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KAMEHAMEHA SCHOOLS

Educational Impact Measures

Introduction

This literature review discusses educational impact measures that are highly predictive of college completion throughout the developmental continuum. It begins with a discussion of predictive measures for youth ages 0-5, and then moves on to do so for the subsequent developmental stages: Ages 0-5; Kindergarten-Grade 6; Grades 7-8; Grades 9-12 and finally post-high school attendance for traditional college students ages 18-25. Whenever possible, this review gives special attention to any measures or combination of measures that predict success for socio-economically disadvantaged, minority, or otherwise at-risk youth. This review also restricts discussion to predictive measures to that which can be reasonably influenced by school-based policies, curriculum or intervention programs. The review concludes with a discussion of thematic similarities and differences across age groups and predictors. While the predictors discussed in this review vary, sometimes widely, it is apparent that multiple supports in concert better ensure the possibility of eventual college graduation and that impact occurs beyond the traditional domain of schools.

Early Childhood: Ages 0-5

This literature review is separated into manageable sections using age groups, even though most of the studies reviewed are longitudinal and cover more than one age group. The age group 0-5 years is more largely focused upon in comparison to other age groups because it's a very formative period in a child's education when foundations are built. Longitudinal studies often begin tracking students from preschool, and interventions that determine academic achievement in later years are concentrated here.

School readiness is the most appropriate language to describe the milestone for ages 0-5 years. The US National Education Goals Panel (1997) identified three components of school readiness:

1. Children's readiness for school (enabling them to participate in classroom and learning experiences).
2. School's readiness for children (schools responding to the children enrolled).
3. Family and community supports and services that contribute to children's readiness (promoting family and community environments that support learning).

The three components identified above indicate that readiness for school is a measure of elements that go beyond the individual child – in fact the child is only one out of three components of readiness. The term ‘readiness’ is also a cautionary tale. Readiness can be a general judgment based on age or development, but oftentimes is a product of assessment variables that seek to measure a child’s ability to transition to kindergarten and from there into grade school. The assessment of a child’s skills and knowledge can be controversial and is contested among the academic community as predictive of a child’s readiness to enter the classroom (Dockett & Perry, 2009). Social and emotional aspects of readiness can also be measured and have come to occupy increasing importance among scholars seeking a more balanced and complete rendering of readiness (Huffman et al., 2001). Assessment of a child’s skills and knowledge can be controversial because these assessments are often biased towards certain kinds of learners, particular kinds of development, or even biased towards particular kinds of schools, and they do not adequately and fairly apply to a diversity of learners. This literature review will give more weighting to studies that are relevant to learners of diverse socio-economic status, ethnicity, culture and language.

Parental Involvement

Studies have concluded that a child’s level of academic readiness for entry to school has an effect on academic performance and skills development in future years of study (Entwisle & Alexander, 1993; Reynolds & Bezruczko, 1993). The extent to which performance and development is consistent throughout grade years is impacted mainly by enablers in the earliest years of a child’s educational journey. Not surprisingly childcare, pre-school, and parental involvement has come under scrutiny in the quest for meaningful and verifiable predictors of academic success. Parent-child relationships and interactions are considered a key predictor of learner success and of particular importance to low-income and ethnic minority learners.

A number of studies have established that parental involvement is a predictor of sustained success. A study of 163 mostly low-income families (of which only 32 percent were non-Hispanic white) and their teachers in urban New England established a link between greater parental involvement and stronger pre-literacy skills (Arnold, Zeljo, Doctoroff, & Ortiz, 2008).

Parental involvement, including support at home and at school, has been shown to facilitate academic success by protecting children deemed at-risk. In a study of low-income African American children (Connell & Prinz, 2002), a positive correlation was established between maternal education level and a child’s readiness for school. This study also concluded that early parental involvement in childcare programs had a positive correlation with cognitive and communicative skills, when parental involvement was at least weekly.

Positive outcomes in both reading and mathematics can be the product of parental involvement and generally more robust home-school and community-school relationships. Higher rates of participation in parent-teacher conferences, home visits by teachers, and parental volunteering in the classroom contributed to successful academic and behavioral development of the child (Abdul-Adil & Farmer, 2006). Parental involvement is not always easy to establish and maintain, although some success has been documented proving that parents respond well to themes of empowerment, outreach and indigenous resources (Abdul-Adil & Farmer, 2006).

Early Literacy

Early literacy is identified as a predictor because it helps students overcome barriers in future learning. Theory suggests that education is a progression of building blocks and that deficiencies of literacy in particular will be detrimental in later grades when literacy is called upon more frequently and with greater complexity. It is in this regard that early literacy is all the more urgent for students whose first language is not the language of instruction.

According to Denton, et al., “the difference in children’s reading skills and knowledge usually seen in later grades appear to be present as children begin school and persist after one and two years of school. For example, White children outperform Black and Hispanic children in reading, and children from poor families tend to have lower reading assessment scores than children from non-poor families” (Denton, West, Walston, & National Center for Education Statistics, 2003).

Hooper, et al. (Hooper, Roberts, Nelson, Zeisel, & Kasambira Fannin, 2010), enrolled 65 normally developing preschool African American children aged between six and 12 months (70.6 percent lived below the poverty line) and followed them until fifth grade. The study measured global language, phonological processing, (pre)reading, and writing concepts in addition to maternal education and gender of the child. Findings from this study showed that the level of writing skills achieved in Grades 3-5 could be predicted by maternal education as well as the child’s core language abilities, and prereading skills at entry to kindergarten.

A six year longitudinal study that examined the impact of early literacy followed four groups of students beginning at age 4 enrolled in school readiness programs; one group in Head Start, one group waitlisted for Head Start, one group not enrolled in any readiness program, and the final group enrolled in an augmented Head Start program called Words Work. Children enrolled in the Words Work program significantly outscored their counterparts in the other groups on reading, outscored the waitlist and non-enrollment groups on mathematics (at 2nd grade standardized testing), and were able to maintain their lead on both reading and mathematics through 5th grade (Zimmerman, Rodriguez, Rewey, & Heidemann, 2008).

Head Start is a federal program of school readiness that includes health education services (immunizations and health screenings) and social services (parental literacy and advocacy). Given the success of the Words Work (WW) program, it is worth examining in some detail. Both WW and Head Start programs involve parents but the WW program involves them to a greater degree. The component of parental involvement is established in a range of studies as a predictor of future academic achievement. Five additional micro-components are worth mentioning in regard to the WW program, thus together there are six enablers of early literacy:

1. Greater parental role (compared to Head Start).
2. Materials available in additional languages.
3. Books in the student’s native language to take home free of charge.
4. More intensive, integrated and literacy-rich instruction (compared to Head Start).
5. Equipment and materials that support literacy practice in the classroom (computers with literacy software, reading and library spaces, etc.).
6. Greater professional development for teachers with a focus on assessment tools and practices (compared to Head Start).

(Zimmerman et al., 2008)

These six enablers of early literacy can be read as predictive of future achievement when a child has participated in such a program.

Participation in the Chicago Child-Parent Center (CPC) Preschool Program is demonstrated to have had a long-term impact on academic performance. Students who were enrolled in the CPC preschool initiative were tracked through to college completion-age – it should be noted that many CPC students who were on track to be successful in college were unable to attend due to economic barriers such as financial aid availability and the cost of college. The CPC group did, however, have a 28.5 percent improvement over the comparison group in college attendance (Ou & Reynolds, 2006).

