have been exposed create conditions for the construction of particular ways of seeing and viewing the world. The thesis of this paper is that young people have grown up in a world rich in digital technologies. This has formed their sense of self and their habitus, such that the ways they think and perform in the world of retail have been significantly shaped by these experiences. Thus, young retail workers have developed ways of seeing the retail industry that are different from those of older generations. These differences need to be formally recognised, as the industry itself has undergone significant digital change; while young people may have a stronger doxa for the field than older generations, this doxa has not been formally recognised by employers and hence may be an untapped resource within the industry. This is particularly the case for the mathematical habitus brought by younger workers to the retail industry, which has been influenced by digital technologies being juxtaposed with the mathematical habitus of older, more senior managers and recruitment officers whose mathematical demands have been informed by older technologies that have limited relevance in a digital retail industry.

Overview of the Project

The project[1] sought to identify the mathematical practices in contemporary workplaces, recognizing that technologies may be reshaping many of the old practices and that changes to the ways in which numeracy was being enacted within workplaces may result in practices very different from those of previous generations. To this end,

[1] This project was funded by the Australian Research Council through its Linkage Grant Scheme. The industry partners are Centrelink; Gold Coast City Council; Gold Coast Insitute of TAFE, Queensland Studies Authority and SCISCO Career Pathways.

a mixed methods approach was adopted. The study involved three key phases that employed a funnelling technique. The first was a large scale survey administered to approximately 1000 respondents. The survey used both Likert scale (closed) questions and open-ended questions. The second phase was an ethnographic study of 19 sites using stimulated recall as one of the methods for identifying the situated numeracy within the chosen sites. The final phase was a community consultation phase in which focus group interviews with key stakeholders were undertaken. Throughout the study, 'young people' were defined as those who were born after 1980. The 'senior people' could not be identified by age due to ethical constraints, but the nature of their positions within the field meant that they were senior in age and standing within the field/s of work. In the first phase a large survey was implemented and it was found that there were considerable differences in perceptions between young people and their senior peers (teachers, employers and job placement officers) (Zevenbergen, 2004). The data from this survey were both quantitative and qualitative, and sought to identify the perceptions and experiences of participants in contemporary workplaces. Just under 1000 participants responded to the survey, so the analyses produced some significant findings.

This large survey was then followed up with 19 case studies in which a process of work shadowing was undertaken. There were three phases to each case study – a preliminary interview, work-shadowing and a final interview. The 19 case studies were selected to represent the range of occupations that young people are entering; these cases include a hairdresser, chef, boat builder, shop fitter, builder, brick layer, short order cook, administrative assistant, worker in retail, baker, motor mechanic, laboratory technician, worker in hospitality, room attendant, printer, and sign writer. The work-shadowing process involved the researcher following the worker for 3-5 days, depending on the industry, and photographs being taken of all new tasks undertaken. At the completion of the work-shadowing, the photographs were shown to the workers, who then spoke about the tasks in terms of what they were doing, and how they were approaching the tasks. This stimulated recall method (Lyle, 2003) has been found to be effective in eliciting the thinking processes of the participants (Dunkin, Wlech, Merritt, Phillips, & Craven, 1998; Prawat & Anderson, 1994). Throughout the work-shadowing process, field notes were also kept. These documented practices and conversations with the workers across the sites, along with reflections of the observations and interactions. Follow-up interviews were also conducted with the employers of some of the workers. This process was constrained by the willingness of employers to commit to an interview, however, most employers participated. The interview was used to clarify issues and outcomes with the employer's perspective. A final phase involved community consultation workshops with employers, teachers and other key stakeholders associated with the employment of young people. These interviews were conducted as focus groups and sought input as to the outcomes of the study to validate outcomes with the wider community. The data in this paper draw on the data from the retail industry. These data come from all phases of the project. The case study presented here is a compilation of these data.

