ΣΟΦΙΑ-SOPHIA

DOI: http://dx.doi.org/10.18634/sophiaj.15v.2i.865

Preparing for College: A Conceptual Model for Student Pathways to Higher Education

Claudia Patricia Ovalle Ramírez*

* Centro de Justicia Educacional, CJE [Educational Justice Center].
Pontificia Universidad Católica de Chile, Santiago de Chile.

Article information:

Received: September 10, 2018
Revised: June 6, 2019
Accepted: August 30, 2019

How to cite:

Ovalle, C.P. (2019) Preparing for College: A Conceptual Model for Student Pathways to Higher Education. *Sophia*, 15(2); 28-39.

UNIVERSIDAD La Gran Colombia

ISSN (electronic): 2346-0806 ISSN (print): 1794-8932

Sophia-Education, volume 15, N° 2. July/December 2019. English version

Abstract

College and Career Readiness (CCR) is an educational model that determines the skills, behaviors, and knowledge that high school students require in order to be successful in higher education or jobs. In Colombia there are few studies related to university preparation, therefore, this article aims to present the conceptual model, recent research in the field, and topics for a research agenda that incorporates data from samples of Colombian students.

Keywords: University preparation, educational justice, desertion student, secondary education, higher education, Colombian educational system.

Introduction

Preparation for university is an important educational justice issue for the development of Latin American countries. Only with a quality education, which allows the articulation and continuity between educational levels, can the human resource be prepared to face the challenges of production and technological advancement of the 4th industrial revolution (4i).

Colombia is an interesting Latin American case to review on the issue of educational justice and on the preparation for university in particular. In 2012 it was estimated that in Colombia 39% of high school students did not enroll in post-secondary educational institutions and 45.5% of students who managed to make the transition to higher education did not persist until they obtained their post-secondary degree (OECD, 2013), that is, they were not sufficiently prepared for university. In 2013, a total of 2,109,224 students enrolled in university and 2,575,332 students who were expected to enroll did not (SNIES, 2013). Previous research has determined that this disengagement is related to problems with academic factors, for example, the results obtained in the standardized test at the end of high school "SABER 11" that indicate that students do not have the knowledge and skills necessary for higher education (Ministry of National Education, 2013).

In Colombia, university desertion reaches 14.39% per year or 129,000 students (Spadies, 2013). The field of university education in which most students drop out is engineering, because one out of two students does not graduate and one out of five resigns in the first semester or changes to a different undergraduate program. Students who enroll in engineering programs at public universities have a high probability of dropping out in the first semester (22%) and in the last semester (55%) compared to students in other undergraduate programs (Ministry of National Education, 2010). At the national level, the fields with the highest dropout rates are Agronomy, Veterinary and related fields (24.52%), Engineering (23.48%), and Mathematics (22.27%).

arly college dropout is related to performance level on State tests. It has been established that there is a relationship between the score of the Saber 11 exam (compulsory test for access to higher education) and student dropout: thus, in the first cohort of 2013, the low level of Saber 11 had a dropout rate of 25.12%, the medium level 18.86% and the high level 13.67% (Spadies, 2013). A relationship between university performance and standardized tests has also been observed. For example, first-year undergraduates with low college averages generally score low on the Saber 11 test (Montes and Lerner, 2011). Likewise, the percentage of students who enrolled in IES (Institutions of Higher Education) with high scores on Saber 11 decreased from 32.8% in 2000 to 21.67% in 2014. The percentage of students with medium scores remained constant (42%), while low scores increased from 25% in 2000 to 36% in 2014. In 2013, 57% of students who dropped out of college had scored in the LOW range, compared to 35% who dropped out and had scored HIGH on the same exam (Ministry of National Education, 2013).

The data presented suggests that a large number of high school students cannot enter or persist until they graduate from higher education in Colombia. It is possible, among other factors, that Colombian students do not enter or are unable to remain in undergraduate programs because they lack the necessary skills and knowledge that are pre-requisite for university studies. Evidence of this is in the results of standardized international and internal evaluations. Thus, in the PISA - International Program for Student Assessment - Colombian 15-year-old students obtained 413 in Reading (OECD country average was 493), 381 in Mathematics (OECD average was 496) and 402 in Science (OECD average was 501). Most students scored below level 2 in one or more areas, which is related to low performance in post-secondary education (OECD, 2013).