The CPC program serves three and four year old children from high poverty neighborhoods in Chicago that are not served by the federal Head Start program. Much of the program mirrors that of Head Start, including health and social services, development of reading/writing skills and parental involvement - parents are required to participate in the CPC program at least one half-day per week. Where CPC differs substantially from any Head Start program is that CPC children are enrolled for up to six years, typically ages three through nine, whereas Head Start is limited to preschool only.

When looking at high school completion, highest grade completed and college attendance, the CPC group experienced lower levels of educational attainment compared to the national average, but higher levels compared to the comparison group. It should be noted that educational achievement rates for the at-risk children served by the CPC program would normally be below the national average, hence the inclusion of a comparison group of similar background variables.

The 20-year tracking study of the CPC program, the Chicago Longitudinal Study, identified five main predictors of academic achievement (example predictor variables follow in brackets):

1. Socio-demographic factors (ethnic background, socioeconomic status and gender).
2. Individual factors (interactions with teachers and parents, school rules, early cognitive abilities, low intelligence, early academic achievements, juvenile arrest).
3. Early intervention programs (availability, attendance).
4. Family processes (parental involvement, parental attitudes and values toward academic achievement, single parent/two-parent families, child's taking adult roles, family stressors such as health or financial problems).
5. School-related factors (school performance, enrollment, school-behavior problems, grade retention, absenteeism, extracurricular activity participation).

(Ou & Reynolds, 2008)

Indigenous Languages

There is a need for close attention to the literacy needs of learners whose first language is not the language of instruction, and this has implications for literacy as a predictor of academic success. Bilingual immersion programs enable two-way immersion of, for example, Hawaiian and English for all learners from early childhood and have proven to be particularly effective at improving the literacy of learners considered at-risk (Collier, 1992; Greene, 1998; May, 2005, 2008; Thomas, 2002; Willig, 1985). These programs typically require strong home-school and community-school relationships as an ecosystem of support for the child's learning and due to the cultural, social and political significance of language teaching (De Korne, 2010). Schools are not culturally neutral spaces (Graue, 2006). Participation in a bilingual immersion program is a predictor of success in literacy leading to general academic achievement for indigenous children (or other children whose native language does not match the dominant language of instruction).

Resilience

The Chicago Longitudinal Study of the CPC program proved the theory of resilience among at-risk children, whereby protective factors can overcome risk factors given the necessary blend of supports and services. For example, a child who is a minority and lives in poverty with parents who lack a high school diploma can be deflected from his/her educational achievement trajectory by high quality early preschool support for literacy, parental instruction and involvement, and a teacher and school that has high expectations of the child and provides a positive school ethos (Ou & Reynolds, 2008).

Cognitive Test Scores/Early Educational Childcare

The Carolina Abecedarian Project is a full-time, high quality educational childcare service for children from infancy to five years old from minority low-income families. Cognition was tested between ages three and twenty-one, and academic test scores were collected between the ages of eight and twenty-one. Children enrolled in this program were shown to have steeper rates of increase in cognitive development during early childhood, although this growth rate tapered off towards a parallel with the control group in middle childhood (F. A. Campbell, Pungello, Ramey, Miller-Johnson, & Burchinal, 2001). Whereas the cognitive growth rate was still below the national average for these children, measurement and tracking of cognitive function during this study was able to prove that half of the intervention effect on academic achievement is accounted for by cognitive growth rate (F. A. Campbell et al., 2001). While the study does not explain what accounts for the other half of intervention in academic achievement, we are at least given a direct correlation between early intervention and academic achievement in children from infancy to age twenty-one. The Carolina Abecedarian Project is also shown to be a protective factor for children considered at high-risk of academic failure due to risk factors such as low family income and low family educational level. When compared to the control group, children enrolled in The Carolina Abecedarian Project had higher academic achievement in both reading and math from the primary grades through young adulthood (F. Campbell et al., 2010). They also completed more years of education and were more likely to attend a four-year college (F. Campbell et al., 2010).

Elementary School: Kindergarten to Grade 6

Longitudinal studies often begin tracking students from when they are preschool children, and interventions that determine academic achievement in later years are concentrated there. Predictors offered in the previous section apply equally to this section, particularly the Words Work, Chicago Parent-Child Center Preschool Program and The Carolina Abecedarian Project.

Academic Achievement

Academic achievement begins to play a more important role once children enter grade school. Academic achievement as a predictor of later successes is a broad category that can be deconstructed and analyzed by looking at academic enablers. Academic enablers are defined broadly as “attitudes and behaviors that allow a student to participate in, and ultimately benefit from academic instruction in the classroom” (DiPerna & Elliott, 2002). These authors went on to test the theory that motivation, interpersonal skills, engagement, prior achievement and study skills are academic enablers that influence academic achievement. Their study, which included 394 students and 104 teachers in kindergarten through sixth grade, established that:

1. Prior achievement and motivation have the largest effect on achievement.
2. Interpersonal skills have a consistent effect on achievement, although the magnitude was small.
3. Engagement has a large effect on achievement in K-2 and a moderate effect on grades 3-6.
4. Study skills have a moderate effect on grades 3-6 yet a negligible effect on K-2.

(DiPerna, Volpe, & Elliott, 2002)

Similar learning enablers were shown in another study, tracking two equivalent samples of over 3200 kindergarteners through to fifth grade, to have had a positive impact on mathematical growth (DiPerna, Lei, & Reid, 2007). The study controlled for general knowledge and age and was able to highlight approaches to learning such as goal-directed behavior, persistence and organization as predictors of success in mathematics.

Parental Involvement

“Home-school relationships in elementary school have long-term benefits” (Casper, Lopez, Wolos, & Harvard Family Research Project, 2007). Using data from the Chicago Longitudinal Study, Barnard found that, even after controlling for background characteristics and risk factors, parent involvement in school was significantly associated with lower rates of high school dropout, increased on-time high school completion, and highest grade completed (Barnard, 2004). High levels of family involvement between grades K-5 was predictive of gains in child literacy achievements (Dearing, Kreider, Simpkins, & Weiss, 2006). This included attending parent-teacher conferences, volunteering inside and outside the classroom, attending school performances, social events and field trips.

Mother-child interactions during kindergarten were found, in a longitudinal study of 142 children, to have a positive correlation with academic achievement as much as twelve years later for children at risk for academic failure (Gregory & Rimm-Kaufman, 2008). There was no direct correlation between mother-child interactions and high school standardized test results, but the protective function of mother-child interactions in kindergarten deflected the failing trajectory of at-risk children. Another study found that, “supportive, positive parenting (i.e., parenting characterized by rules and structure, warmth and closeness, and high expectations for achievement and pro-social behavior) offer a resiliency resource for children living under adverse conditions” (Gutman, Sameroff, & Cole, 2003).