In the subsequent sections of the paper, the data are drawn upon to theorise the ways in which young retail assistants are perceived and evaluated by more seniors members of the community – including employers, teachers and job placement officers. It was found that, across the two data sources (survey and case studies), retail assistants drew on different types of knowledge, skills and dispositions than more senior members of

the study. While they were competent in the workplace, it was noted that there were considerable differences from what is traditionally seen as school mathematics. The data from the work-shadowing strongly reinforced the survey data, showing differences between the approaches of young workers against their more senior peers (teachers, employers and job placement officers). It is theorizing this difference that is the focus of the remainder of the paper. To provide a context, a brief discussion is provided with examples of data collected from the case studies. These are used to illustrate the types of mathematical thinking that was shown by the young workers.

Mathematical Practices of Young People in Retail

It was found that retail assistants drew on a wide range of skills as they undertook their work, and were highly competent in their approaches. Their ways of working were shaped by the dispositions that they brought to their sites, but also by the demands of the sites themselves. In all cases, the sites were highly technologised and electronic cash registers were a strong feature of the work environment. It is this aspect of the project that is the feature of this paper. It is proposed that digital technologies have impacted on the habitus of young workers before they enter the workplace, so that they have particular digital dispositions that create a doxa for the technologised workplace.

In concert with this aspect, many of the workplaces have been reshaped by digital technologies so that the nature of work is quite different. Thus, the field is changing as a result of these digital technologies. Within such a context, it becomes important to ask whether or not the habitus that young workers bring to the contemporary field of work is being recognized or marginalized within these fields.

Digital Technologies in Contemporary Retail

In many of the worksites, technology was used to undertake calculations and context-specific tasks. The tasks varied from site to site but offered very different ways for working from the practices of those who worked in the respective fields a decade or so ago. In this way, it is possible that different dispositions towards the use of digital technologies may shape the ways in which generations work in those sites. The following sections provide examples of various worksites and use data from the various collection tools from the project.

Retail Industry as a Field

In the retail industry in the 1970s and 1980s, where digital scanning had not occurred, transactions involved the retail assistant either calculating costs using pencil-and-paper methods or the use of mechanical cash registers. This scenario is a far cry from today's automated systems. Similarly, the nature of shopping has changed radically in the past two or three decades. The shift from small corner shops to the large corporate, multinational, supermarket chains is one aspect, but also the change in salary allocation has contributed to altered shopping practices. Many people are now paid on a fortnightly or monthly basis through direct bank transfers, compared to weekly cash payments of the past. One only has to consider the introduction of, and the growth in size of, shopping trolleys over this period, to acknowledge that shopping as a practice has undergone significant changes. Small retailers, through to large department stores, use registers that have touch pads or use scanning tools that identify stock and compute prices. The sales process involves the retail assistant

entering sales items through the process determined by the technological device in the workplace; this device is not only a tool to determine amounts owing, but also to monitor stock. The monitoring of stock is an essential component of contemporary business. This position is summed in the comment offered by the owner/operator of a franchise bakery:

> Employer: The key to success in this business [is] to try to get the balance right – having enough bread to make the sales – we don't want to run out of bread and not make the sale, but we also don't want to have too much waste. I use the information we keep from the register to run my business. I can see trends for different days and use this to predict what I need to bake on a particular day. It was hard when we first started as we had no idea of how much to bake of what, but it has got a lot better now that we have been here for a few years. We can work out now how much to bake in the morning for the start of the day and how much to bake as the day goes on. We sell a lot of loaves in the morning so the mums have fresh bread for the school kids. We then sell another big lot in the afternoon when they come home from work and need bread for sandwiches the next day. So we plan around that so the bread is not sitting there all day getting stale.