Barrera, Maldonado and Rodríguez (2012) point out that in addition to low levels of achievement on international tests-even when compared to nations similar to Colombia-Colombian students also show differences in performance within the country on standardized tests, making differences in knowledge and skills between students from lower strata and rural areas and their better-off peers more evident. On standardized tests at the university level (Saber Pro), it has been found that students achieve a gain of only half a standard deviation in general competencies (problem solving, critical thinking, interpersonal relations, and informative and argumentative writing) at the end of post-secondary education. (Rosefski and Saavedra, 2011).

One of the factors that has been empirically linked to student success and college achievement is known as "College and Career Readiness" (CCR, Conley, 2007a, 2007b, 2010,2014). This model is presented in the following section along with a proposed agenda derived from this model for research in the Colombian context.

Preparing for College: A Conceptual Model of Skills, Knowledge and Behavior for Access and Persistence in Higher Education

Readiness for postsecondary education has been defined in the literature as possessing a range of skills (cognitive and behavioral) and knowledge (Conley, 2012). Skills include cognitive strategies (critical thinking, logical reasoning, effective communication, and analysis), learning techniques, and knowledge appropriation (i.e., goal setting, persistence, motivation, etc.). Knowledge includes discipline content (e.g., Mathematics, Language Arts, Science) and information to overcome the transition to university (i.e., knowing about funding sources, access and tuition mechanisms, and having personal expectations).

Conley explains that "a student who is ready for college is qualified to enter and succeed in courses that will give him or her credit toward a college degree or certificate without the need for remedial or booster courses" (p.2, 2012). "This definition does not refer to indexes or cut-off scores that use a single score or in combination with other elements such as GPA or grade point average to predict success in college" (p.1, 2012). As shown in Figure 1 (taken from Conley, 2012), being ready for college implies the acquisition of cognitive strategies, specific content, knowledge of the university system, and the development of learning techniques.

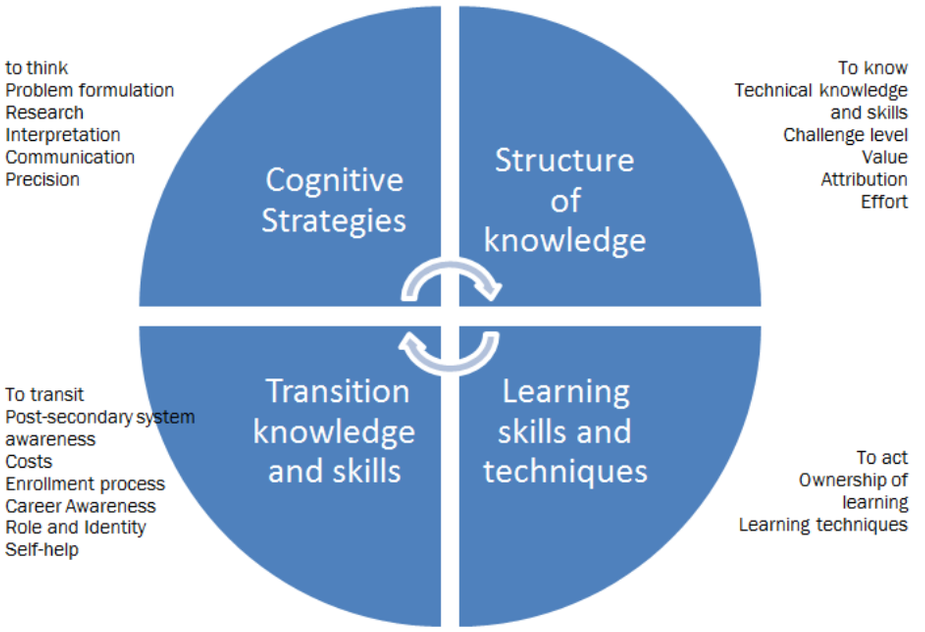
The literature on College Readiness indicates that attempts have been made to establish a student's level of readiness by means of different indices such as grade point average (Strayhorn, 2011), school ranking (Swail, Redd, & Perna, 2003), grades in specific school subjects, or standardized scores such as the SAT (Wiley, Shavelson, & Kurpius, 2014). Other factors that have been associated with a student's level of college readiness are academic rigor, knowledge of the college environment, and beliefs about academic ability. Some studies have included variables such as curriculum and school quality (Swail, Redd, & Perna, 2003), and compliance with grade level requirements (Plunk, Tate, Bierut, Grucza, 2014).

