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LMIP WORKING PAPER 24

Pathways through Education and Training and into the Labour Market

Michael Cosser

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LABOUR MARKET
INTELLIGENCE PARTNERSHIP

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Preface

One of the gravest economic challenges facing South Africa is high unemployment, but at the same time, a skills mismatch. The market demand for skilled labour is greater than the number of individuals completing post-school education and training. Prospective employers often complain that the education system does not give individuals the necessary skills to be productive in the workplace, or to start their own enterprises.

Government acknowledges that the unemployment crisis is a systematic problem and cannot be addressed by ad hoc interventions scattered across line departments. With this 'big picture' thinking in mind, DHET aims to create broad and equitable access to a full spectrum of post-school opportunities and lifelong learning encompassing adult education and training, workplace training, the FET college system, artisan and technical training, higher education and innovation.

DHET's ability to create these learning opportunities requires a network of partners to gather and maintain a labour market intelligence system. Such a system can provide analytical insights to support policies and intervention programmes.

In February 2012, therefore, DHET commissioned a HSRC led research consortium to support its capacity to create and maintain a labour market information and intelligence system, guided by the national Delivery Agreement 5. The primary focus is the development of a 'strategic intelligence capability' towards the establishment of 'a credible institutional mechanism for skills planning'. The HSRC coordinated research project is organised in terms of six interlocking research themes, two which focus on labour market information and four which focus on labour market intelligence:

- Theme 1. Establishing a foundation for labour market information systems in South Africa
- Theme 2. Skills forecasting: the supply and demand model *(a Wits EPU project)*
- Theme 3. Studies of selected priority sectors
- Theme 4. Reconfiguring the post-schooling sector
- Theme 5. Pathways through education and training and into the workplace
- Theme 6. Understanding changing artisanal occupational milieus and identities

The consortium made a strategic decision that their research must not duplicate or repeat existing research about the challenges facing South Africa's education and training system and labour markets. Their research must address gaps, promote synergies and explore complementarities.

Hence, as a first step, working papers were commissioned to inform the research agenda for each theme. Although the working papers cover different issues, each has four common dimensions: policy challenges to institutionalise and build a post-school education and training system in South Africa, lessons from seminal national and international research, conceptual frameworks, methodological issues and data challenges raised by this research, and potential research gaps.

One of the HSRC led consortium's goals is to create a living community of practice that researches and debates education, skills and labour market issues. These working papers were presented at a conference in May 2012 to start building such a research network.

The dissemination of these working papers is intended to encourage more individuals to join the research community. We look forward to individuals' comments. They can be emailed to agoldstuck@hsrc.za.za. Welcome to the research community!

Theme 1:	Theme 3:	Theme 4:	Theme 5:	Theme 6:
Establishing a foundation for labour market information system in South Africa	**Studies of selected priority sectors**	**Reconfiguring the post-schooling sector**	**Pathways through education and training into the workplace**	**Understanding changing artisanal occupational milieus and identities**
Simon McGrath Some international reflections on developing VET indicators	**Haroon Bhorat and Morne Oosthuizen** Studies of Selected Priority Sectors in the South African Labour Market: A Proposed Research Programme	**Andre Kraak** Private post-school education in South Africa	**Michael Cosser** Pathways through education and training and into the labour market	**Angelique Wildschut** Conceptualising the study of artisans
Phil Toner Establishing a foundation for labour market information systems in South Africa	**Peter Jacobs and Tim Hart** A critical review of the research on skills development in rural areas	**Andre Kraak** Differentiation in the post-school sector	**Pundy Pillay** Pathways through education and training and into the workplace: a concept paper	**Jeanne Gamble** Models and pathways to institutionalise apprenticeships
Anthony Gewer Developing a framework for institutional planning and monitoring in FET Colleges	**Shirin Motala** A critical review of research on skills development and labour market demand in the early childhood development sector	**Joy Papier et al** Contemporary issues in public FET colleges	**Sharlene Swartz** Navigational capacities for youth employment: A review of research, policies, frameworks and methodologies	
Carmel Marock Developing a framework for understanding SETA performance: Monitoring and evaluating their role in skills planning, steering and enabling a supply within their sector	**Thembinkosi Twalo** A comparative review of skills development in cooperatives	**Veronica McKay** A critical review on Adult Basic Education (ABET) in South Africa	**Fiona Lewis** Traffic jams or trees – how are South African youth progressing through the higher education sector? And what lessons can we learn from current studies?	
Bongiwe Mncwango Towards a demand side firm level survey of labour information in South Africa	**Margaret Chitiga and Stewart** Development of a national skills forecasting model	**Thenjiwe Meyiwa and Nolutho Diko** The state of graduate teacher transitions to the labour market	**Stephanie Alais** Jobs? What jobs? Skills? What skills? An overview of studies examining relationships between education and training and labour markets	

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Michael Cosser and Fabian Arendse Education and labour market indicators	**Imraan Valodia** Conceptualising skills development in the informal sector	**Felix Maringe** An overview of studies exploring systemic issues related to the South African post-school sector		
Joan Roodt National database sets and research on labour market demand		**Peliwe Lolwana** Is post-school education adult education and training? The shape and size of post-school education		
Mariette Visser National database sets available for post school sector (supply side)		**Michelle Buchler** A critical review of research on skills development qualifications structures		
Michael Gastrow Innovation, skills development and South African labour market intelligence		**Volker Wedekind** Towards responsiveness and employability in the post-school sector		

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EXECUTIVE SUMMARY

Cross-sectional surveys of student trajectories through the education and training systems and into the labour market, like those mounted by Statistics South Africa, are useful in providing snapshots of the status quo at any given time. Because student movement is frequently non-linear, however – in terms both of temporal progression up the education and training ladders and of one-way movement into the labour market – other mechanisms are needed to account adequately for such movement. Panel studies provide the most comprehensive and insightful means not only of tracking students along their various pathways but of facilitating understanding of the factors that shape those pathways. This paper reviews the literature on panel studies and on models for tracking students before suggesting how a particular model might be applied in the study of student pathways in the South African context.