Jimerson, Egeland & Teo showed that parental involvement during grades one to three enabled sustained success through to grade six (Jimerson, Egeland, & Teo, 1999). The importance of parental involvement as an indicator is reflected in the overlapping longitudinal studies, the Words Work program and the Chicago Parent-Child Center Preschool Program, cited in the previous age group section 0-5 years. The study by Jimerson et al., included 174 children who were considered high-risk of academic failure due to their poverty background. They found that those students who are doing poorly in first grade are almost always the same students doing poorly in grade six and beyond (data was collected at the end of the first, second, third and sixth grade and at 16 years of age). Their study focused on those students who “deflected” their “achievement trajectory” or bucked the trend expected of them. Results concluded that two factors predict positive changes in achievement over time:

1. The quality of the home environment.
2. Parental involvement in the child’s education during the first three years of school.

The quality of the home environment was assessed using the HOME inventory measures including parental involvement in the child’s education at home, stimulation, organization and overall quality of the home environment (Bradley & Caldwell, 1979). Home organization and stimulation resulted in an increase in reading and math achievement between first and sixth grade. Parental involvement during the first three years of elementary school enabled an increase (upward deflection) in math achievement.

Casper et al., recognize that “home-school relationships characterized by bilateral communications and opportunities for participation in school events and formal parent involvement programs are predictive of children’s interest in reading and math, as well as improvements in reading and math achievement” (Casper et al., 2007)

Literacy, Especially Vocabulary

Correlations between first, second and third graders language abilities were explored in Boston among predominantly low-income and minority children (Hemphill & Tivnan, 2008). The focus on literacy found that first grade decoding of printed text was predictive of second grade reading comprehension, and second grade reading comprehension was predictive of third grade reading comprehension. The study found that “the impact of vocabulary on reading achievement remains strong even when the diversity of student characteristics is large,

and average levels of vocabulary are relatively low” (Hemphill & Tivnan, 2008). Reading achievement growth rates remained the same regardless of the starting vocabulary – there was no accelerating effect of vocabulary on subsequent reading achievement. The studies authors hypothesize that this may be due to “risk factors in our study children’s school and out-of-school experiences, for example through exposure to weak teaching, family stress, and other factors that disproportionately affect children in high-poverty schools” (Hemphill & Tivnan, 2008). On the other hand it has been tentatively concluded that early language skills may be stronger predictors of later, rather than beginning, literacy” (Dickinson & McCabe, 2001; Griffin, Hemphill, Camp, & Wolf, 2004).

Participation in Afterschool Programs

The difficulty of attributing academic success to after-school programs led to a drastic reduction in federal funding in 2002. A comprehensive meta-analysis was conducted by Durlak et al. of 75 reports evaluating 69 different after-school programs in which they state, “after-school programs can be a prime community setting for enhancing young people’s development” (Durlak, Weissberg, & Pachan, 2010). The overall picture is a positive one. Such programs have an important (although hard to measure) impact because they involve school-community linkages that strengthen child self-perception, bonding to school, family involvement and positive social behaviors. After-school programs were associated with a reduction in problem behaviors, an increase in child self-perception and school bonding, and “significant improvement in students’ performance on achievement tests in their school grades” (Durlak et al., 2010). Positive staff-child relations in after-school programs were positively associated with children’s reading grades in both grades 2 & 3, and math grades in grade 2 (Pierce, Bolt, & Vandell, 2010).

Middle School: Grades 7 and 8

Family Involvement

Research and intervention evaluations attest that family involvement in middle school years can yield positive academic results in school success (Kreider, Caspe, Kennedy, Weiss, & Harvard Family Research Project, 2007). The Harvard Family Research project defines family involvement in the following ways: (1) Parenting, which consists of attitudes, values and practices employed in raising youth; (2) Home-school relationships, constituted by formal and informal connections between families and secondary schools; and (3) Responsibility for learning, which emphasizes home and community activities that foster youth’s social and academic growth (Kreider et al., 2007). While these three family involvement processes are similar to those academic and social-emotional outcomes in early childhood and elementary grades, they differ in terms of the contexts in which they must be considered. The middle school child’s “drive for independence, expanding cognitive abilities, and widening social networks” (ibid p. 2) must be considered. Other frameworks of family involvement include parenting, communicating, volunteering, learning at home, decision making and collaborating with the community (Epstein, 2007).

Parent-youth relationships are not only relevant to traditional, classroom outcomes (i.e. academic achievement), but also within the context of out-of-school time activities that benefit youth socio-emotionally and academically (ibid p. 2). The Harvard Family Research Project documents that when families are actively engaged in learning contexts outside of school, youth are more likely to stay involved in structured afterschool/out-of school activities, which are linked to academic and social benefits (p. 2).

Participation in Afterschool Programs

Shernoff (2010) argues that middle school student engagement in afterschool programs can predict school success, as characterized by positive academic and socio-emotional outcomes. Bohnert (2007), Dubas & Snider (1993) and McHale et al. (2001) cited in (Shernoff, 2010) report that engagement in extracurricular and community-based activities can yield learning

cooperation and teamwork, experiences of increased empathy and understanding critical to the development of “perspective-taking”, better psychosocial adjustment and social skills, compared to counterparts that do not engage in such activities (p. 326).

To determine more precisely what it is about afterschool programs that predicts school success, Shernoff conducted a study investigating the extent to which the *quality* of after-school program experiences affect social competence and academic performance, and if the difference of structured afterschool programs, as opposed to other settings, correlate to higher social competence and academic performance. The study investigates two models that provide different perspectives on the ways in which the quality of afterschool experiences relate to the development of social and academic performance: (1) the meditational model, which assumes that greater participation in programs correlates to higher quality of students’ experiences; and (2) the differential effects model, which proposes that variations in engagement and quality of experiences may influence participant outcomes (p. 327).

The study sampled 4,970 afterschool experiences among 196 middle school students in two medium sized cities and one small town in three Midwestern states over the course of one week in the fall and spring academic semesters of 2001-2002. All participating middle schools sponsored school-based, afterschool programs, featuring the following activities: organized sports and other physical activities (34%); arts enrichment (13%); socializing (12%); homework completion; academic enrichment (5%); sit-down games (4%); organized interests and clubs (4%); video games (3%); and other, miscellaneous activities (17%) (p. 328). Engagement was conceptualized using a combination of flow theory, characterized by (a) a high level of challenge presented by an activity; (b) high skills to meet that challenge; and (c) the regarded relevance of that activity. Engagement in the study was also conceptualized as the concurrent experience of (a) concentration; (b) interest; and (c) enjoyment (p. 327). Academic performance outcomes were assessed by course grades in English and math and compared to the baseline measures of self-reported grades collected at the start of the academic year (p. 330). Social competence outcomes were assessed by participant self-reported data in multiple dimensions, ranging from the goal setting and planning and conflict resolution, to non-conformity, teamwork and perspective taking.

After analyzing inter-correlations among all variables, including student background, demographic, predictor and outcome variables, it was first concluded that middle school students who participated in school-based afterschool programs for one academic year had higher English grades than non-participants (p. 333). Furthermore, of those that participated, the differential effects hypothesis, which emphasized the quality of the programs, was partially supported with respect to academic outcomes. It did not reflect any significant change in social competence outcomes. (p. 334). Therefore, results of the study suggest that the quality of after-school program experiences, defined, may be more important than the quantity of experiences in predicting positive academic outcomes (p. 335).