According to Conley, college readiness should be measured by the fact that this is a multidimensional construct so that educational institutions should obtain information on the 4 academic and non-cognitive dimensions expressed in the model to establish individual student profiles (Conley, 2014).

College Readiness has been associated with outcomes such as access to college education, retention (first to second year of college), persistence (graduating from the post-secondary system and doing so on time), and success in college (i.e., in terms of the college average). College Readiness outcomes also include access to college immediately after the bachelor's degree, college retention, and graduation (St.Jhon, Masse, Fisher, Moronski, Lee, 2014; Plunk et al, 2014), performance in specific classes (i.e., mathematics), and college average (Conley and French, 2014; Wiley, Shavelson, and Kurpius, 2014; Olaya, Trejos, and Soto, 2009), as well as first semester college average (Strayhorn, 2011).

In Colombia there are no definitions or measures related to the concept of College Readiness, although there are studies that have attempted to develop predictive models of the performance of samples of Colombian students at the post-secondary level. For example, Olaya, Mosquera and Artamanova (2009) used school academic data (Literal Reading Level and Abstract Thinking) and the results of the SABER 11 standardized test of first-year students from the University of Pereira to establish who would pass the Mathematics 1 class before taking it at the University. Studies in Colombia have also included the prediction of school readiness results such as the loss of one or more subjects at the university level, the university average and being withdrawn from the university (Merberke, 2005), and the performance in specific classes in university programs (i.e., Mathematics 1 and 2 classes in Engineering courses, Olaya, Trejos and Soto, 2004).

Figure 1. Dimensions of the "College Readiness" construct (Conley: 1, 2014)



The Colombian education system can integrate the College Readiness model, and some initial actions have already been taken but can be improved and directed towards this purpose. For students to be ready for post-secondary education, there are national standards to promote that students learn the necessary content to succeed in university, there is public aid conditioned to encourage low income students to enroll in post-secondary institutions, and finally, the state has implemented a standard test (SABER 11) to help institutions of higher education in the decision making process for the admission of students at the post-secondary level.

However, in Colombia, public school institutions do not have indicators available during high school that would allow them to know if a particular student is ready for university academic work, and therefore they are not implementing instructional and assessment practices that would enhance the student's College Readiness (CCR). Educational institutions limit college readiness to standardized testing of 11th graders or to career counseling interventions, leaving aside aspects such as high school training of the academic and non-academic aspects described in the Conley model (2010, 2013).

In the area of public policy, information systems that include CCR indicators have also not been established, nor have issues such as the alignment between the content learned in school and the necessary foundations for the post-secondary level been reviewed.

Cognitive strategies and academic content

The literature in the field of CCR shows that individuals who are most likely to enter and succeed in postsecondary education are characterized by possessing cognitive strategies such as critical thinking, logical reasoning, effective communication, and analysis; are able to transfer what they know to solve problems in different contexts; have school content management; do interpretation, research, and problem solving; and write and read different types of texts (Conley, 2003, 2007a, 2010, 2014). Therefore, it is necessary to establish whether these skills are being fostered in the Colombian school system.

The cognitive skills that every high school student must possess are intentional behaviors that students

must employ in context and that require frequent practice in an extended number of situations (i.e., in different curriculum areas) so that students learn when and where to apply them (Conley, 2010, 2007a). These strategies are essential for students to succeed in freshman courses in the undergraduate curriculum (Conley, 2003, 2007b), and are required in other educational settings that involve the development of professional and workplace skills (Conley, 2014). These strategies are: formulating hypotheses, developing problem-solving strategies, identifying sources and collecting information, analyzing information, building products in different formats, monitoring and confirming the accuracy of the work developed (Conley, 2003).