INTRODUCTION

Most of our knowledge about the involvement of the South African populace in education, training, and the labour market is derived from household surveys – the quinquennial Census; the Community Survey; and the erstwhile October Household Survey (now the Labour Force Survey) in particular. All these household surveys are conducted by Statistics South Africa (StatsSA), which has built up a formidable repository of data on these and other topics. Before the publication of *Responding to the Educational Needs of Post-school Youth* (Cloete, 2009), which was based on an analysis of the Community Survey of 2007 (StatsSA, 2007), there was, however, little mining of StatsSA data on young people; hence the intense interest among researchers and policy-makers alike in the appearance of the Cloete book. In particular, the finding that 2.8 million young South Africans between the ages of 18 and 24 were not in education, employment or training ("NEET") and not severely disabled in 2007 has galvanised policy-makers into confronting the problem head-on: the Green Paper for Post-school Education and Training (DHET, 2012) reproduces a key table from Cloete (2009) disaggregating the 2.8 million by education level and age. What the table does not show, however – and what the Green Paper does not pick up on – is that the number of youth NEET and not severely disabled represents 41.6 per cent of 18 to 24-year-olds[1] – an alarming statistic despite a high unemployment rate (32.8 per cent[2] according to the 2007 Community Survey) across all working age categories.

Notwithstanding the obvious usefulness of the kind of analysis undertaken by Cloete (2009), analysis of data from the Community Survey and other similar surveys is limited in three ways. First, although it is technically possible to disaggregate data in a detailed way (for example, the age and completed year of education of every household member can be calculated), it is cumbersome to report data at this level of specificity. Thus Cloete's (2009) table in the Green Paper (DHET, 2012) groups education levels – for example, "Primary or less"; "Grade 10/Std 8 or higher but less than Grade 12" – which loses the specificity of completed *year* of education. Second, the mere fact that household surveys of the Census or Community Survey kind are not conducted annually means that they cannot do more than provide snapshots of social situations, albeit at regular intervals. And third, the underlying reasons for a particular social phenomenon are not always visible from (because they were not addressed in) the Community Survey. Why is it, for example, that such a large proportion of the youth are NEET and not severely disabled? We may speculate that poverty, low socio-economic status (SES), and poor educational opportunities contribute to this phenomenon; but without careful analysis of the factors influencing youth pathways over an extended period, we are unable to say much more than this. Understanding the dynamics of youth pathways through different institutions and the factors that shape the aspirations they have and the choices they make paints a holistic, and therefore powerful, picture of skills formation and deployment in the youth labour market.

These three limitations of household survey-based research point to the need for pathway studies that track young people, year by year, through the education and training system and (where appropriate) into the labour market.

This paper provides, in the course of a review of the literature on pathway studies, a conceptual framework within which future research might be located, and suggests how such research might proceed.

[1] Author's own calculation from the Community Survey 2007.
[2] Author's own calculation from the Community Survey 2007.

CONCEPTUAL FRAMEWORK

A framework within which a proposal for a programme of research on pathways is located is discussed below. Three theories are outlined: youth-to-adulthood transition; aspirations gap; and factors influencing student choice behaviour.

1. YOUTH PATHWAYS AND THE TRANSITION TO ADULTHOOD

Pathways and transitions from one education system to another and from one institution type to another are located within the broader transition from youth to adulthood. The nature of that transition and the factors that influence how and when it occurs will clearly impact upon the transitions within the education and training systems and between these and the labour market. The early adult transitions are typically: leaving home; finishing school (in the South African context, college or university); starting work; getting married; and becoming a parent (Mouw, 2005). Notionally (according to a traditional sequentially ordered paradigm of youth-to-adult transition) we are interested in the first three of these. However, there is no reason why marriage and childbirth cannot be interspersed with them, rendering the traditional paradigm flawed. Thus, for example, Rindfuss, Swicegood & Rosenfield (1987) found more than twenty years ago that the sequential order in which these transitions occur was becoming less predictable. Mouw (2005: 256) caricatures the situation thus: "The popular image of the 'Generation X' twenty-something living a prolonged adolescence by delaying serious employment and family responsibility gained widespread currency in the 1990s and lends credence and imagery to the raw demographic data *suggesting a delayed and chaotic path towards adulthood*" (emphasis added). As Mouw points out, however, this is likely to be an exaggeration, since adult generations routinely lament the inability of the next generation to live up to itself.

Nevertheless, transition-to-adulthood theory provides a useful correlative for an examination of transitions and pathways through the education and training system and into the labour market, particularly from the perspective of the timing of these pathways and transitions. Stevens (1990) used US census data to find the age difference between the time 25 per cent and 75 per cent had achieved a particular adult transition. He found that the time it took the 25^{th} to 75^{th} percentiles to achieve the transitions declined from 1900 to 1960, and that the transitions were more likely to happen at the same time. By 1980, however, these trends had begun to reverse. The sequence of transitions, within the 15 to 24-year-old age range, from school to further schooling, school to the labour market, school to college, school to university, college to university, the labour market to college and university, and any other permutations not indicated here will constitute one of the theoretical paradigms for the proposed set of studies.