Supportive Relationships

Peer Relationships

Peer factor relations impact school engagement and motivation, and carry implications for school success. “Students who perceive that classmates care about them and like them, who are accepted by their peers, and who enjoy mutual friends, also tend to be socially and academically engaged at school” (Wentzel & Watkins, 2002). Positive peer relations in middle school years are particularly tied to the ability of urban youth of color to transition to and graduate from high school (Shin, Daly, & Vera, 2007). The National Center on Effective Secondary Schools stated that “the most immediate and persisting issue for students and teachers is not low achievement, but student disengagement... student engagement is critical to educational success; to enhance achievement, one must first learn how to engage students (Shin et al., 2007). In line with this sentiment, the study being reviewed turns to the question

of available resources that protect youth from harmful influences, and indicators beyond academic outcome measures to predict school success.

Spradlin et al. (2005) state that low socio-economic and minority students lag behind their peers in terms of academic achievement by up to three years once they reach the eighth grade (Shin et al., 2007). They are also more susceptible to adverse environmental impacts (living in low-income neighborhoods), which negatively affect drop-out and graduation rates. These realities raise questions about what schools and educators can do to affect retention and resilience among low-income, urban minority students.

The study examined individual and peer factors in relation to the school engagement of 132 seventh and eighth grade students from a diverse public elementary school in a larger Midwestern city. The study hypothesized that positive peer norms, peer support and positive ethnic identification mitigated negative peer norms and low school engagement.

School engagement was assessed using the School Sentiment Index (SSI), an 82-statement instrument containing Likert-type formatted items. Ethnic identity was evaluated using a 20-item Multigroup Ethnic Identity Measure (MEIM), which in addition to ethnic self-identification, solicits information on (a) affirmation and belonging; (b) ethnic identity achievement; and (c) ethnic behaviors. Social support was evaluated using the Vaux Social Support Record, which assesses perceived levels of family, peer and school social support in the lives of the participants. Finally, peer norms were assessed using the Friend's Delinquent Behavior-Adolescent Attitude Survey (FDB-AAS), which examines the negative influence of peers on participants (p. 7). The limitation of relying on student self-report data was cited in the study, acknowledging that other data sources might have been used, i.e. report cards, parent reports and teacher reports.

After calculating means, standard deviations, internal consistency reliability estimates and inter-correlations for variables included in the study, analysis revealed statistically significant relationships between negative peer norms and the academic outcome variable of school engagement. Furthermore, analysis showed that positive peer norms and ethnic identity significantly correlated with school engagement (p. 8). Overall, the results of the study suggest that positive peer norms and positive ethnic identity may pose as important protective factors for urban youth of color. These findings have implications for what schools might do to encourage the development of strong, positive ethnic identities as protection against experiences of racism and discrimination. School counseling is one such vehicle for such encouragement in its capacity to not only reach out to students, but also to teachers and parents in the community (p. 12). In other words, school counseling practices can “advocate for school environments that actively support students’ development and expression of their cultural heritage” (p. 12).

Teacher Relationships

Like peer relationships, positive relationships with teachers also contribute to the educational success of middle school students. “When middle school students are well-liked by their teachers and perceive that their teachers care about them, provide clear structure and positive feedback, and are available to help with social and academic problems, they also tend to display positive forms of social behavior, motivation, and academic accomplishments” (Roseer, Midgley & Urdan, 1996; Skinner & Belmont, 1993, and Newman, 2000) in (Wentzel & Watkins, 2002). The results of a study conducted by Wentzel et al. on the impact of multiple teacher supports in the classroom generally found that teachers who provide quality instruction, offer help and advice, communicate clear expectations and create safe learning environments contribute positively to student motivation and the pursuit of goals (p. 199). Some variance was found based on student expectations with regard to sex, grade level, teacher and classroom, and in the relations to classroom interest and goal pursuit. It should be noted that the study sampled predominately white and middle class students, who reported on teachers with similar backgrounds. The Center for Teaching Equality points out that the

distribution of effective teachers correlates to achievement gains and gaps, noting in particular that “high-poverty schools are more likely to be beset with teaching vacancies in math and special education, and much more likely to staff classrooms with out-of-field, inexperienced and less-prepared teachers” (Berry, Daughtrey & Wirder, 2010). While positive interactions and relationships with teachers helps to predict educational success, the possibilities for its attainment appear challenged by issues of equity and teacher access.

High School: Grades 9 to 12

School-Family Relationships

Parental Involvement

Family involvement can prevent high school drop-out (Leuchovius, National Center on Secondary, Transition, & Pacer Center, 2006). “[F]amily involvement is one of the most important contributors to school completion and success. The most accurate predictors of a student’s school achievement is the extent to which his/her family encourages learning” (p. 2). Family involvement in the middle and high school years translates into high yet reasonable communication about expectations for the student’s education and future career, as well as active involvement in his/her education. Middle and high school students with involved parents make better transitions, maintain work quality, formulate realistic future plans, graduate at higher rates, and advance to postsecondary education (2). The National Parent Teacher Association (2001) cited in Leuchovius (2006) state that students whose families remain involved are more likely to:

- earn high grade-point-averages and scores on standardized tests,
- enroll in more challenging academic programs,
- pass more classes and earn more credits,
- attend school regularly,
- display positive attitudes about school,
- graduate from high school and enroll in postsecondary programs, and
- refrain from destructive activities such as alcohol and drug use, and violence.

School Outreach

From the point of view of schools outreach to families can predict increased high school completion (Lehr, National Center on Secondary, & Transition, 2004). In a review of 45 peer-reviewed, empirically-based prevention and intervention studies addressing dropout and/or school completion, Lehr distilled one of the five most effective intervention categories to be “family outreach strategies”. These intervention strategies included increased school feedback to families, as well as conducting home visits (p. 2). Family outreach interventions were also conceptualized within a greater “check & connect” model, meant to engage students in learning via a school mentor that establishes a long-term relationship with them, and stays in regular contact with their families and other teachers. The mentor monitors student risk factors responds accordingly (p. 3). The main subjects of these studies who received some kind of intervention were those with poor academic performance, poor attendance records, and a history of dropping out of school.

Grades & Attendance

The ninth grade seems to be singled out in the literature as a particularly critical time that determined graduation and transition to higher education. The ninth grade is a “bottleneck” year for many high schools, in which high enrollment rates constrict progress towards grade 10 (Wheelock & Miao, 2005). 22% of ninth graders repeat the year, contributing to a knock-on effect of bulge in enrollment in the grade (McCallumore & Sparapani, 2010). Perhaps related, ninth-graders have the “lowest grade point average, the most missed classes, the majority of failing grades, and more misbehavior referrals than any other high school grade level” (p. 448).

Ninth graders are also the first to feel the pressure of state-mandated graduation requirements, and perhaps more likely to feel the impact of transitioning from generally smaller schools and classes to larger-sized high schools which also marks declines in academic performance and increased absences. Not surprisingly, a study conducted by the Consortium on Chicago School Research indicated that (1) ninth-grade grades and (2) attendance were identified as the two most important indicators of high school success (Gewertz, 2007). An analysis of the school district's graduation patterns revealed that 9th graders who maintained a B average have a 93 percent chance of graduating in four years, and likelihood of 80 percent at completing high school with a B average or higher. Correspondingly, 9th graders with C averages were deemed to have a 72 percent chance of graduating in four years, and those holding D averages a much decreased 28 percent likelihood of a four-year high school experience. The emphasis on 9th grade academics and attendance as predictors of high school graduation may indicate the need for schools to provide transition assistance in the form of orientations or freshman academies (separate wing or building) (McCallumore & Sparapani, 2010, p. 449-451). Wheelock & Miao (2005) suggest improving a school's holding power by building stronger relationships between teachers/adults and the students (such as developing freshmen learning communities), providing transition assistance to students through academic preparation programs during the summer between the 8th and 9th grade, or by integrating study skills into the 9th grade curriculum (p. 4).