In Colombia, the General Education Law (Ley 115 of 1994) indicates that the objectives of secondary education (the last two grades 10 and 11 of high school) include, among others, deepening in areas such as the natural sciences and in areas of vocational interest to the student, in which the development of cognitive skills important for college preparation such as research and communication can be evidenced.

However, these skills are not considered a prerequisite for college entrance, since they are not included in the standardized grade 11 test (Saber 11) that focuses on general skills such as Critical Reading, English, Citizenship Skills, and Mathematics. Instead, these areas and skills are assessed only through the end of higher education on the SABER-PRO test and are known as specific competencies (Scientific Thinking, Quantitative Reasoning, and Argumentative Writing).

This suggests that there are several aspects of preparation for postsecondary study that the only state standardized assessment that determines access to higher education (Saber 11) is not evaluating: a set of cognitive skills that educational research has found to be necessary and that students are expected to develop before they go on to college.

A concrete example of the lack of assessment of essential aspects of College Readiness is in the assessment of the Critical Reading competency of the Knowledge 11 test. This competency is evaluated by taking into account performances such as identifying and understanding the local contents that make up the text, understanding how parts of the text are articulated to give it global meaning, reflecting on a text and evaluating its content or the validity of its arguments (structural aspects). However, at the university level, teachers expect students to engage in more extensive informational reading and to demand critical thinking from the student (i.e., how an argument is constructed and what details support it), and to a lesser extent, analysis of the structural elements of the text (Conley, 2003) that are assessed with the Saber 11 test.

The items in the Saber 11 test are designed to reflect the educational standards proposed by the Colombian Ministry of National Education. An important question is whether the test-which represents the criteria for entry to the post-secondary level-reflects the educational standards and whether these standards can indicate whether the student is ready for university or whether they are limited to a series of contents typical of the secondary level.

In the USA, this research was developed by David Conley (University of Oregon) who asked university instructors if school standards are applicable to their courses (if they are prerequisite, relearned in the course, introduced in the course, or learned in other courses) and if they are useful (critical for course learning or unnecessary for it) in their freshman classes.

Once the school standards that, in the opinion of university teachers, serve as preparation for university were established (Conley, 2003), the extent to which these educational standards are reflected in the standardized tests applied at the end of high school was investigated. The indicators included evaluated the cognitive complexity of the item compared to that of the standard (i.e., recall, comprehension, analysis, use), categorical concurrence (i.e., average number of items that evaluate the same standard), range of knowledge (i.e., determine if the items represent all the standards), balance of representation (i.e., within a standard, how many objectives are represented by the items that evaluate the standard?) (Conley, 2011).

In Colombia, this level of articulation between training expectations at the secondary and post-secondary levels has not been established, nor has

the applicability and usefulness of secondary standards for future academic work in higher education been evaluated, nor has the level and extent to which these standards are evaluated with the items of the SABER 11 test been established (for example, whether the test emphasizes the knowledge of some levels or represents the standards of all levels of secondary education).

In the Conley's College Readiness (CCR) model (2012), academic content is that which is fundamental to the understanding of academic disciplines in the University and this is acquired through the continuous application of cognitive strategies. Conley presents the structure and concepts corresponding to the academic subjects that every student must know how to handle in the "Standards for Success" (Conley, "Standards for Success" 2005, 2014). These standards contain the knowledge in 6 areas that students must manage to pass the first year courses in the university according to the criteria of the university teachers, therefore they are known as "Standards for Success".

These standards are relevant because many students have difficulties in the post-secondary system since expectations are different from those at the high school level (Conley, 2003b). Thus, many students have difficulty when college teachers expect them to interpret and apply learned knowledge (transfer learning), make evidence-based written reports, read technical texts rather than narrative text, receive negative feedback on their work, and have learned specific content when the school has not prepared them in the text.

Cognitive strategies and content can be developed in educational settings through practices such as: focusing instruction on the core concepts specified in the college readiness standards (Conley, "Standards for Success," 2003); aligning courses and expectations between school and college (i.e, designing school syllabuses that resemble and are aligned with those of the university and allow the high school teacher to better understand the expectations of the university); comparing courses in the school curriculum in terms of the educational standards they develop (i.e, to avoid not addressing or repeating them in instruction); the development of formative assessments (i.e., solving complex tasks such as experiments, debates, simulations, and argumentative texts), and the use of scaffolding (i.e., allowing activities of increasing complexity by decreasing the support provided to the student) (Conley, 2010).