2. THE ASPIRATIONS GAP

What students dream of doing one day and what they end up doing may be two very different things. How far apart aspirations and destinations are is the subject of a paper by Ray (2002) on the "aspirations gap", which, in an economic context, he defines as the difference between the standard of living aspired to and the standard of living one currently has. That gap can be small or large. In the context of school-to-further learning and school-to-work transitions, the aspirations gap may be conceived of as the difference between where a student aspires at a particular point in time to be and her / his actual destination a year (or several years) hence. For some students, their aspirations will have been fulfilled: they aspired, for example, to a higher education, and they got there (enrolling in a higher education institution). There is no aspirations gap for this sub-set of students. For others, their aspirations will have been partially fulfilled: they aspired to a university education,

and they attained a National Senior Certificate (NSC) without endorsement that enabled them to access a University of Technology but not the more academically rigorous university education towards which they had aspired. There is a small aspirations gap for these learners. And for others, their aspirations will not have been fulfilled at all: they aspired to a higher education, but failed the NSC. For this sub-set, the aspirations gap is large.

Ray's account of the aspirations gap continuum is summed up as follows:

> If economic betterment is an important goal, the aspirations window *must* be opened, for otherwise there is no drive to self-betterment. Yet it should not be open too wide: there is **the curse of frustrated aspirations**. There must be individuals in our immediate cognitive neighbourhood who do better than we do, yet if they do a *lot* better, there will be no investments made even if the cognitive neighbourhood to such individuals is unbroken. In short, the experiences of others may have little effect on us *either* because they lie outside our aspirations window, or even if they do, their living standards (which form our aspirations) are far away from ours (Ray, 2002: 4; **emphasis in bold added**).

The combination of pathway model and aspiration gap approaches suggests that a major thrust of the research to be undertaken within this theme should be to ascertain the extent of difference between students' aspirations for future endeavour and their actual destinations one or more years hence. At the broadest level, this entails assessing the difference between students' aspirations at school in grade 9 and their attainment of their goals for further study, for work, or for travel over the next decade.

3. FACTORS INFLUENCING STUDENT CHOICE BEHAVIOUR

The broad consensus from a reading of the student choice behaviour literature (see, in particular, Jackson, 1982; Chapman, 1984; Hanson & Litten, 1982; Hossler & Gallagher, 1987; Temple, 2009; Wagner & Fard, 2009; Coy-Ogan, 2009; Afful-Broni & Noi-Okweni, 2010; Ming, 2010) is that a range of factors influences students' intentions and behaviour with regard to progression to the next level of education. (This literature focuses on the transition from school to higher education, but is germane to any stage of transition.) These are:

- personal characteristics (race, gender, personality type)
- family background characteristics (socio-economic status, family background, household income); and
- institutional characteristics (quality of teaching and its impact on learners' academic performance; provision of career guidance; location and size of institution; cost of tuition; access to information; range of programmes offered; financial aid; job prospects after graduation).

An important dimension of the student choice behaviour literature is a focus on branching points in decision-making. In an ideal world, student choice behaviour would be a matter of unfettered choice. In reality, however, students make choices on the basis of the options open to them – options constrained both by personal and socio-economic circumstances (race, gender, socio-economic background, etc.) and institutional factors (institutional selection mechanisms, institutional capacity, etc.).

In the South African secondary education system, there are two critical points at which students make decisions. The first is in the course of the Grade 9 year,[3] when students decide on the combination of subjects they will take for the remainder of their secondary schooling; and the second is in the Grade 11 or Grade 12 year, when students decide whether to enter higher education, a Further Education and Training (FET) institution, or the labour market. While decision-making may be a fairly workable notion for Grade 11 or 12 learners, however, Grade 9 learners are in many instances constrained by their own ignorance of the consequences of selecting subjects for their upper secondary education, or indeed by their academic performance in the subjects they have taken to date. Nevertheless, these branching points, as Boudon (1974) calls them, constrain students in different ways. For example, for young students (notionally aged 15) from low socio-economic backgrounds there are costs involved in deciding whether to continue with upper secondary education (or FET, in the language of the National Qualifications Framework), and if so what combination of subjects to pursue. The choice of subjects for FET is made at the Grade 9 level; and since this choice of subjects may well determine whether a student pursues further learning after school, no study on student choice behaviour can afford to ignore this critical branching point.

What is abundantly evident from the body of research on student choice behaviour alluded to above is the shift from a focus on educational outcomes as the key predictor of progression to further learning to an understanding of the interrelatedness of a number of variables in the decision-making process. The observation of Gayle, Berridge and Davies (2000: 62) that "The effects of these [individual and social background] factors are [best] understood as part of an ongoing social process that underpins the young person's educational career" hints at the need for longitudinal studies into the influences of different social factors on student choice.

METHODOLOGICAL APPROACHES TOWARDS STUDYING THE DYNAMICS OF STUDENT MOBILITY

Given the need articulated above to understand the dynamics of student progression and concomitant skills development flows through the education and training system and into the labour market, the challenge is to identify the most efficient and effective mechanisms for undertaking such monitoring activity. Longitudinal research would seem to embody the best means of achieving this.

Over the last decade, South Africa has participated in a number of large-scale assessments of education such as TIMSS (Reddy, 2006), PIRLS (Howie et al., 2007) and SACMEQ (Moloi & Strauss, 2005). These cross-sectional surveys are a rich source of information about educational quality at a given point in time. Compared to more sophisticated survey designs, such studies have the added advantage of being less expensive and easier to administer. Their main weakness is the limited view of the educational process that they provide. Learning is cumulative. Without information that spans a period of time, it is impossible to determine exactly how learning inputs and outputs are related. Longitudinal studies overcome this limitation by collecting information from the same individuals and organisations over time.