Within the retail industry, technology has changed the ways in which work is being undertaken. The register serves a much more important role than just a calculator. In terms of employability skills for this industry, it shapes the expectations the employers have of their staff. In the comment below, the employer is speaking about the role of workers in the industry:

> Employer: To be able to give change, to be able to do the transaction quickly on the computer, that's pretty much it. As far as the mathematics side of it, just as long as they can add up 7 rolls to give to the people. (Interview, bakery)

The employer does not expect much more than counting skills as the cash register does the calculations. More specifically when asked about the mathematics that is needed for the industry, employers responded in the following ways:

> Employer: Most are of the calculations are done on the register, but some aren't. A lot of things that we have to order in, we have to calculate prices ourselves, and they need to know how to do percentages and mark-ups and stuff like that but we use calculators for that.. Registers do most of it, like the adding up the sale and stuff. Counting back change is just normal. (Interview, automotive retail)

> Employer: Out front [front of shop where sales are undertaken], there really isn't that much, the computer system is so advanced, they don't generally use it [mathematics]. (Interview, bakery)

The baker then went on to argue very strongly that people skills are far more important in the retail industry. The technology is such that much of the mundane arithmetic work has been removed from the tasks, and that being able to work with customers and other employees is far more critical. This view was reiterated by the employees and evident in comments such as the one below:

> Retail assistant: The way I see my job is that I have to keep the customer happy or they won't come back. I have to make sure they are served quickly so they don't wait around; I have to be nice to them and sell them what they want. I also have to try and make a few more bucks for the boss so I try to on-sell [sell more than what they want] so I always ask if there is something else or suggest that

> they try the samples we have as they are really yummy. While I do that I am estimating what the bill might be like, just kinda guessing, so that when I put it into the register, the amount that comes up is about what I expect. Then I give them their change and smile at them and hopefully they come back. (Interview, food retail)

This view is a far cry from the more widely held perception among more senior members of the community that retail is about operating with numbers, mental calculations, and counting back change. All these tasks involve simple forms of mathematics, but from the survey and subsequent interviews, a significant number of senior respondents were highly critical of young retail assistants. The survey reported that senior respondents valued mental calculation and use of number, whereas young employees saw more applied areas of mathematics as being important in the workplace, and particularly those relating to the use of technology. Using a step-wise multivariant analysis, there were statistically significant differences at less than $p \leq 0.001$ showing that senior respondents saw the value of mental calculation as being more important than younger respondents, while younger respondents saw applied areas of mathematics and use of technology to support numeracy/mathematics as more important than their senior respondents (Zevenbergen, 2004). The other sources of data collected through the study reinforced this outcome. Some representative comments are used to illustrate this finding:

> Employer: The only thing I will say is that I am extremely shocked at how many young people can't add up in their head. And it's something that I spend a lot of time teaching my staff here, especially the young ones. And I always find the older people always have done it, probably because at school they didn't use calculators as early as what children do now. (Interview, food industry)

> Employer: Young people don't seem to have the ability to calculate [mentally] things like we used to. They need calculators to work out change when the cash register does not work. They do not know when the change they are giving is incorrect. (Interview, not retail)

> Job Placement Officer: One of our biggest problems in placing young people is the difficulties they have with calculating. We hear it all the time - that young people have no idea of how to add up things when you buy stuff and have no idea if what they ring up is right or wrong, or if they put in $50 instead $5, they just count the change out and have no idea it is wrong. (Interview, focus group)

> Teacher: I find it frustrating when I go shopping and they [retail assistants] have no idea if it is right or wrong. They just rely on the register; they scan it, and smile nicely at you, but really have no idea. They might be really nice kids, but some of them just have no idea. (Interview)

These types of comments were a view that was commonly reiterated across all data sources. It was a theme whereby young people's numeracy levels were seen in relation to the retail industry, and where there was an expectation that the practice of retail involved adding up the items and then working out the change. However, participants in retail and hospitality did not appear to adhere to this view as much as others external to these fields. This view was reinforced by young people in the workplace. In the interview below, the retail assistant is recounting an incident where she had made an error in scanning items and the customer accused her of being innumerate.

