Identifying 'fit-for-purpose' data for predictive validity studies to inform postsecondary admissions decisions

Conference Paper

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Abstract

Whilst college readiness continues to dominate the educational landscape in the US, students still leave high school not ready for college. As a consequence, admissions offices need to consider all available indicators (*e.g.*, high school performance; admissions tests; college preparatory courses) in order to effectively evaluate prospective student applications. Predictive validity studies are one of the inherent mechanisms in the admission process and can be used to predict college performance and success. However, such studies are ultimately guided by the availability of data. This paper seeks to investigate the availability and content of sources of secondary and postsecondary education data in the US that are 'fit-for-purpose' for informing postsecondary admissions policy and decision making.

Introduction

As an education reform movement for improving student achievement, teacher effectiveness and overall school performance, 'college readiness' currently dominates the United States (US) educational landscape. Its importance and implications for postsecondary success have received significant attention recently, as college and societal aspirations rise and government legislation promotes college readiness for all (Conley, 2012; Camara, 2013; US Department of Education, 2014; 2015).

A successful transition from high school to postsecondary study is dependent, in part, upon a student being 'college ready'. However, concerns abound among educators and policy makers as to whether prospective college students are prepared, from an academic point of view, to handle the rigours of college coursework (Rubin, 2014). Despite the primacy of college readiness, students across the US continue to leave high school not ready for college (*e.g.*, Symonds *et al.*, 2011; Radford and Horn, 2012; ACT, 2016; Chen and Simone, 2016). National statistics indicate that in 2011/12, about one third of all first- and second-year bachelor's degree students (29% of those at public 4-year institutions and 41% of those at public 2-year institutions) reported having taken remedial courses after high school graduation (Skomsvold, 2014). Critics argue that remediation is costly and delays time to college-degree completion because students do not often earn credit that fulfils degree requirements. In particular, research has shown that students who enrol in a remedial course are less successful in college than students who do not (Attewell *et al.*, 2006; Bettinger and Long, 2004).

One strategy to improve academic performance and college readiness is to provide students with a college experience prior to postsecondary entry (Iatarola *et al.*, 2011). Acceleration programs or college preparatory courses (*e.g.*, Advanced Placement; International Baccalaureate; Cambridge AICE) are seen as one of the main policy mechanisms for increasing college enrolment as they can have positive effects on cognitive strategies, content knowledge and learning/behavioural techniques (Conley, 2010, 2012; Conley *et al.*, 2011). Grades in these programs, together with the strength of the high school curriculum studied, admissions test scores (*e.g.*, ACT; SAT) and high school grade point average (GPA) characterise college readiness and are influential in admissions decision-making (NACAC, 2007; Clinedinst *et al.*, 2013).

Predictive validity and the need for 'fit-for-purpose' data

With increasing numbers of applications for admissions to colleges and universities for the limited number of places in freshmen classes, admissions personnel need to identify applicants that are most likely to be academically successful and must decide whether each student is ready for college-level coursework.

Camara (2013), who proposed a validity framework to support the use of assessments aligned with the *Common Core State Standards* to investigate college readiness, recommended conducting validation studies following high school students taking the assessments as they enter postsecondary education and looking at a variety of postsecondary outcomes.

Predictive validity research has played an important role in informing admissions policy in recent years (*e.g.*, House and Keeley, 1997; Bowen and Bok, 1998; Burton and Ramist, 2001; Noble and Sawyer, 2002; Rothstein, 2004; Clinedinst *et al.*, 2015; Liu *et al.*, 2016; Makransky *et al.*, 2017) and admission offices have been relying on the ability of preparatory courses, high school GPA or admissions test scores to predict how well students will do in college. Indeed, the overall aim of predictive validity research is to ascertain to what extent a current measure of performance (*e.g.*, high school GPA) predicts future performance.

Predictive validity studies are ultimately guided by the availability of data. College attendance, persistence and completion are key outcomes by which researchers and policy makers evaluate the effectiveness of secondary schooling and make decisions about postsecondary admissions. Therefore, tracking students into and through college is critical for predictive evaluations.

This paper seeks to investigate the availability and content of sources of secondary and postsecondary education data in the US that are 'fit-for-purpose' for informing postsecondary admissions policy and decision making. Their strengths, limitations and utility in predictive research are also addressed.

Evaluation of data sources for predictive validity studies

A portfolio of data sources was identified using web-based search engines (*e.g.*, Google), site-specific search engines (*e.g.*, state data sites), literature-reported data sources and communication with data owners. We sought only data that was available at the student level and, for each data source identified, we collected the following information (where available): data description, ownership, data format, record start and end years, metadata availability, method to obtain data, point of contact information and data constraints/limitations.