Longitudinal studies vary in their complexity, ranging from descriptive trend and cohort studies to more in-depth panel studies. Trend studies are useful for monitoring general changes in a population over time. Although they are both flexible and cost-effective, they lack the level of detail that would allow the researcher to make any causal claims about the effect of educational characteristics on learning outcomes. Cohort studies would be suitable in situations where interest lies in the impact of a particular environment on learning. In a cohort study, a group that has been exposed to a

[3] Notionally at the age of 15 – though frequently, because of commencement of schooling at an advanced age, interruption of schooling, or repetition of previous years of study, at age 16 or 17.

particular environment is compared to another group that has not been exposed. These groups are not determined by the research design. Cohort studies circumvent ethical issues that may arise when children are randomly assigned to different study conditions and it later discovered that particpation in a particular group has an enduring effect on educational development. This strength is also a fundamental weakness of a cohort study because there are inevitably other factors that have influenced the decision to be part of a group. A choice of what school to attend may be driven by a number of factors that are beyond the scope of a study and these unknowns will threaten the study's validity.

There is growing recognition that a panel study is the most suitable approach to understanding what the long-term effects of the schooling process are. In education, panel surveys involve identifying a representative sample of learners and then following these individuals with additional surveys as they move through their educational careers. With a well designed panel survey, it is possible to develop statistical models that explain the underlying causes of academic success and failure as well as the the interplay between influences of the school and home. Their cost and complexity mean that careful attention to the design process is required from the onset so that proper comparisons can be made.

Panel studies are commonplace in various parts of the developed world. Some of the better known are collated by the University of Michigan (2011). The compilers of this list include two South African panel studies: the KwaZulu-Natal Income Dynamics Study (KIDS) (1993, 1998); and the National Income Dynamics Study (NIDS) (2008-present).

KIDS is a 10- year, 3-wave panel survey. In 1998, a consortium of South African and international researchers re-surveyed 1 100 of the households that were first surveyed in 1993 in KwaZulu-Natal province as a part of the national Project for Statistics on Living Standards and Development. Triangulating different methodologies, a sub-sample of households was re-visited in 2001 and 2004 using qualitative methodologies (University of KwaZulu-Natal, 2011).

Conceived in 2006, NIDS was the first household-based national panel study to be conducted in South Africa. The South African Labour and Development Research Unit (SALDRU, based at the School of Economics at the University of Cape Town [UCT]), was tasked with this multi-million rand survey. In 2008 the first wave of data collection began when about 300 fieldworkers spread out in all nine provinces of the country in search of the 28 000 people that formed part of the 7 305 selected households. The survey focussed on internal migration, birth and death, savings, health, education and household spending patterns. The Wave 1 NIDS data were made public at the end of July 2009. In 2010, Wave 2 of data collection took place. The same respondents visited in 2008 were tracked within the borders of the country, and interviews were conducted with household members where new households had come into being as a result of migration (University of Cape Town, 2011a).

A third panel study conducted in South Africa is the Cape Area Panel Study (CAPS), a longitudinal study of the lives of youths and young adults in metropolitan Cape Town. The first wave of the study collected interviews from about 4 800 randomly selected young people age 14-22 in August-December, 2002. Wave 1 also collected information on all members of these young people's households, as well as a random sample of households that did not have members aged 14-22. A third of the youth sample was re-interviewed in 2003 (Wave 2a) and the remaining two-thirds were re-visited in 2004 (Wave 2b). The full youth sample was then re-interviewed in both 2005 (Wave 3) and 2006 (Wave 4). Wave 3 also includes interviews with approximately 2000 co-resident parents of young adults. Wave 4 also includes interviews with a sample of older adults (all individuals from the original 2002 households who were born on or before 1 January 1956) and all children born to the female young adults. The study covers a wide range of outcomes, including schooling, employment, health, family formation, and intergenerational support systems (University of Cape Town, 2011b).

Besides KIDS, NIDS and CAPS, there is another South African panel study worthy of mention: the Birth to Twenty (Bt20) Programme. For seven weeks between March and June following Nelson Mandela's release from prison in 1990, 3 273 children were born in the metropolitan area of Johannesburg-Soweto and enrolled into a long-term birth cohort study that would follow them and their families for the next 20 years. Bt20, colloquially nicknamed Mandela's Children, is the largest and longest running study of child and adolescent health and development in Africa, and one of the few large-scale longitudinal studies of its kind in the world (University of the Witwatersrand, 2011).

THE NEED FOR EDUCATIONAL INSTITUTION-BASED PANEL STUDIES

All the surveys recorded in the University of Michigan (2011) list bar one, as well as CAPS and Bt20, are household surveys. There are clear advantages to conducting household surveys. They allow for geographical representivity. They provide access to household and not only individual characteristics. The fact that most people live in households allows for almost complete coverage of the population. Households provide a convenient place where people can be contacted to be interviewed. And, as manifested by the University of Michigan list, a large number of household surveys are conducted, which allows for cross-validation of the results of different surveys.

Household surveys are not ideal, however, when it comes to the collection of detailed information from and about educational institution-based learners. Educational institution-based surveys have certain advantages over household surveys: not only do such institutions provide a "captive audience" for the researcher through the institution's provision of a list of names, which makes the survey simple and fairly inexpensive and yields high response rates; but these surveys offer greater freedom of response in comparison with household surveys, learners not being inhibited by having to answer questions in the presence of family or other household members, or indeed having parents / guardians answer on their behalf.