> Retail Assistant: When it is peak time, you get people through all the time and some of them are really nasty. You have to be nice to everyone. One day I had

> this grumpy old man come through and I rang up his stuff wrong. Well he ripped right into me. [He] told me I was dumb and I needed to go back to school and that the company should give my job to an intelligent person. I got upset, but when I looked at his docket, I could see that I rang up one item twice and that's where the mistake was. I called my supervisor over to alter the till and he was going mad. I started to cry and my supervisor asked him to come over to the inquiry desk to fix it up. It is so hard when it is busy and it is easy to make a mistake but I could see what I did wrong, he just wouldn't listen. (Interview, department store)

Similarly, in the following case, the retail assistant recounted a story comparable to that of the department store assistant.

> Retail Assistant: One of the big problems with this job is snakey customers, you get some real awful people through who just want to bag you, particularly the older ones, mums in a hurry, you know those sorts of people. If I make a mistake and you often can see it when it comes up, so you go back and check the docket for what I did wrong. I see the mistake and have to get the supervisor over to fix it. They go ape and call you all the names in the world but hey, I am not allowed to fiddle with the register. I saw my mistake. I can't help it if I am not allowed to do some transactions on the register. Sometimes you have to wait a little while while the supervisor comes over and then make small talk with them. You can't blame the boss, or people might knock off the money or fiddle the figures. (Interview)

There were numerous examples of a similar nature from the young people, where they reported being often perceived by older people as lacking in particular and narrowly defined skills. In the first example, the retail assistant confirmed the views that older people perceive the work of retail as being one of addition and subtraction, in terms of adding up the amounts and the change to be given. Her error in scanning was seen by the customer to be an error in arithmetic. As she notes, she realized she had made an error and had developed a strategy to identify the error, but this was different from the expectations of the customer. As the previous comments indicate, and supported by the survey data, it would appear that older people see the practice of retail within arithmetic frames of reference. In contrast, the assistant described her task holistically – she did not do the calculation of the account but was able to recognise the error as being one of entering an article twice. In this case, the young person's orientation to the task was to problem-solve rather than calculate. There were clearly different orientations in how the generations were seeing the task. In the second case, this view is reinforced but extended, where the retail assistant articulates how his practice was shaped by the technological tool he was to use and the rules within that field. Thus, the structuring practices within the field shaped the ways in which he could work. This had implications for how he was perceived by the public. In later sections of the interview he talked about how difficult it was to make small talk with angry customers while he had to wait for supervisors to come to adjust the register (sometimes for scanning errors or pricing errors). This again reinforced the importance of the social skills needed for these positions.

Digital Workplaces Shaping Numeracy Practices

What these data suggest is that the nature of retail has changed dramatically. The new forms of technology that are being used create new ways of working. As the employer noted at the start of this section, her expectations of employees are not about their mathematical skills, but their customer service skills, as the technology is available to

do the mathematical tasks. Furthermore, as the baker noted, he required the actual details of sales, such as the number of loaves sold, in order to be able to model his weekly sales effectively and efficiently. To this end, technology is shaping the nature of the retail industry in ways that are different from those of the past.

The habitus of senior members of the community has been shaped by older retail practices where skills related to arithmetic and mental computation were an integral part of the retail transaction. In this way, it can be seen that their comments are representations of their habitus and, as such, shape what they see as valued knowledge and skills within the retail industry. However, their habitus has not been reshaped by the digitalization of the retail industry, so they are failing to recognize and value the new skills of millennial workers. Indeed, the social skills noted by the employer as being critical were also reiterated by the employees, but as one senior person sarcastically noted "and then they smile at you". From the interview, this participant saw the young person as innumerate, and then smiling as if to cover up his or her innumeracy. In contrast, the young people's comments and those of the employers reflect the importance of good customer skills.

Millennial Retail Habitus

In this section, I draw on data from young workers in the retail industry to highlight their dispositions to working in the field. These dispositions can be seen as representations of their habitus. Through interviews and the case study approach, data from the participants illustrate their views and orientations to working in the retail field and how they undertake their practices.