In Colombia these practices that prepare a student to develop competencies at the post-secondary level have not been studied, and it is necessary to develop instruments to make their correct evaluation.

Academic Behaviors

There are other elements related to preparation for higher education in addition to cognitive strategies and content learning, which are important for success at the university level. These elements are academic behaviors and knowledge for college transition (Conley, 2007a, 2010, 2011). It has been found that academic behaviors are as important as academic factors in explaining variation in grade point average (about 31% of the variance explained) and that teaching that increases student motivation results in higher order cognitive thinking strategies (i.e., meta-cognitive) and social-emotional development (Komarraju, Ramsey and Rinella, 2013).

Academic behaviors include study habits and the construct that has been termed "Learning Appropriation" composed of five elements: commitment (i.e., belonging, attitude toward school, intrinsic rather than instrumental motivation), self-control (i.e, goal orientation), self-efficacy (i.e., confidence in one's ability), metacognition (i.e., critical thinking), and cognitive persistence (i.e., awareness that skills are developed and not fixed or inherited) (Conley and French, 2014).

In the U.S., learning appropriation (student goals, effort, and meta-cognition) has been strongly correlated with college grade point average (GPA), student retention, and performance in specific classes (Conley and French, 2014).

In the case of Colombian students evaluated by the OECD (2013), commitment measured as "not being late for school," "not avoiding class days," or "not avoiding classes" has been associated with a year's advantage in mathematics education (or 37 points on the PISA test). Likewise, attitudes toward school have been associated with increases in internal motivation for learning (a correlation of 0.5), and motivation (measured as openness to solving difficult problems, perseverance, and taking responsibility for failing in math) has been associated with high scores obtained by students previously identified as underachievers (OECD, 2013).

These elements (engagement, self-control, self-efficacy, metacognition, and cognitive persistence) can be assessed by means of standardized instruments: Lombardi, Seburn, and Conley's "College and Career Ready School Diagnostic" (2011, cited in Conley, 2014) and the University of Minnesota's "Student Engagement Instrument" (2006, cited in Conley, 2014). These elements have become useful indicators for finding students with potential but who are not perceived when decision-making is based exclusively on standardized tests (Ramsey, 2008).

The intent of teaching to develop academic behaviors is for students to self-regulate, assess themselves, and direct their own thinking (Conley, 2007a). School practices that support the development of academic behaviors include developing time management skills from elementary school, improving study habits (i.e., distinguishing material that cannot be understood without help, working with others in study groups, learning to study effectively for tests, setting realistic goals), teaching persistence through the solution of complex tasks, promoting awareness of one's academic strengths and weaknesses, and emphasizing achievement rather than aptitude (Conley, 2010; Duckworth & Quinn, 2009).

In Colombia, the evaluation of student learning does not include measures of academic behavior which should be implemented because they have a strong metacognitive component that can reflect important aspects such as executive brain functions (Conley, 2013)

Knowledge of the post-secondary context

Conley (2011), emphasizes that students who consider themselves prepared for university have knowledge of the post-secondary context which moderates the aspirations and therefore the life project that the student chooses. When a student does not have knowledge of the higher education context, since this is of privileged access in some educational systems (i.e., for high economic strata), he or she cannot develop expectations, thus losing the opportunity to find options that are convenient for him or her within the educational system (Conley, 2007b).

For example, in Colombia one of the most common ways to access higher education is by entering technical and technological education (two years), and then moving on to vocational training (5 years). However, research in other foreign educational contexts indicates that this route does not guarantee much, since students who do not have the academic resources- i.e., knowledge measured by standardized tests at the end of high school - enrolled in 2-year programs have a low probability of securing a 4 or 5-year university degree. Unlike students of the same academic level whose chances improve by entering directly into 4-year programs. In other words, students do not have enough information about their academic environment to allow them to achieve their aspirations regardless of their results on standardized tests.