Four school-based panel studies, two of them South African, one Canadian and one Australian, are briefly discussed here. The first is the 2005 Grade 12 Learner Aspiration and Destination Study, which sought to understand the factors influencing learners' trajectories as they moved from their grade 12 year into their various post-school pursuits. The study pursued a nationally representative sample of 20,659 learners from 362 schools into their destinations in 2006 and again in 2008. The findings from the baseline (2005) and first tracer study surveys are reported by Cosser (2009) and Cosser with Sehlola (2009) respectively.

The Grade 12 Learner Aspiration and Destination Study had three limitations. First, it did not collect information on what had informed learners' grade 9 subject choices, and it did not examine in any detail learners' passage through school. Second, it collected only limited achievement data (learners' grade 11 subject results), and failed to collect further achievement data for learners who proceeded into formal learning institutions (universities / colleges) after school, except at the generalised level of passing grade. And third, it was self-limiting in its methodology, relying on inadequate postal addresses provided by learners and an even more inadequate postal service to track learners over the next three years. The result of the third limitation was huge attrition: only 17,642 learners provided usable addresses for the first tracer survey, only 4,278 of these learners responded to the first tracer survey, and only 920 of these learners responded to the second tracer survey, in 2008. In other words, there was a 95.6% attrition rate – a loss of 19,739 learners – over the 2005-2008 survey period.

The second South African panel study, also limited in its duration, was the National School Effectiveness Study, the first large-scale panel study of educational achievement in South African primary schools. Data for the National School Effectiveness Study (NSES) were collected between

2007 and 2009 on a nationally representative sample of schools in South Africa. The project was managed by JET Education Services and funded by the Royal Netherlands Embassy. Students in 268 schools in eight of the nine provinces of South Africa (excluding Gauteng, where other school-based research was underway at the time) were tested in literacy and numeracy in 2007 (grade 3), 2008 (grade 4) and 2009 (grade 5). All learners in the grade were tested each year, thereby producing a panel dataset, and the same tests were administered each year, making the results comparable from one year to the next. In addition to the testing, a wide variety of other information was collected through student questionnaires in 2007, 2008 and 2009, teacher questionnaires in 2008 and 2009 and school principal questionnaires in 2007, 2008 and 2009 (Taylor, n.d.).

The third school-based panel study outlined here is the Canadian Youth in Transition Study, or YITS. A longitudinal survey undertaken jointly by Statistics Canada and Human Resources and Skills Development Canada, YITS is designed to examine the patterns of, and influences on, major transitions in young people's lives, particularly with respect to education, training and work. Human Resources and Skills Development Canada and Statistics Canada have been developing the YITS in consultation with provincial and territorial ministries and departments of labour and education. Content includes measurement of major transitions in young people's lives including virtually all formal educational experiences and most labour market experiences, achievement, aspirations and expectations, and employment experiences. The implementation plan encompasses a longitudinal survey of 15 year olds (as of December 1999) to be surveyed every two years (Statistics Canada, 2011).

Fourth, the Longitudinal Surveys of Australian Youth (LSAY), together with YITS, provides the best exemplar of a school-based panel study for emulation in another national context. LSAY track young people as they move from school into further study, work and other destinations, using large, nationally representative samples of young people to collect information about education and training, work, and social development. Survey participants (collectively known as a "cohort") enter the study when they turn 15 years, or as was the case in earlier (pre-2003) studies, when they were in Year 9. Individuals are contacted once a year for 10 years. Studies began in 1995 (Y95 cohort), 1998 (Y98 cohort), 2003 (Y03 cohort), 2006 (Y06 cohort) and more recently in 2009 (Y09 cohort). Over 10,000 students start out in each cohort (Longitudinal Surveys of Australian Youth, 2011).

LSAY provides a rich source of information to help better understand young people and their transitions from school to post-school destinations, as well as exploring social outcomes, such as wellbeing. Information collected as part of LSAY covers a wide range of school and post-school topics, including: student achievement, student aspirations, school retention, social background, attitudes to school, work experiences, and what students are doing when they leave school. This includes vocational and higher education, employment, job seeking activity, and satisfaction with various aspects of their lives.

The methodological advantages of panel studies over cross-sectional studies are well documented by Blossfeld, Schneider and Doll (2009). They show that cross-sectional studies assume stability in the processes investigated (a point first made by Coleman, 1981), whereas educational progression is characterized by change and development rather than a static state. Education research also has to take educational history into account, since individual trajectories differ not only in their end-points but in their starting points and subsequent passage – information not amenable to collection by cross-sectional surveys. The nature of educational transition, moreover, implies that the pathways of individuals need to be investigated at a minimum of two observational points – one at the time of origin (time *t*), the other at the time of destination (time *t+1*). Cross-sectional surveys are clearly ill-equipped to measure the force of these "branching points" (Boudon's term – 1974).

1. MODELS FOR TRACKING STUDENTS

Two models from the literature on tracking students through the education and training system are discussed here – those of Shah & Burke (1999) and Robinson (2004).

The first (Shah & Burke) models student completion rates using aggregated student data on an annual basis. They deploy a Markov chain to model the movement of undergraduates through the higher education system in Australia. Using the age of a student when s/he commences a course, they are able to provide estimates of the probability of that student completing the course. The model also provides estimates for the mean time a student takes to complete the course, and the mean time s/he spends in the higher education system.