> Retail Assistant: [In this job it is] just adding, just totalling up things. When they've got vouchers, we have to take off the $2.60, and what you're left with, and stuff like that. It's probably adding and subtracting. Everything's done through that register, but if you know someone's going to muck around, and you already know how much something's going to be, then you tell them without putting it in. That way before I even put it in the register, I can take their money, and go thanks very much, and when they walk away, that's when I'll put it in. (Work shadowing, pre-observation interview, bakery)

Within this comment the assistant refers to the importance of customer service but also that "everything is done through the register". She is aware of the need to enter all items for product modelling, but when it is a busy time, she would do the task mentally to expedite the process and then enter the amounts/quantities later. In this sense, she saw the task as customer service and was able to work flexibly within the constraints imposed.

When undertaking the work shadowing, the retail assistant was shown a photograph and asked to explain what was happening and her thinking associated with this work:

> Retail Assistant: So I put in what they've ordered, you know custard scroll, 2 custard scrolls, like that, and if they give me a $10 note, we've got $3.40 in there, we've got fast cash, like $5, $10, $20, $50, so if they give me $50, I just hit that button, and it tells me how much change to give. But if they've given me $3.50, I just press cash, and give them 10c, it's easier. (Workshadowing, bakery).

In this example, she articulates how she undertakes her practice – it is not always the case that the register is used to calculate change, but contextually bound. In this instance, she has indicated that it is dependent on the interaction and amounts being

tendered. For Bourdieu (1992) coming to understand practice requires a suspension of meta-analysis, such as that which is found in scientific rationality. He argued that the practice is bound up in the actions, which are inextricably part of the practice, so that it is almost impossible to undertake a meta-analysis of a particular practice outside that practice itself. A theme that occurred throughout the project was that young workers saw their tasks holistically. As the employer at the start of this paper acknowledged, the skills needed for the workplace are not primarily in mathematics, but more about their social skills and capacity to work with others. The data collected in this project suggest that young retail assistants align with this view.

Deferring Cognitive Labour to Technology

The young people in this study had strong dispositions towards the use of digital technologies in the workplace. In the sections that follow, I use data to illustrate the digital habitus of the workers and their dispositions towards the use of technology in their numeracy practices. The use of cash registers in this study is a case in point. In one workplace, the training manager expressed his concern that, in the training process, he found employees were quick to jump into using the machines and would not wait to learn.

> Store Manager: Young people come here unafraid of technology. They don't have the respect for it that older people do. They see it as something they take for granted. As we get more technology here, I can see that we will need to employ more young people. They rush into learning with the new registers and don't want to listen when we are training them. Sometimes, this can create huge problems when they push the wrong buttons and customers get angry, but they don't seem too worried about the mistakes – only that the customers are yelling at them. (Interview, retail manager).

This comment suggests that the employer has a number of issues, but also sees strengths in the young employees. His view of learning is one where there is a trainer who 'teaches' in a particular way. This does not address the ways of working and learning that many young people prefer. In terms of digital environments, they have a habitus that has been shaped by their lifelong exposure to digital technologies – that is, they are digital natives – so coming into training environments with digital media is a familiar situation for them. As the employer notes – "they are unafraid of technology" and "something they take for granted". In contrast to the digital immigrant trainers and employers, the young employees "rush into learning" and "don't want to listen". Being exposed to digital media from a young age has shaped the habitus of these young workers, which, in turn, provides different dispositions for working from their supervisors.

Using simple technology, such as a calculator, was common. For the employees, it was seen as a device that could be used to support their work – much like a hammer or other tool. Whereas in modern times, manual labour was continually being replaced by new machinery, the same could be said of tools in post-industrial times. In modern times, tools enabled workers to defer manual labour to such devices. In post-industrial times, digital tools are enabling young workers to defer cognitive labour to these tools, and thus enable them to undertake other tasks. As noted in an earlier section of the paper, retail assistants noted the work they undertook was framed in more expansive modes than the narrow arithmetic conceptions of senior participants. This is

aptly summed up in the following comment by a retail assistant in a large supermarket:

> Shop Assistant: Why would I go and add all these items up. The register is faster, more accurate and more reliable. My job is really to see if they add up to something that looks right. My job is to keep the customer happy and the boss rich. It would take too long to do addition.