Peer Relationships

Peer relationships can impact upon attendance and academic performance. One study notes that peer influences must be integrated into high school completion programs, as peer pressure and social networks impact school experiences and expectations to graduate (Gunn, Chorney, & Poulsen, 2009). Another asserts that peer group identity is equally if not more influential than parents on shaping values (Hartnett, 2008). "Since teenagers often look for love and acceptance through peer identity groups, particularly as family culture erodes, peer group identity becomes a central factor in the process of development" and "...may be a predictor of those who make it to graduation and those who do not" (p. 36-37). Given the extensive link between peer acceptance and academic outcomes, schools may want to consider ways to encourage positive peer relationships around collaborative learning opportunities (Wentzel & Watkins, 2002).

Preparedness & College Selectivity

Fry makes the case that "college selectivity" among minority high school students, and in the case of his study of Hispanic students, has a bearing on college completion (Fry & Pew Hispanic Center, 2004). According to Fry, the higher college drop-out rates among comparably prepared Latino students is not just an indication of the legacy of poor elementary and secondary education that many have endured. College retention and drop out is related to the quality of the higher education institutions that they attend. The more selective the institution, the more likely Latino students are to complete a bachelor's degree than Hispanic college students on the less selective college pathway. By less selective pathway, Fry refers to enrollment in "open-door" institutions. Among the best prepared to attend college, 60 percent of Latino students attend non-selective colleges compared to 52 percent of whites; open door institutions enroll 16% of well-prepared Latinos compared to 12 percent of whites. While there is no clear consensus on why more selective institutions yield higher retention and graduation rates, Fry notes that highly selective institutions tend to offer more financial aid assistance, provide stronger mentoring for their students, and in general attract the most prepared students. These more favorable factors have a bearing on the educational environment in which students learn (p. 11). While Fry acknowledges that access to top, selective schools is limited, his findings carry implications for how high schools might help Latino high school students in the college selection and preparation process.

Experiencing a College-going Culture

What perhaps all the predictors described previously in this section build toward what Corwin and Tierney describe as a strong *college culture* (Corwin & Tierney, 2007). They claim that students who attend high schools that build a college-going culture are more likely to be ready for and enter college. Diane Hill also claims that high schools that provide “college linking” or structured transitions assistance, particularly for low SES students, make a significance difference in four year college enrollment (Diane Hill, 2008). College culture has to do with the role of teachers and administrative leaders, guidance counselors, college preparation programs, and the overall ways in which a particular school’s culture promotes college going (p. 1). College going cultures can be cultivated in a specialized section of a school, within a magnet program or even learning community. However, the ideal college culture should be accessible to all students (p. 3). Pallas & Holupka (1987); Hossler et al. (1999); Hugo (2004); and McClafferty & McDonough (2002) cited in (Corwin & Tierney, 2007) break down measures of a college culture into five components that build college readiness and increase the likelihood of college success: (a) academic momentum; (b) an understanding of how college plans develop; (c) a clear mission statement; (d) comprehensive college services, and (e) coordinated and systemic college support (p. 3).

Gunn et al. likewise found that a combined effort of school-initiated interventions focusing on student life conditions in and outside of school, created an environment of support for high school completion (Gunn et al., 2009). They reported on the improvement of high school retention rates among First Nations/Metis/Inuit (FNMI) youth through an extensive action research project conducted by the Alberta Initiative for School Improvement (AISA) to support the development and implementation of approximately 1,600 grassroots high school completion projects led by school districts, teachers, parents, and students across the Alberta province. FNMI youth are considered at high-risk for high school drop out, owing to a variety of in and out-of-school factors, including poverty, substance abuse, criminal involvement, racism, poor relationships with teachers and fellow students and the subsequent perceived expectation of failure (p. 18).

As such, the AISA projects tried to make a difference in the high school graduation chances of FNMI students’ in a variety of ways. Interventions included modifications to instructional practices to accommodate diverse learning styles and instituting alternative programming for students identified at risk to attend learning centers, take part in online academic programs and career incentive programs. Additionally, AISA programs provided at-risk FNMI students with social and psychological supports, providing counseling that helped them adopt adaptive emotional approaches, referred them to supports within the community, and enacted cross-cultural awareness programs with the schools and communities. Finally, many of the high school completion projects attempted to forge links to students’ home lives and incorporate the positive influences of their families into their school lives. Communication and partnering strategies were the most widely reported form of school-home collaboration, to include the formation of Parent Advisory Councils, Websites, newsletters, and the institution of “open-door” policies (p. 21). Parental support and positive feedback turned out to be quite high for these collaborations, as they had rarely if ever had their children recognized for their academics, citizenship or school involvement (p. 21). According to Gunn et al. the “communication between parents and schools was imperative for a positive relationship to exist and for this program to flourish...” (p. 21).

Civic/Community Engagement

Civic engagement at the high school level might also be considered a predictor of college-going, as the outcomes of civic programs mold intellectual, political and community-based commitments often characterized by the goals of higher education. Civic engagement outcomes “constitute a vision of civic engagement that sees youth as well-rounded citizens capable of engaging in civil, political, and problem-solving activities, both individually and socially” (McIntosh & Munoz, 2009). In a study on urban high school students, it

was found that civic engagement activities, such as community service, political discussion and environmental conservation, made the greatest impact on participants' educational development (McIntosh & Munoz, 2009, p. 41). Civic engagement impacts the educational development of the “whole child”, which offers opportunities for students, particular those disadvantaged or low achieving, to experience an alternative view/purpose of education that may leave positive, lasting impressions.

Civic engagement, as a predictor of success, might also be cultivated within the context of Indigenous educational needs and the political struggle for community self-determination. No where are the stakes higher for civic or community-based learning than among populations, whose culture and ways of knowing have been discounted by traditional education, and as a result have experienced the most academic “failure”. The Royal Commission on Aboriginal People in Canada notes that “the majority of Indigenous youth do not complete high school, and rather than nurturing the individual, the present schooling experience typically erodes identity and self worth” (O'Connor, 2009). Based on field research in an experiential education program in Yukon and a community-based experiential program in Alberta, O'Connor makes the case that, among other important benefits, building partnerships within the community to assist in curriculum delivery and using field studies to deliver and engage students were deemed crucial to both initiatives (p. 417).