It is necessary for public educational institutions to establish which training routes their students can follow. Research has established that schools are fundamental in shaping students' professional interests. This information should be provided before the student's grade, especially in the case of students who are the first generation in their families to go to college (Conley, 2014).

Plan for research on "College Readiness" in Colombia

Some suggested topics for a research agenda on College Readiness in Colombia are presented below:

Topic 1. Four of the most important universities in Colombia (listed in the international index of best universities or Shanghai index) have a different concept about the skills required by the student or the level of preparation for higher education. This is evident in the measures they use to select freshmen:

- One of these institutions has its own admission test that evaluates Mathematics, Science, Social Studies, Text Analysis and Image Analysis on a scale of 0 to 100 points (120 questions). The total standardized ability is obtained from the skills in the five components and a standardization on that total score with a mean of 500 and a deviation of 100.

- Another of these IES performs 2 tests (Logical Reasoning and Reading Competence). The applicants must present both tests and each one has a value of 50% for any program of their interest. The minimum score to be admitted to a program is 53 out of 100 (53/100)

- Another of these universities makes exclusive use of the Icfes Saber 11 test, but allows the selection to vary by university program. First, a ranking is made from lowest to highest grade in each of the areas in which the academic program (e.g., Civil Engineering) has assigned specific weights in the Icfes test. The position of the applicant will depend on the specific weights assigned by the program. These weights will also be applied to the Specific Entrance Examinations (programs of Bachelor of Visual Arts, Bachelor of Dramatic Arts, Bachelor of Music, Music that can give up to 100% weight to the corresponding specific test)

- The last of these universities establishes an overall score based on the main areas of the Icfes Saber11 exam (common core) which is constructed using mathematical formulas. These formulas take into account all the results of the common core areas. The highest scores of all participants are those entering the university. The University also accepts tests such as the SAT with a minimum score of 1650/2400 or the American College Testing, ACT, with 25 points, for students who graduate from high school abroad or international baccalaureate.

In this context, the question arises as to which of the selection models of these universities allows the identification of the student's readiness for higher education, or whether the construction of a new model is required (i.e., especially for public universities), which may contribute to a lower dropout rate at the program and institution level and to guide the enhancement of basic knowledge for success in the university.

Topic 2. Another area of interest is the use of the Saber 11 test and the level of preparation for university of the students, which is related to the predictive validity of this test: Does the Saber 11 test predicts enrollment in a specific program, for example, predicts entry into STEM (science, technology, engineering and mathematics) careers? Does it predict academic success in these programs (i.e., does it predict the college GPA or the GPA in specific courses: Math I, Calculus I)? and does it predict persistence (in terms of continuation of studies in the second year and until graduation)?

Including the results of Saber 11, what is an appropriate rate of college readiness for students entering post-secondary educational institutions (public? private?)? For example, a statistical model could predict such things as the college average or the expected average in certain college subjects from a combination of variables such as high school course grades, college readiness level (i.e., measured with instruments such as the Checklist for College Readiness (Conley, 2005), and the College Career Ready School Diagnostic (Conley, 2010), and college admissions test scores.

The evaluation of non-cognitive aspects of learning is also an area to be studied with samples of Colombian students. In public school contexts, instruments have been constructed to evaluate learning skills and aspects related to the appropriation of learning (an example is the CCRSD instrument from Conley, 2014). This last factor has been recognized as a relevant predictor of performance at the post-secondary level (Conley & French, 2014), but there are no instruments in the Colombian environment that allow for determining behaviors such as goal setting, persistence, self-control, motivation, seeking help, and monitoring progress in academic activity.

Topic 4. In David Conley's terms, in order to be prepared for higher or post-secondary education, the student must receive a curriculum that coordinates the expectations of the higher education system, an evaluation system embedded in the curriculum that focuses on formative rather than summative evaluation, and instruction that allows the student to develop habits, thinking and study strategies, and not just acquire content. Therefore, other areas of interest for research on university preparation in Colombia include:

- School practices. Public education systems can make their students ready for postsecondary education by implementing school-based practices that are effective and do not involve additional costs (EPIC, 2009; Schmoker, 2011; Conley, 2013).

In this context, it would be valuable to know the practices of Colombian educational institutions that promote preparation for university (in the 4 dimensions of Conley's model) and how these relate to certain outcomes such as access and academic success in university.