Deployment of the Markov chain involves using two characteristics of a student. These are age at course commencement and year of enrolment in the course. For example, a typical transient state is: being a 20-year-old at course commencement and in the second year of enrolment in the course. Since a single year is used as the period of transition from one state to another, this definition implies that a student can enter a transient state only once and cannot remain in it for more than one period. The two absorbing states of the Markov chain are dropout from course and completion of course. Altogether 51 transient states, as identified by crosses in the matrix in Table 2, are included in the model.

Table 1: Transient states of the Markov chain model

Age at course commencement	Year of enrolment in course					
	1st	2nd	3rd	4th	5th	6th or higher
Under 18	**X**					
18	**X**	**X**				
19	**X**	**X**	**X**			
20	**X**	**X**	**X**	**X**		
21	**X**	**X**	**X**	**X**	**X**	
22	**X**	**X**	**X**	**X**	**X**	**X**
23	**X**	**X**	**X**	**X**	**X**	**X**
24	**X**	**X**	**X**	**X**	**X**	**X**
25-29	**X**	**X**	**X**	**X**	**X**	**X**
30-34	**X**	**X**	**X**	**X**	**X**	**X**
Over 34	**X**	**X**	**X**	**X**	**X**	**X**

Note: The combination of the row and column labels of the matrix defines the transient state. States included in the model are indicated by (X).

Source: Shah & Burke (1999: 365)

The combination of the row and column labels of the matrix defines the transient state. The last state in each row has a slightly different interpretation from that of the other states. For example, the last state in the third row is to be interpreted as: being 19 years old at course commencement and in the third or higher year of enrolment.

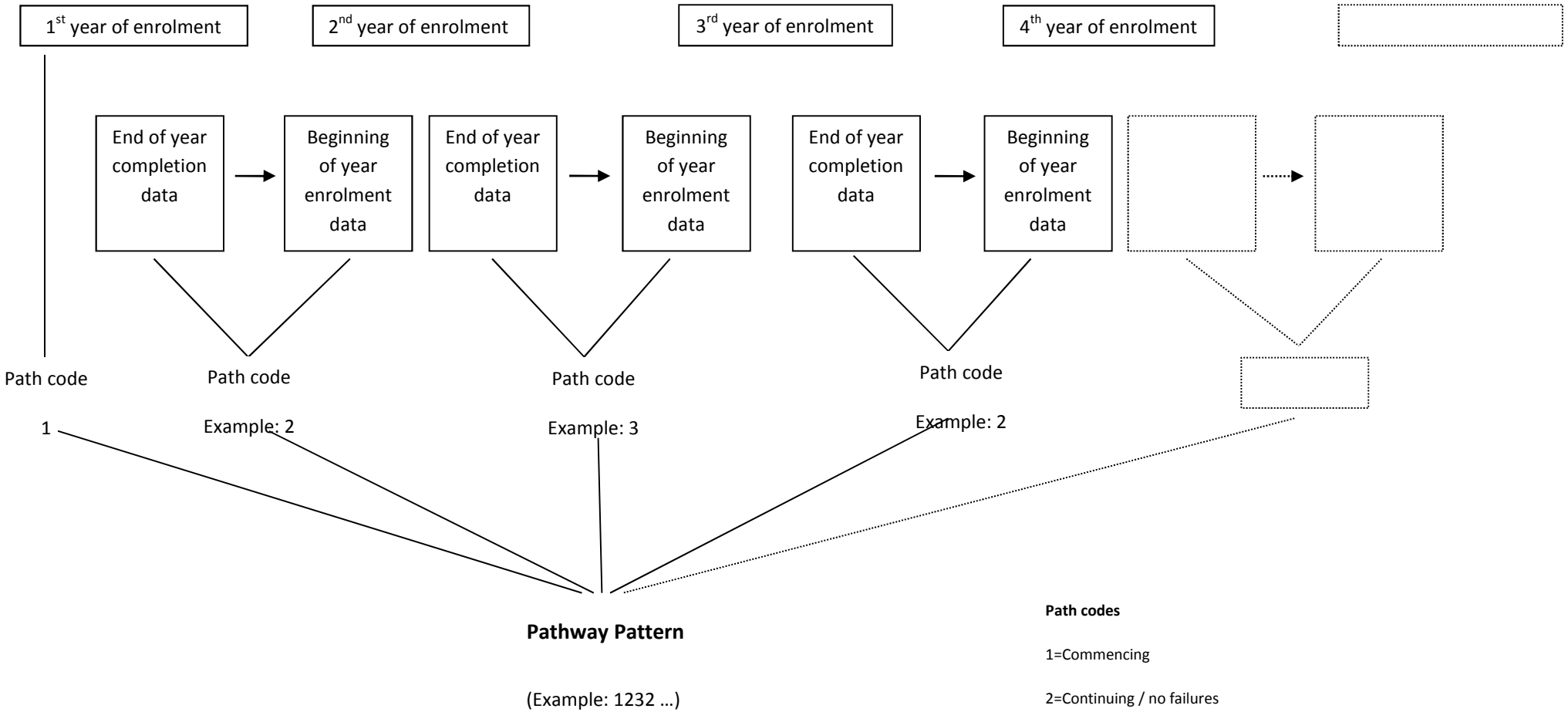
Estimating the transition probabilities clearly relies on data on student flows. Such data may come from cohort analysis, which depends on conducting a longitudinal study. But, claim Shah & Burke, such studies are expensive to conduct and useable data from them are not available for a period of time after commencement of the study. But in cases where longitudinal data are available, as in the

present study, one should obviously draw on them in using a model of the kind (Markov chain) Shah & Burke use in their study.