Post-high School: Ages 18 to 25

Academic Performance

Retention research has consistently found that intellectual or academic performance variables predict retention beyond the freshman year (Astin, Korn, & Green, 1987; Fleming, 2002; Kim, 2002; Moffat, 1993; Ramist, Lewis, & McCamley-Jenkins, 1993; Tross et al., 2000; Waugh, Micceri, & Takalkar, 1994; Wolfe & Johnson, 1995; Zheng et al., 2002) cited in (Hoffman & Lowitzki, 2005). Academic performance, however, does not signal college completion alone, as other factors support or mitigate it, such as high school/pre-college performance factors (high school grade point average and SAT or ACT scores), achievement motivation, goal setting, gender, socioeconomic status and parental education attainment (Friedman & Mandel, 2010; Harackiewicz, Barron, Tauer, & Elliot, 2002). For example, while the main finding of one was that “academic performance has large effects on likelihood of retention and transfer” study (Allen, Robbins, Casillas, & Oh, 2008), they also found that “academic self-discipline, pre-college academic performance, and pre-college educational development have indirect effects on retention and transfer” (p. 647). Likewise, a study to understand the predictors of bachelors degree attainment among Native Hawaiian community college students found that high school grade-point average was an important factor that determined transfer to and graduation from a four-year institution (Hagedorn, Lester, Moon, & Tibbetts, 2006). Other studies have shown that the more cultural dissonance minority students experience, the more likely high school grades become strong predictors of college success, while test scores become weaker predictors of academic achievement (Hoffman & Lowitzki, 2005).

Student Engagement

Astin (1993), Kuh et al., (2005) and Pascarella & Terenzini (1991, 2005) in (Kinzie, Gonyea, Shoup, & Kuh, 2008) assert that college student engagement is positively linked to educationally purposeful activities, such as the desired outcome of good grades, higher first-to-second year persistence, and graduation rates. Returning for a second year of college is an important measure of graduation (cited in Gardner, Upcraft & Barefoot, 2005). Student engagement, as a predictor of college success, is particularly important to consider for historically underrepresented students whose likelihood of college completion is more dependent upon supportive college environments (p. 22). In addition to a higher dependence on the desire to complete college, the persistence of underrepresented students is often linked to racially conscious constructs, such as “sense of belonging”, “validation” and “stereotype threat” (p. 23). Researchers have shown that historically underrepresented students are unable

to take full advantage of learning opportunities in predominately white schools. Also, family socioeconomic and educational backgrounds, racial discrimination, and strong competing family obligations further stand in the way of their ability to become engaged in their institutions (p. 24).

The following criteria for engaging students are identified and discussed, as they pertain to what institutions can do, beyond the provision of classroom instructional practices, to support college persistence and graduation.

Experiencing Early Interventions

New students who receive the benefits of early interventions throughout their first year are more likely to stay enrolled in college, therefore significantly increasing the chances of eventual college completion. Such attention should include monitoring of academic performance, even prior to the first year through precollege mentoring programs, and sustained interactions with faculty and staff about what is expected of students once they reach campus (p. 30). First year experiences establish behavioral patterns that will endure over students' college careers. "Faculty members, advisers, and student affairs professionals must clearly and consistently communicate to students what is expected of them and provide periodic feedback as to the quality of students' performance" (Kinzie et al., 2008).

Take, for example, the University of Hawaii at Manoa's College Opportunities program, which recruits academically underprepared, economically disadvantaged or otherwise non-traditional students to participate in a structured, six-week summer college preparation program. Participants spend time learning about the skills and knowledge necessary to succeed in the college classroom. Participants go on to receive a coordinated counseling services throughout their first year, to include academic and financial aid advising (COP 2010 Application in PPRC, 2010).

Experiencing Interconnected Learning Supports

Kinzie, Gonyea, Shoup & Kuh (2008) likewise note that students who experience a purposeful network of learning supports, otherwise known as comprehensive or complementary systems initiatives (p. 32) are more likely to persist. Interconnected learning support networks can be comprised of early warning systems and safety nets, and that connect students with academic needs faculty in intentional ways. Supplemental instruction, peer tutoring and mentoring, theme-based housing, financial aid, internships, service learning opportunities and on-campus employment are all factors that support college retention (p. 32).

Experiencing Cultural Affirmation

While more traditional predictors of college completion depend on the notion of the student as an individual, or as individuals who must assimilate to college and campus culture in order to succeed (Tinto, 1975, 1987; Pascarella & Terenzini, 1980, 2005, Astin, 1993; Braxton, Sullivan, and Johnson 1997; Kuh & Love, 2004 cited in Wells, 2008/2009 and PPRC, 2010), some recent studies embrace notions of group power and community that does not require students to leave their identity behind once they enter higher education (Tierney, 2004 in Goodman, 2010). This is particularly relevant for cultural minority students whose chances of persistence beyond the first year and eventual graduation correlate to experiences of cultural alienation/dissonance or affirmation (Kuh & Love, 2004 in Goodman, 2010).

Schools that offer a strong minority presence in administration and faculty is one identified way to positively impact graduation rates of students of color. In a study to identify significant predictors of program completion for students of color from 573 two-year colleges, it was found that having individuals of color serve on the board of trustees, as well as providing minority peer tutoring programs served as significant predictors of retention and college completion. Furthermore, the number of faculty and administrators of color, combined with the amount of contact time that chief student affairs officers had with students of color strongly predicted program completion rates (Opp, 2002).

Investment Predictors

While academic, institutional and environmental factors have been shown to predict college success, a student's feeling of "investment" in her/his education has also been shown to impact graduation. What is more, some studies suggest that educational "investment" predicts college completion across diverse variables, such as ethnicity and SES (Berkovitz & O'Quin, 2007; Kiser & Price, 2008). Findings from a persistence study of first year students, modeled by ethnicity (Caucasian, Hispanic and African American) from Texas State University, found that the cumulative hours earned throughout the first year of college was statistically significant in predicting persistence (Kiser & Price, 2008).

Berkovitz & O'Quin (2006/2007) conducted a study on predictors of college completion for readmitted college students – students who at some point dropped out of college to reapply and return to higher education. Readmitted college students are understudied according to the authors, but very important given the relatively high correlation of drop out rates to socio-economic, cultural and other disadvantages. According to McGrath & Brunstein (2007) cited in the study, students who voluntarily left college did so because of lower academic preparation, financial problems, and lower SES than those who remained in school. Skahill (2002-2003) also cited the impact of social networks on retention, noting the much higher likelihood of commuter students to drop out compared to those living on campus (Berkovitz & O'Quin, 2007). Finally Davig & Spain (2003-2004) reviewed in this study found that non-returners cited family problems, job conflict, and financial problems as reasons for not re-enrolling (p. 200).

Thus, this study made a point to review ten years work of readmissions applications of a medium-sized 4-year public school of approximately 11,000 students in a large Northeastern state to determine what predicts college completion for returning, at-risk college students. The researchers created a scoring sheet for archival and admissions data from the standard readmission application completed by all students seeking to return. The analysis did not find any significant differences between returners and non-returners in terms of background variables pertaining to sex, ethnicity, history of academic dismissal, transfer history, or courses taken as unclassified students once stopping out (p. 204). However, returners, compared to non-returners, had higher grade point averages upon readmission, had completed more semesters before stopping out, and had transferred in more college credits upon readmission (p. 204). It appeared that students' investments in terms of amount of time and number credits earned, compared to their non-returning counterparts, predicted their likelihood of college completion (p. 205). Furthermore prior participation in a pre-freshmen summer orientation program emerged as a significant predictor of graduation especially for younger returnees (p. 209). This finding correlates to this review's previous discussion on the significance of "being prepared" for campus life. While the study concluded that only 47% of returning "at-risk" students graduated, and that these students took considerably longer than four years to do so, this number is quite favorable given the national average of 41.2% of students who earn a college degree from a four-year public school within five years of entry (p. 209).