Her comments reflect the changed nature of shopping, where customers purchase large quantities of goods and it would not be possible to add all the items quickly. Rather, other tools - including estimation to check the appropriateness of an account, and problem solving techniques should the account appear to be erroneous - were more appropriate to the contexts in which she worked. Other respondents also commented in comparable ways as can be seen in the comments below:

> Food Delivery: When I get the orders ready for delivery, I always use a calculator to work out how much it will cost. Like they write the order on the bag and put the money in. I enter the food to see how much it is and then the change. I also have to think about credits they might have. If I think I have made a mistake, it is quicker for the calculator to do it than for me to go through it all again. It is quicker and more accurate so I think why not use it so I can do the other things that I have to do. (Interview)

> Console Operator: In this job, all I do is punch in the items and then the register does the rest for me. I then put in the money they give me and it tells me how much change I have to give them. I don't do anything else except if there is a mistake – like I put in the wrong petrol pump or the wrong money or scan too many other items they buy. I have to have a bit of an idea of what it should cost but that comes automatically when you have been here long enough. I have to work out where the mistake is, but then you re-enter it into the register. (Interview, petrol station)

The deferral of the cognitive labour to technology makes considerable sense in current work conditions. As the participants and retail employers have noted, the practice of retail sales has undergone substantial change and there are numerous demands on young workers as they complete their interactions with customers.

Summary and Conclusions

The results of this study suggest that retail assistants approach their numeracy work in unique ways that are often different from the expectations of senior members in the wider society. They are more likely to approach tasks holistically; to use estimation; to problem solve; to use technological tools to support their work and thinking; to use intuitive methods; and to see tasks aesthetically. The field work raises issues about the dispositions that young employees have towards their work and how they undertake the tasks in the field.

The project has identified that young people in work may undertake numeracy practices that may be quite different from those expected (and undertaken) by older generations. The study has indicated that retail assistants tend not to rely on mental calculations, where there is a focus on accuracy, but to estimate. This approach conflicts with that of many older people, who tend to value the 'old skills' of mental calculations and accuracy, and who see the use of technology as a short cut that is not valued.

From this study, it appeared that retail workers enter the field of work with particular dispositions that enable them to undertake work in ways that are different from their predecessors. Concurrent with this is the changing nature of work, where digital tools are an integral part of contemporary workplaces and which shape the ways of working in these new workplaces. Young workers may enter the workplace with a habitus different from that of older generations, and which positions them in ways that are contradictory to the current structuring practices within many sites. The study highlights potential tensions between the habitus of young workers and older participants in the field. While power is retained by older workers, some of whom tend to fail to recognize and value the dispositions that many young workers bring to a site, the capital they bring to work fails to be validated and hence is not drawn upon.

The habitus of the young participants and their predisposition to use technology meant that they worked in very different ways from older generations. Not only were they less likely to perform mental calculations, but they were more likely to use estimation and to problem solve more effectively than their employers and older peers. These skills may better suit the contemporary workplace and hence are forms of capital that young workers bring to the retail industry. They are different from old skills, but more aligned with the changing nature of the retail industry. Recognising these skills, how they align with contemporary practice, and developing more appropriate selection protocols, may support retailers and young people in work placements and training.

This study has highlighted potential differences between young people and older people in the retail industry, and the changing nature of work in this field. To this end, the outcomes suggest that young people may not have problems with mathematics and/or numeracy per se, but may have different dispositions towards working mathematically than their older peers. Consequently, it may be more appropriate to think of young workers as being differently numerate, rather than being innumerate.

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