In determining whether students are college ready, direct evidence between performance in high school assessments and/or acceleration programs and performance in postsecondary education may provide the strongest form of evidence. However, establishing predictive validity through relating secondary school performance to later academic performance can lead to problems associated with confounding variables that obscure the effects of other variables (*e.g.*, Banerjee, 2003). A common challenge in predictive validity studies is, therefore, controlling for factors that determine participation and outcomes in postsecondary education. Data on students' background (*e.g.*, ethnicity, gender, high school GPA, SAT/ACT scores, socio-economic status) is hence required alongside secondary and postsecondary performance data.

Overall, the searches showed that it is possible to acquire 'fit-for-purpose' quantitative data on secondary and postsecondary education in the US that is useful in predictive research. In particular, it is possible to gather data on:

- Measures of postsecondary success (*e.g.*, enrolment; retention; first-year GPA; cumulative GPA);
- Measures of high school performance (*e.g.*, acceleration program; high school GPA; standardised test scores);
- Students' background (*e.g.*, age; gender; race/ethnicity; socio-economic background).

The data sources identified are spread across a wide variety of owners and locations, each with different access arrangements and data formats. Table 1 lists all the sources of data looked at as part of this research, summarises the availability of key data elements and provides information about access. Although some of the sources are not suitable to carry out predictive validity studies to inform postsecondary admissions policies and decision making (*e.g.*, the Common Application, US Census Data), the four data sources described below in more detail have great potential and their use could be considered, for example, by researchers, policy makers and other stakeholders in education to gather evidence about the predictive validity of high school programs of study and about students' college readiness.

Individual postsecondary institutions

Most postsecondary institutions gather routine data, via their admissions offices and students' postsecondary transcripts, which can support predictive validity studies. For example, Shaw and Bailey (2011) and Shaw, Warren and Gill (2014) used data collected from students enrolled at Florida State University to demonstrate that Cambridge[1] assessments (*e.g.*, AS and A levels) prepare students as well as other acceleration programs (Advance Placement; International Baccalaureate) to study in US colleges and universities.

Studies using this type of data usually take a 'case study' approach, and therefore are bounded investigations that are not readily generalizable. However, compared to other methods and in the absence of national data, a case study can examine, in-depth, a particular issue within its 'real-life' context (Yin, 2006).

National Student Clearinghouse (NSC)

Colleges submit students' data to the NSC, including at what school they enrolled, at what intensity (*e.g.*, part-time or full-time), type of degree earned and (since 2012) the students' major.

NSC data is relatively new to academic researchers and policy makers. However, a growing number of papers use it for research and for exploring the effects of various programs or policies on postsecondary attendance, persistence and attainment (*e.g.*, Roderick *et al.*, 2006; Dynarski *et al.*, 2013a; Hemelt *et al.*, 2013; Hyman, 2013; Mattern *et al.*, 2013; Deming *et al.*, 2014; Bergeron, 2015; Vidal Rodeiro *et al.*, 2017).

The NSC data does not include individual course information or GPA and, therefore, college success can only be measured by enrolment and/or graduation. Furthermore, students who are enrolled in college might not appear in the NSC data. In such cases, it is not possible to distinguish if there is some reporting/measurement error or the student did not enrol at all. Dynarski *et al.* (2013b) explored some of the pitfalls of using NSC data to measure postsecondary outcomes and reported the most common sources of non-coverage.

Data from national surveys

Prior to the establishment of the NSC, it was very challenging to follow students through secondary and into postsecondary education. Researchers mainly relied on nationally representative surveys that asked for information on educational attainment.

Three longitudinal surveys were identified and explored in this work: the *Education Longitudinal Study* (ELS), the *High School Longitudinal Survey* (HSLS) and the *Beginning Postsecondary Students Longitudinal Study* (BPS).

The data from these surveys provides information on background characteristics, high school performance and postsecondary education for big samples of students (*e.g.*, the HSLS followed a sample of 24,000 9*th* grades in 2009). However, survey data has a limited

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[1] Cambridge Assessment International Education is a provider of international education programs and qualifications for 5-19 year olds. It is part of Cambridge Assessment, a department of the University of Cambridge in the United Kingdom.

capacity to follow groups of students over time (*e.g.*, due to attrition). This restricts the ability of researchers to meaningfully evaluate programs or policies of interest that affect a particular group or cohort of students in time or to track long-term outcomes.