The second model, developed by (Robinson, 2004), is a technique for identifying and representing pathways of student progression through a degree course. Through reference to student data from 1994 to 2000 supplied by a large public university to the Australian Department of Education, Training and Youth Affairs, Robinson shows how her model allows one to capture information on both the process and outcomes of student progression.

Figure 1 illustrates Robinson's model. Students categorised as 'commencing' at the beginning of the first year of the course in 1994 formed the base cohort (N = 72). A student's completion status at the end of each year for the total enrolled units of study for that year was coded into four categories: all enrolled units of study completed; all enrolled units of study not completed; changed enrolment or transferred to another degree course within the university; and no enrolment in any unit of study.

Completion data at the end of an academic year determined a student's status at the beginning of the following year. If records indicated that the student had re-enrolled at the university but in a different degree course, the student was recorded as a 'transfer' for that year. If records indicated that the student had not re-enrolled at the university then the student was recorded as 'no enrolment' for that year. Status at the beginning of each year was coded as: commencing course – applicable to enrolments in the first year of the study (1994) only; continuing with no failures from previous year of enrolment; repeat of some or all units from previous year of enrolment; or no enrolment recorded.



Source: Robinson (2004)

Figure 1: Identification of pathway patterns from unit of study enrolment and completion data

Information from indicators of enrolment and completion status at the beginning of the year and the end of the previous year were amalgamated into six categories: (1) commencing student (first year of enrolment only); (2) continuing with no repeats; (3) unit of study repeat/s following failure; (4) stopout (temporary); (5) transfer (enrolment in another degree course at the same university); or (6) no enrolment at the university.

These categories were used to categorise enrolment and completion status for each student. All students in the base cohort in 1994 were 'commencing course' in the first year and given the coding of '1'. In subsequent years, if a student had transferred to another course within the university, s/he was coded '5' for that year. A student was coded as '3' if s/he had failed a unit in the previous year. Stopouts were initially recorded as 'temporary'. The analysis was continued for two more years to further distinguish between temporary 'stopout' and permanent 'dropout' or withdrawal at that point in time. Stopouts were recorded as 'no enrolment' if the student had not returned by the end of 2000. Some of these could be re-classified as 'temporary' if the study was further extended. At the end of the minimum course completion period of five years, each student had been assigned a code for each successive year following commencement, each code indicating a stage in his /her course progression and enrolment status for that year.

Each student's enrolment status over the five previous calendar years was represented by a series of codes. For each student, the pattern of five digits represents his / her pathway of course progression. As an example, the course pathway of a student classified as a 'commencing' student in his / her first year, satisfactorily completing each of the subsequent three years and enrolled in the fifth year, would be indicated initially by the code series 1,2,2,2,2. These codes Robinson then concatenated into the pattern '12222'. If the final year of enrolment was successful, this student would have completed, in 5 years, the minimum time taken to do the course. A pathway pattern of '12252' indicates a student commenced in first year, continued in Year 2 and Year 3, transferred to another course within the university in Year 4 and returned to enrol back in the original course in his / her fifth year of enrolment. This student would not have completed in the minimum time. However, the student might possibly have completed another one-year course in the fourth year of enrolment, the 'transfer' year.

Robinson exemplifies the capturing of student progression patterns in the following table:

Table 2: Course progression pathway patterns and descriptions

Pathway pattern	No repeats, stop-outs, transfers, dropouts	Repeats of units of study	Temporary stopout	Transfer	Dropout
12222	*****				
12225				*****	
12232		*****			
12242			*****		
12252				*****	
12322		*****			
12323		*****			
12432		*****	*****		
13222		*****			
12226					*****
12256				*****	*****
12266					*****
12666					*****
13666		*****			*****
16666					*****

[a] Pathway pattern codes: 1 = Commencing, 2 = Continuing/no failures, 3 = repeat, 4 = stopout, 5 = transfer, 6 = no enrolment

Source: Robinson (2004)

As Robinson indicates, the coding of 'transfer' pathways in her model refers to only those students leaving a course and enrolling in other courses *within* the university; those students changing their course and transferring to *another* university are not accommodated. In such cases, she proposes replacing code 6 in Table 2, which refers to students switching to another university, to code 9. Those students whose pathway is coded as 9 could then be included in any subsequent analysis of progression and performance within the second institution; such students would have two pathways, one for each university.

Since the present thesis will consider the mobility of students not only within an institution but across the entire higher education system in South Africa, such a modification would need to be made for the study reported on here.

As Robinson (2004) indicates, the model can be adapted to any situation in which the tracking of students is required. So, for example, Wildschut, Kruss, Janse van Rensburg, Haupt & Visser (2012) use the model to track apprenticeship students in South Africa, as illustrated in the following table.