- Curriculum standards: In countries such as the United States, the "Common Core State Standards" specify the concepts and skills needed to succeed in today's world (Common Core State Standards Initiative, 2010). The idea is to create fewer standards that are more demanding, so as to ensure that more students will be ready for college by the end of high school. In Colombia there is a need to develop studies that identify if the national curricular standards in areas such as Mathematics, Language and Science are useful for post-secondary education. That is to say, it has not been reviewed if the contents learned in high school are adequate and sufficient for students to access and succeed in university.

- Educational Assessment: College Readiness skills require new and varied forms of assessment based on observed student performance in the classroom. Standardized assessments such as SABER 11 may not be sufficient for this. Conley and Darling-Harmmond (2013) indicate that the North American States must develop a system of evaluation that can capture the following aspects: the definition that each state intends to raise about preparation for university, consider a continuum of evaluations, generate an evaluation that provides a profile of the student's abilities and achievements, connect these evaluations to the curriculum, instruction and teacher professional development, create a system of quality education that promotes the types of learning and practices required to reach a level of CCR.

- All of the above means that coordination between curriculum and assessment is required, that the assessment must be authentic or relevant to inform the teacher and student of the achievement of objectives, and that it must stimulate the development of higher level cognitive processes (i.e., development of critical thinking).

- - The perceptions of university teachers and school administrators about the academic and non-academic skills or components of student learning are also relevant to research on the readiness of Colombian students. With these teachers it is also relevant to investigate the applicability, importance and use of educational standards in different grades and areas, to establish agreements on expectations at both levels.

Conclusion

Although Colombia has made progress in improving the coverage and quality of education, there are still gaps that require attention, for example, the need to improve students' knowledge, skills, and behaviors so that they are prepared for the post-secondary level. A basic conceptual model for College Readiness is that designed by Conley (2010, 2013). From this model, reflection and development of actions can be generated at the national and regional level in aspects such as assessment, curriculum and instruction at all educational levels.

Acknowledgements

Conicyt PIA Project CIE 160007

Reference List

Barrera-Osorio, F., Maldonado, D., & Rodríguez, C. (2012) Calidad de la Educación Básica y Media en Colombia: Diagnóstico y Propuestas. Bogotá: Misión de movilidad social - DNP.

Conley, D. T. (2011). Reaching the Goal: The Applicability and Importance of the Common Core State Standards to College and Career Readiness. Oregon US. Retrieved from https://www.epiconline.org/publications/documents/ReachingtheGoal-FullReport.pdf

Conley, D. T. (2012). A Complete Definition of College and Career Readiness. Educational Policy Improvement Center (NJ1). Retrieved from http://www.epiconline.org/publications/documents/College%20and%20Career%20Readiness%20Definition.pdf

Conley, D.T., Darling-Hammond, L. (2013) Creating systems of assessment for deeper learning Stanford. CA: Stanford Center for Opportunity Policy in Education.

Conley, D.T. (2003). Understanding university success: A report from Standards for Success, a project of the Association of American Universities and The Pew Charitable Trusts. Eugene OR: Center for Educational Policy Research.

Conley, D.T. (2003b) Mixed Messages: what state high school tests communicate about Readiness for College. Eugene OR: Center for Educational Policy Research. Retrieved from http://inpathways.net/mixed_messages.pdf#sthash.MiQvNCLh.dpuf

Conley, D.T. (2005) College Knowledge: What it really takes for students to succeedand what we can do to get them ready. CA: Jossey-Bass.

Conley, D.T. (2007a). Redefining college readiness, Volume 5. Eugene OR: Educational Policy Improvement Center.

Conley, D.T (2007b). Toward a more comprehensive conception of college Readiness. Eugene OR: Educational Policy Improvement Center . Retrieved from https://docs. gat esf oundati on.org/documents/collegereadinesspaper.pdf

Conley, D.T. (2010). College and career ready: Helping all students succeed beyond high school. San FranciscoCA: Jossey-Bass .

Conley, D.T. (2013). Rethingking the notion of non cognitive, *Education Week*, 32(18), 20-21.