Social and Cultural Capital

One cannot get a fuller picture of what makes college completion possible without understanding the role of social and cultural capital in students' educational experiences. Emerging scholarship advocates for models of student success that understand the impact of the conditions of possibility behind already established persistence and graduation predictors. Research that conceptualizes social and cultural capital, and that measures its impact, is still quite rare. However, the discussion below gives some sense of how researchers are starting to approach the link between social/cultural capital and retention, as well as suggest ways institutions and policy makers might begin to understand the fact of social and cultural capital as embedded in already identified predictors and variables of college completion.

Citing Berger (2000) and Longden (2004), Wells (2008/2009) suggests that cultural capital is an important and novel framework from which to study persistence and retention issues, because of the ways it might open up tautological relationships that currently define predictors to more rigorous scrutiny and understanding. For example, Wells claims that while facets of social capital as they relate to retention, such as parental education levels, have been studied, they are not further qualified or disaggregated. Thus, the conclusion is often that “education begets education”. In this example, what remains largely un-researched is what parental education might signify in terms of the positive family networks and relations at work in a student’s education (Wells, 2009). Given the mounting evidence that higher education can be both a vehicle for socioeconomic mobility as well as a reproducer of socioeconomic inequalities, it is important to understand the impact of social and cultural capital on student college success. “If those that are privileged, and therefore able to amass the most social and cultural capital (and also to set the norms for what forms of capital are valued), are more likely to attain a college degree, then the social hierarchy is effectively reproduced via higher education” (p. 104). Thus Wells set out to answer the following questions in a study using the National Educational Longitudinal Study (NELS: 88-94), to include data sets beginning in the 8th grade year (1988), and then followed up in 1990, 1992, 1994 and 2000:

1. How do previously acquired amounts of social and cultural capital affect persistence in higher education? Specifically, this study tests the hypothesis that higher levels of social and cultural capital are associated with higher levels of first-to-second year persistence.
2. How do these initial levels of social and cultural capital brought to college differ for racial and ethnic groups? (p. 108)

Data was first descriptively analyzed to examine how the acquired social and cultural capital brought to college differed by racial/ethnic group. Then logistic regression analysis was used to determine the effects that such capital had on persistence. Results of the analysis confirmed that prior social and cultural capital “have significant positive effects on the first-to-second year persistence of college students.” The effects were demonstrated by the already established ability to successfully negotiate applications, financial aid and enrollment. The findings also pointed to Hispanics, on average, as possessing the least amount of social and cultural capital by these measures. African American social/cultural capital also appeared lower than whites and Asians (p. 122). These findings are an interesting first step towards more rigorous studies that might be able to assess the differential impact of social and cultural capital by race/ethnicity, interaction effects, and/or create models that demonstrate indirect effects (p. 121-122).

Conclusion: Thematic Similarities and Differences

This concluding section offers a discussion of thematic similarities and differences of the main predictors discussed in this review, across age groups. While some predictors appeared across the board qualified by the changing demands of developmental context, others seemed specific to particular developmental stages. Amidst the differences and similarities, it should be noted that the themes discussed in this review constitute a field of inter-dependent and successive measures that likely predict eventual college completion.

Family involvement is important for educational success, although methods of involvement and interaction with their children’s education are conceived of differently as they progress across the developmental continuum. Parental involvement during early childhood and younger years was emphasized in terms of mother-child interactions, and both quality and quantity of interaction between home and school. Parental involvement during these early years is thought to be a protective factor that deflects from risk factors the child may have such as socio-economic status. At the high school level parental involvement was linked to school-family interactions and cooperation that support students’ aspirations for college attendance.

Resilience, enabled by protective factors of family support, peer networks and comprehensive program services, are particularly important to minority and/or at-risk students who possess less social and cultural capital than their counterparts. For younger age groups, the protective capacity of the home environment was strongly mentioned, while peer relationships and afterschool or transition programs emerged in the middle and high school years. Finally, at the college level, resilience was interpreted as social and cultural capital, as well as participation in college transition and mentoring programs, which correlates to persistence beyond the first year and eventual college completion.

Literacy was heavily cited as a critical predictor of later academic achievement and educational success among young children in the 0-5 age range. Exposure to immersion programs and the development of biliteracy for those students whose first language is not English was also raised as a critical negotiator of achievement, as deficiencies in one's heritage language and language of instruction carry negative implications for school readiness, future literacy and other academic skills.

Academic achievement featured as a strong predictor of educational success for high school and college-going students, when considered in relationship to other measures of motivation, interpersonal skills, and academic engagement. Academic achievement seemed to feature more prominently in the literature for these age ranges, possibly because students become accountable to graduation standards. Academic achievement at the 9th grade year was specifically cited as foretelling of later academic achievement and ability to transition through the rest of high school.

Peer relationships were identified as determinants of educational success for the middle and high school years. The impact of peer influence on self-acceptance, identity and behavior outcomes becomes stronger during these years, as parental influence begins to wane. Peer pressure and social networks can directly impact student academic achievement, attendance and participation, and ultimately students' potential to graduate from high school.

Engagement is also a theme that arose as a predictive measure of school success, particularly for the middle school through college years. At the middle school level, participation in afterschool programs was raised as an important predictor of academic achievement. At the high school level, participation in civic engagement programs signaled possibilities for academic success, and was particularly noted in the context of community-based programs whose mission is to remap the educational paths for indigenous and at-risk youth. At the college level, higher student engagement was linked to persistence and graduation. Students who experience supportive college environments, and therefore commit to their institutions, in turn commit more strongly to their educational programs.

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Appendix A

Matrix A: Predictors found in literature review

Predictors	Qualifiers	Age/Grade
Family Involvement	<ul style="list-style-type: none"> • Parent-child • At-Home • Home-School • School-Home 	<ul style="list-style-type: none"> • 0-5; K-6 • 0-5; K-6 • 7-8; 9-12 • 7-8; 9-12
Early Literacy	<ul style="list-style-type: none"> • Bilingual/Immersion • Vocabulary • Reading skills • Cognitive skills 	<ul style="list-style-type: none"> • 0-5; K-6 • K-6 • K-6 • 0-5
Resilience/ Protective Factors	<ul style="list-style-type: none"> • Family support • Peer support • Afterschool programs • School culture • Transition programs • Social/cultural capital • Comprehensive svcs 	<ul style="list-style-type: none"> • All • 7-9; 9-12 • 7-8 • 9-12; Post-High • 9-12; Post-High • Post-High • 9-12; Post-High
Academic Achievement	<ul style="list-style-type: none"> • Cognitive test scores • Reading and math • Grades • GPA • SAT/ACT • Standardized tests 	<ul style="list-style-type: none"> • K-6 • K-6 • Post-High • 9-12; Post-High • Post-High • All but 0-5
Peer Relationships	<ul style="list-style-type: none"> • Academic achievement • High school completion • Peer-mentoring/tutoring • Positive Ethnic Identity 	<ul style="list-style-type: none"> • 7-8; 9-12 • 7-8; 9-12 • Post-High • 7-8
Engagement	<ul style="list-style-type: none"> • Attendance • Culture-based engagement • Civic engagement • Positive self-concept • Positive ethnic identity • Positive social behavior • Motivation/Goal setting • Enrollment 	<ul style="list-style-type: none"> • 9-12 • 9-12 • 9-12 • All but 0-5 • 7-8; Post-High • K-6 • 7-8 • 9-12
College-going Culture	<ul style="list-style-type: none"> • Transition programs • Pre-college counseling • College planning assistance • College selection assistance 	<ul style="list-style-type: none"> • 9-12; Post-High • 9-12 • 9-12 • 9-12
Teacher/Faculty Relationships	<ul style="list-style-type: none"> • Academic achievement • Engagement • Persistence • College completion 	<ul style="list-style-type: none"> • 9-12; Post-High • 9-12; Post-High • 9-12; Post-High • Post-High
Interconnected/ Comprehensive Support Networks	<ul style="list-style-type: none"> • Learning communities • Magnet program • Orientation • Peer-mentoring • Theme-based housing • Financial Aid • Internships • Service learning • Supplemental instruction 	<ul style="list-style-type: none"> • 9-12 • 9-12 • Post-High • Post-High • Post-High • Post-High • Post-High • Post-High • Post-High