Table 3: Possible trajectories into the apprenticeship system

1	2	3	4	5	6	N	%	1	2	3	4	5	6	N	%
W	A					316	21.3	**S**	A					345	22.3
W	S	A				51	3.4	**S**	W	A				333	22.5
W	S	W	A			20	1.3	**S**	U	A				52	3.5
W	U	A				14	0.9	**S**	W	U	A			22	1.5
W	B	A				13	0.9	**S**	U	W	A			16	1.1
W	U	W	A			5	0.3	**S**	W	S	A			12	0.8
W	U	S	A			4	0.3	**S**	U	S	A			11	0.7
W	B	W	A			3	0.2	**S**	B	A				9	0.6
W	S	B	A			2	0.1	**S**	B	W	A			7	0.5
W	S	W	U	A		2	0.1	**S**	W	S	W	A		5	0.3
W	U	W				1	0.1	**S**	W					2	0.1
W	A	S	A			1	0.1	**S**	W	U	S	A		2	0.1
W	U	B	A			1	0.1	**S**	W	B	A			2	0.1
W	S	U	W	A		1	0.1	**S**	A	W	A			1	0.1
W	S	W	S	A		1	0.1	**S**	U	S	U	A		1	0.1
W	U	W	S	A		1	0.1	**S**	A	U	A			1	0.1
Subtotal						436	29.4	**S**	U	B	A			1	0.1
U	A					33	2.2	**S**	U	S	W	A		1	0.1
U	W	A				39	2.6	**S**	W	U	W	A		1	0.1
U	S	A				27	1.8	**S**	U	W	S	W	A	1	0.1
U	S	W	A			18	1.2	**S**	W	S	W	S	A	1	0.1
U	W	S	A			7	0.5	**Subtotal**						826	55.7
U	W	S	W	A		3	0.2	**B**	A					12	0.8
U	S	U	A			2	0.1	**B**	W	A				4	0.3
U	W	U	A			2	0.1	**B**	W					1	0.1
U	B	A				1	0.1	**B**	U	A				1	0.1
U	W	B	A			1	0.1	**B**	S	W	A			1	0.1
U	S	A	U	A		1	0.1	**B**	W	U	A			1	0.1
U	S	U	S	A		1	0.1	**B**	S	W	U	A		1	0.1
U	S	U	W	A		1	0.1	**Subtotal**						21	1.4
U	S	W	S	A		1	0.1	**A**						58	3.9
U	W	B	W	A		1	0.1	**A**	W	A				3	0.2
U	W	U	W	A		1	0.1	**Subtotal**						61	4.1
Subtotal						139	9.4	**Total**						1483	100.0

*W-Working *U-Unemployed *S-Studied *B-Both Worked and Studied *A-Apprenticeship

Source: Wildschut et al. (2012: 24)

The authors are able to draw a number of conclusions from this table, first and foremost that only 4.1% of the total sample entered an apprenticeship directly after school (A) – fewer than one hundred individuals – and that apprenticeship is consequently not a career option of choice for school leavers (Wildschut et al. 2012).

FUTURE RESEARCH ON STUDENT PATHWAYS

The preceding section has propounded the theoretical precepts – youth to adulthood transition theory, aspirations gap theory, and student choice behaviour theory – that combine to produce a conceptual framework for projects under Theme 5 of the LMI programme of research. In addition, it has argued the need for longitudinal research, particularly of the educational institution-based panel study kind, to facilitate an understanding of the dynamics of the movement of young people as they progress along various trajectories and make transitions from one institution and stage of life to another.

Arising from this framework, a key research question which new research should seek to address is:

> How does an in-depth knowledge of the dynamics underpinning learner, student and worker mobility along various education, training and labour market trajectories enhance our understanding of the key influences on mobility and its impact on skills development?

This question is posed in the light of Delivery Agreement 5 of the Delivery Agreement between the Minister of Higher Education and Training and the President of South Africa (DHET 2010). Delivery Agreement 5 aims at "A skilled and capable workforce to support an inclusive growth path". Delivery Agreement 5 in turn consists of 3 separate delivery agreements: Agreement 1, covering Output 5.1; Agreement 2, covering Outputs 5.2 and 5.3; and Agreement 3, covering Outputs 5.4 and 5.5. It is Outputs 5.2 and 5.3 with which this theme is quintessentially concerned.

Output 5.2 reads "Increase access to programmes leading to intermediate and high level learning", while Output 5.3 reads "Increase access to occupationally-directed programmes in needed areas and thereby expand the availability of intermediate level skills (with special focus on artisan skills)". Both these outputs revolve around increasing access – whether to FET college and university education (Output 5.2) or to occupationally-directed intermediate-level skills programmes (predominantly in FET colleges) (Output 5.3). The challenge is to demonstrate how the deployment of pathway studies can increase access to such programmes.

If learning proceeded in linear fashion, through the schooling system and into further and higher education, there would be no need for pathway studies: tracking students would be a matter of joining up school, FET college, and university management information system (MIS) databases in order to trace the movement of students from one institutional type to another. Because student movement is frequently non-linear, however, other mechanisms to monitor student flows are needed. The kind of tracking model discussed above – that designed by Robinson (2004) and modified by Wildschut et al. (2012) – provides a useful mechanism for pursuing student trajectories through the education and training system and thence into the labour market. A powerful study could be mounted that combined the tracer studies deployed by Cosser (2009) and Cosser with Sehlola (2009), which looked essentially at the *transition* between school and further learning, with the tracking model designed by Robinson (2004), which considered the *passage through* higher education, with the modification of Robinson's model by Wildschut et al. (2012), which allowed one to track student learnerships *through the education and training system and into and out of the labour market*, with the tracer study conducted by Letseka, Cosser, Breier and Visser (2010), which focused on the *transitions* of graduates of higher education institutions into the labour market, further higher education study, or economic inactivity. In the context not only of non-linear student movement but of student loss to formal education and labour market systems (the phenomenon of those not in employment, education or training – NEET – popularised by Cloete et al., 2009), a panel study of the kind here proposed constitutes the only means of tracking students in and out of education, training, and the labour market.

The power of a panel study of the kind proposed lies in its ability not only to trace student movement through education, training, and the labour market, however, but to identify *and monitor*

changes in the factors that shape students' trajectories *as students progress along their various pathways*. This realisation helps us to make sense of the observation by Gayle, Berridge and Davies (2000: 62) cited earlier – that "The effects of [individual and social background] factors are [best] understood as part of an ongoing social process that underpins the young person's educational career", a process that can only really be appreciated through the deployment of a panel study.

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