Conley, D.T. (2014) Getting Ready for College, Careers and the Common Core: What every educator needs to know. CA: Jossey-Bass .

Conley, D.T., & French, E.M. (2014). Student Ownership of Learning as a Key Component of College Readiness. *American Behavioral Scientist*, 58(8), 1018-1034.

Díaz, F. (1995), La predicción del rendimiento académico en la Universidad: un ejemplo de aplicación de la regresión múltiple. *Enseñanza*, 13, 43-61.

Duckworth, A.L, & Quinn, P.D. (2009). Development and validation of the Short Grit Scale (Grit- S). *Journal of Personality Assessment*, 91, 166-174.

EPIC (2009) Creating college readiness. Profiles of 38 schools that know how. Retrieved from http://www.ccrscenter.org/products-resources/resource-database/creating-college-readiness-profiles-38-schools-know-how

Komarraju, M., Ramsey, A., Rinella V. (2013) Cognitive and non-cognitive predictors of college readiness and performance: Role of academic discipline. *Learning and Individual Differences*, 24 (1), 103-109.

Ministry of National Education Colombia (2010) Educación Superior: Boletín Informativo Ingreso Permanencia y Graduación. February 14th. Retrieved from http://www.mineducacion.gov.co/1621/articles-92779_archivo_pdf_Boletin14.pdf

Ministry of National Education Colombia (2013) Acuerdo Nacional para disminuir la deserción en la Educación Superior 2013-2014. Retrieved from http://www.mineducacion.gov.co/sistemasdeinformacion/1735/articles-254702_archivo_pdf_politicas_estadisticas.pdf

OECD (2013), PISA 2012 Results: Ready to Learn: Students' Engagement, Drive and Self-Beliefs (Volume III). Pisa: OECD Publishing. Retrieved from http://www.oecd.org/pisa/keyfindings/PISA-2012-results-volume-III.pdf

Olaya, P., Mosquera, J.C., Artamonova, I. (2009) Academic performance in Mathematics I predictions models on the Pereira *Technological University, Scientia et Technica,* 15(43), 258.

Olaya, P., Trejos, A. & Soto, J. (2004) Búsqueda de la relación entre áreas del ICFES en matemáticas, física y lenguaje y rendimiento en mar I y mar II a través del análisis de componentes principales. *Scientia et Technica*, 20, 133 - 139

Plunk, A.D., Tate, W.F., Bierut, L.J., Grucza, R.A. (2014). Intended and unintended effects of state mandated High School Science and Mathematics course graduation requirements on educational attainment. *Educational Researcher*, 20(10), 1- 12.

Ramsey, J. (2008). Non-cognitive Assessment and College success: the case of the Gates Millenium Scholars. Washington D.C: Institute for Higher Education Policy

Rosefsky,A., Saaverdra, J.E. (2011) Do colleges cultivate critical thinking, problem a solving writing and interpersonal skills? *Economics of Education Review*, 30 (3), 1516-1526.

Schmoker, M. (2011) Can schools close the gap. *Phi Delta Kappan*, 93 (7), 70 - 73

SNIES (2013). Sistema Nacional de Información de la Educación Superior. Retrieved from www.mineducacion.gov.co/ sist e masd e inf o r macio n/1 735/ w3-propertyname-2672.html

SPADIES (2013) Sistema para la prevención de la deserción de la Educación Superior. Disponible en http://spadies.mineducacion. gov.co/spadies/JSON.html

Jhon, E.P., Masse, J.C., Fisher, A.S., Moronski, K., Lee, M. (2014) Beyond the bridge: actionable research. *American Behavioural Scientist*, 58(8), 1051 - 1070.

Strayhorn, T. (2011) Bridging the Pipeline: Increasing Underrepresented Students' Preparation for College Through a Summer Bridge Program. *American Behavioral Scientist*, 55(2), 142-159.

Swail W.S., Redd, K.E., Perna, L.W. (2003) Retaining minority student in Higher Education: A framework for success. NJ, USA: Wiley Per. Inc.

Wiley, W., Shavelson, R.J., & Kurpius, A.A., (2014). On the factorial structure of the SAT and implications for next generation college readiness assessments, Educational and *Psychological Measurement*, 74(2), 859-87