(Continuation of Matrix A)

Predictors	Qualifiers	Age/Grade
Early Interventions	<ul style="list-style-type: none"> • Pre-college Mentoring • College-prep programs 	<ul style="list-style-type: none"> • 9-12 • 9-12
Cultural Affirmation	<ul style="list-style-type: none"> • Institutional culture • Faculty of similar background 	<ul style="list-style-type: none"> • Post-High • Post-High
Educational Investment	<ul style="list-style-type: none"> • Credits earned • Semesters completed 	<ul style="list-style-type: none"> • Post-High • Post-High

Appendix B

Matrix B: ‘4 Rs’ – Factors, Citations & Measures

RIGOR		
Factors	Citations	Measures
Pre/Early Literacy	Arnold et al. (2008); Hemphill & Tivnan (2008)	
Literacy	Hooper et al (2010); Dearing et al (2006); Kim et al. (2009)	MA Comprehensive Assess Sys.
Vocabulary	Hemphill & Tivnan (2008); Ladd & Dinella (2009)	Peabody Picture Vocabulary Test
Biliteracy	Hooper et al. (2010)	
Communication Skills	Connell & Prinz (2002)	
Cognitive Skills	Connell & Prinz (2002); Campbell et al. (2001)	Battelle Development Inventory
Study skills	DiPerna & Elliott (2002); Connell & Prinz (200)	Brigance K-1Screen (BKS)
GPA	Friedman et al. (2010); Tauer & Elliot (2002)	
Standardized Tests	DiPerna et al. (2007); Durlack et al. (2010)	
Reading & Math	Caspe et al. (2007); Hooper et al. (2010)	WJ-R Letter-Word Identification
English	Shernoff (2010); Jimerson (1999)	ACES (Acad. Comp. Eval. Scale)
School Readiness	Dockett & Perry (2009); Huffman et al. (2009)	
College Preparedness	Ou & Reynolds (2006); Corwin & Tierney (2007)	
On-time Graduation	Shin et al. (2007)	
College Enrollment	Fry & Pew Hispanic Center (2004)	Barron’s Selectivity Classification
Motivation & Goal Setting	DiPerna & Elliott (2002)	
High Expectations	Gregory & Rimm-Kaufman (2008)	
Positive Self-Concept	Garder et al. (2005); Wiggins (n.d.)	Self-Esteem Inventory
Social & Cultural Capital	Wells (2008/2009)	
Positive Ethnic Identity	Shin et al. (2007)	MEIM (Ethnic Identity Measure)
Resilience	Ou & Reynolds (2006)	
Socio-emotional Dev.	Durlak et al. (2010); Connell & Prinz (2002)	Walker & McConnell Scale
Cross-cultural Skills	De Korne (2010); Graue (2006)	

RELEVANCE		
Home-School Connect- edness	Durlak et al. (2010); Wheelock & Miao (2005)	
School Engagement	Shin et al. (2007); Gunn et al. (2009); Skahill (2002)	School Sentiment Index
Community Engage- ment	McIntosh & Munoz (2009); O’Conner (2009)	
Enrollment	Berkovitz & O’Quinn (2007); Kiser & Price (2008)	
Attendance	Wheelock & Miao (2005); Gewertz (2007)	
Program Completion	Barnard (2004)	
RELATIONSHIPS		
School-Home	Leuchovius (2006); Lehr et al. (2004)	
Home-School	Caspe et al. (2007); Kreider et al. (2007)	
Parent/Family Engage- ment	Connell & Prinz (2002); Abdul-Adil & Farmer (2006)	HOME inventory
Peer-to-Peer	Shin et al. (2007); Spradlin et al. (2005)	FBD AAS (Friend’s Delinquency)
Faculty/Staff-Learners	Wentzel & Watkins (2002); Berry et al. (2010)	
RESPONSIBILITY/RECIPROCITY		
Leadership	Kinzie et al. (2008)	
Civic Engagement	McIntosh & Munoz (2009)	
Service Learning	Kinzie et al. (2008)	
Positive Social Behavior	Epstein (20007); DiPerna et al. (2007)	Social Skills Rating System
Behavioral Patterning	Berkovitz & O’Quinn (2007)	

Appendix C

Matrix C: '4 Rs' Across the Developmental Continuum

	Early Childhood (0-5)	Grades 1-6	Grades 7-8	Grades 9-12	Post-High
RIGOR Academic Achievement Cognitive Development Key Milestones Intrapersonal Development	Pre/Early Literacy Cognitive skills Communication skills School Readiness Resilience	Standardized Tests Reading & Math Scores Literacy/Vocabulary On-time Graduation Resilience Positive Self-Concept	Standardized Tests English grades Resilience Positive Ethnic Identity Socio-emotional Dev. Motivation & Goal Setting	Standardized Tests Grades GPA Study Skills College Preparedness Resilience Positive Self-Concept Cross-cultural Skills High Expectations	GPA College Enrollment Resilience Social/Cultural Capital
RELATIONSHIPS Mutually Fulfilling	Parent/family Engagement	Parent/family Engagement	School-Home/Community Peer-to-Peer Teacher-Student	School-Home/Community Peer-to-Peer Faculty-Student	
RELEVANCE Student Engagement	Home-School Connection	Home-School Connection	Home-School Connection Engagement	Home-School Connection Engagement Program Completion Enrollment Community Engagement Attendance	Engagement Program Completion Enrollment Community Engagement
RESPONSIBILITY- RECIPROCAL Servant Leadership	Positive Social Behavior	Positive Social Behavior	Civic Engagement Service Learning Leadership	Civic Engagement Service Learning Leadership	Behavioral Patterning Civic Engagement Service Learning Leadership

(Continuation of Matrix C)

	Early Childhood (0-5)	Grades 1-6	Grades 7-8	Grades 9-12	Post-High
How To/ Program Characteristics	Immersion (Bilingual) Early Interventions Comprehensive Ed Programs		Afterschool Programs Community Partnerships	School Culture College Selectivity College-going Culture Learning Communities Magnet Programs Internship Programs CBE Curriculum Immersion (Cultural) Community Partnerships	School Culture Housing Program Financial Aid Institutional Networks Orientation Attendance Internship Programs Early Interventions Comprehensive Ed Programs

Appendix D