Data from state-level warehouses

For many years, the departments of education of many states have been trying to link individual student records from secondary/high school to postsecondary education systems, to ensure that 'their' high school graduates are ready for postsecondary education and to identify practices and programs that best prepare students to succeed in college. This has led to the creation of state-level data warehouses. Several of them have been looked in detail in this research (Table 1).

The data in state-level warehouses includes information about the programs students participate in, as well as a variety of demographic data. This data should allow carrying out studies to establish the predictive validity of high school qualifications and programs in terms of preparing students for college.

There are, however, data sharing restrictions. In some cases, a review to ensure the data request meets FERPA criteria and a data sharing agreement are required. Furthermore, an important condition for the release of the data in some states is that data is used for research that supports the needs of their departments of education.

The four data sources mentioned above can be used to make inferences/conclusions about college readiness on the basis of the different types of data they include. For example, data from the NSC will allow reaching conclusions drawing on evidence from participation/performance on a preparatory course and subsequent college enrolment and from college performance(measured by graduation); and data from state data warehouses, which usually includes GPA, drawing on evidence from detailed performance in college (*e.g.*, 1st year GPA, cumulative GPA).

Conclusions

This paper focused on identifying 'fit-for-purpose' data to carry out predictive validity studies in postsecondary admissions decision making. Identifying such data is challenging. While the availability of the data provides an opportunity for answering many research questions, the data sources must be chosen carefully to ensure timely availability and appropriateness to address such questions (*e.g.*, availability of key variables and coverage of the right students).

Each data source identified in this research has advantages and disadvantages, which should be considered in light of the research questions, as the validity of the study will be dictated by the quality (and availability) of the data. Overall, the data sources identified here should be useful to researchers, government officials, teachers, policy makers and other stakeholders in education to explore issues related to students' progress and their college-readiness.

Weir (2005) sounds a note of caution in relation to predictive validity arguing that predictive studies are insufficient evidence of validity by themselves. Establishing predictive validity through correlating performance against later academic performance is often not possible for practical difficulties in mounting tracer studies and due to problems associated with confounding variables. Notwithstanding the challenges, predictive validity is still regarded a vital aspect of the admissions process and identifying the 'right' data to carry out predictive studies is crucial.

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Table 1: Sources and availability of key data

Data source	Personal data	High school data		Postsecondary data				Availability	Cost
		Acceleration program (*e.g.,* AP, IB, AICE)	SAT/ACT	Institution	Major	Degree awarded	GPA		
Individual postsecondary institutions (*e.g.*, Florida State university)	Gender Ethnicity	Yes	Yes	Yes	Yes	Yes	Yes	Yes (subject to institutional review board approval)	Free
The Common Application	Gender Ethnicity SES* (proxy) Age	Yes (High School Transcript)	Yes	No	No	No	No	Not likely	No information
US Census data	Gender Ethnicity SES (proxy) Age	No	No	No	No	No	No	Yes (PUMS files)	Free
Survey data									
ELS 2002 (Education Longitudinal Study)	Gender Ethnicity SES Age	Yes (High School Transcript)	Yes	Yes	Yes	Yes	Yes	Yes (restricted use)	Free
HSLS 2009 (High School Longitudinal Survey)	Gender Ethnicity SES Age	Yes (High School Transcript)	Yes	Not yet (late 2017)	Not yet (late 2017)	Not yet (late 2017)	Not yet (late 2017)	Yes (restricted use)	Free
BPS 2012 (Beginning Postsecondary Students Longitudinal Survey)	Gender Ethnicity SES Age	Yes (High School Transcript)	Yes	Not yet (late 2017)	Not yet (late 2017)	Not yet (late 2017)	Not yet (late 2017)	Yes (restricted use)	Free

* Socio-economic status

Table 1: Sources and availability of key data (continued)

Data source	Personal data	High school data		Postsecondary data				Availability	Cost
		Acceleration program (*e.g.,* AP, IB, AICE)	SAT/ACT	Institution	Major	Degree awarded	GPA		
National Student Clearinghouse	Age	No	No	Yes	Yes	Yes	No	Yes	Fee (depending on data requested)
State-level data warehouses									
Florida	Gender Ethnicity SES (proxy) Age	Yes	Yes	Yes	Yes	Yes	Yes	Yes (if research aligned to state's research agenda)	Fee ('recovery fee')
Washington	Gender Ethnicity SES (proxy) Age	Yes	Yes	Yes	Yes	Yes	Yes	Yes (restricted use)	Free
Virginia	Gender Ethnicity SES (proxy) Age	Yes	Yes	Yes	Yes	Yes	Yes	Yes (if research aligned to state's research agenda)	No information