A Conceptual Model for the Study of Student Readiness in the 21st Century[1]

Catherine A. DiBenedetto[2]
Clemson University
Clemson, SC

Brian E. Myers[3]
University of Florida
Gainesville, FL

Abstract

Preparing 21st century students to be college and career ready is complex and requires collaborative efforts among secondary schools, colleges and universities, policy makers and business and industry leaders. Students' developmental processes, motivation, interest, aspirations, socioeconomic status and support systems have been contributing factors that influence the direction they take to become college and career ready and ultimately life ready to be successful in the world. The identified list of employability skills and the conceptual model established by this review of literature provide a framework to assist in understanding the complex process of preparing students to be college and career ready in the 21st century. College teachers and university teacher preparation programs can benefit from this research as they work to incorporate 21st century knowledge, skills and dispositions into the undergraduate curriculum. Improved resources and support for educators, those ultimately responsible and held accountable for student achievement, will assist in creating solutions to better prepare students to be career ready in the 21st century.

Introduction

Although the times have changed and educational reform has become focused on accountability measures for both students and educators, the overall purpose of schooling has remained consistent. Academic, technical and employability skills have always been required of students to be successful as they graduate from high school and enter college or a career. Goodlad (1984) posited four purposes of school: academic development of intellectual skills and knowledge, vocational preparation for work, social preparation to be a citizen and personal knowledge to develop as an individual. During the 21st century, the role of education in preparing students has expanded beyond the local community to the global economy. The global population has continued to rise and the challenge to feed over nine billion people by 2050 has become a critical priority for society (FAO, 2011). Future citizens and leaders will need to be equipped with the knowledge, skills and dispositions that are essential for successful entry into the 21st century workplace.

College and career readiness has not been well defined and there is little evidence to investigate and define what renders a student to be college and career ready (DiBenedetto, 2015). There has been some question with regard to who has been responsible for preparing students with the college and career readiness skills needed to be successful in the 21st century workplace. The general public has believed that high schools are responsible for preparing students to be college and career ready. The general public has also expected that students will enter college. However, over 50% of the students who have entered college have not succeeded nor earned a degree (Lynch, 2000). Lack of success in college has caused concern and industry leaders have indicated students are not prepared with the knowledge and skills required of them to be productive in the workforce as a decline in students' abilities to perform at the required level has been reported (Gardner and Liu, 1997; Hart, 2008). Many high school graduates have not been adequately equipped to meet the challenges they have faced in higher education or the 21st century workforce (Casner-Lotto and Barrington, 2006). Only one-third of the students who have graduated from high school have possessed the skills required for college (Green and Winters, 2005). In the post-secondary education system, teachers have reported the need for remedial training in over 37% of their students (MetLife, 2011). Employers and college students agree that graduates should acquire a broad range of both academic and technical knowledge and skills, which include opportuni-

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[2]Assistant Professor, Agricultural and Environmental Sciences Department, 251 McAdams Hall, Phone: (864) 656-0296 Email: cdibene@clemson.edu
[3]Professor, Agricultural Education and Communication Department, 307A Rolfs Hall, Phone: (352) 273-2567 Email: bmyers@ufl.edu

ties to apply learning in order to achieve career success (Hart, 2015).

Information learned in the classroom must be taught using methods for students to transfer the knowledge gained into real world experiences. Changes in the American workforce have been occurring that require technical knowledge and skill. The emergence of technological information has required expert communication in complex situations in order for students to be career ready in the 21st century (Dede, 2010). Contextual learning experiences have provided opportunities for students to build a foundation around critical thinking and problem solving. Career-ready individuals have required essential academic, employability and technical skills that will prepare them to address the global economic challenges of the 21st century (ACT, 2010). Employers have indicated that students who complete some type of applied learning or project-based learning experience are more valuable job candidates than those who have not engaged in applied learning (Hart, 2015). The development of independent-minded individuals is an important aspect of the American public education system (Wardlow and Osborne, 2010).

Theoretical/Conceptual Framework

The complexity of the educational system has required educators, policy makers and industry leaders to work collaboratively to prepare students to be career ready for the challenges they have faced in the 21st century workplace. Several contributing factors have influenced student success. Student motivation, interest, aspirations, socioeconomic status, support systems and developmental processes have ultimately determined whether or not students have been prepared for a career that has ultimately made them life ready to become successful in the world in which they have lived.

The K-12 educational process is a systematic endeavor. Therefore, it has required a systems approach to prepare students to be both college and career ready. Figure 1 depicts the theoretical frameworks that collectively developed the Conceptual Model for the Study of Student Readiness in the 21st Century. This systems approach to preparing students to be college and career ready was adapted from the major tenets of Social Cognitive Theory (Bandura, 1986) and Bronfenbrenner's Bioecological Theory of Human Development (Bronfrenbrenner, 1979; 2005).

Social Cognitive Theory

Social cognitive theory posited that individual's react to their beliefs about what they can do; conducting self-perceived judgements of themselves based on their self-efficacy (Bandura, 1986). Three interrelated factors referred to by Bandura (1986) as personal factors, behaviors and environment affect how people have learned from their social environments and how a person's sense of self-efficacy has been developed. For example, an educator demonstrates self-efficacy through his or her belief in their personal competence to learn or perform behaviors (Schunk, 2012). Recommendations from the National Research Council (2009) suggested a need for instructional changes in undergraduate coursework in colleges of agriculture to improve 21st century skills, which included critical thinking, problem solving and communication. Estepp et al. (2013) adapted Bandura's (1986) triadic reciprocality model of causality, aligning it with teacher effectiveness. In this model, effective classroom instruction represented the environmental variable, 21st century skills represented the behavior variable and cognitive processes of students represented the learner variable (Estepp et al., 2013).

Bioecological Theory of Human Development

Process, person, context and time (PPCT) are the four factors emphasized in Bioecological Theory of Human Development (Bronfenbrenner, 1979; 2005). These factors represent the individual interactions within an individuals' environment that affect the process of development (Tudge et al., 2009) and along with the tenets of social cognitive theory, guided the development of the Conceptual Model for the Study of Student Readiness in the 21st Century. In bioecological theory, process refers to the interaction between the person and the environment where development occurs (Bronfenbrenner, 1979; 2005). Within the context of the educational system the process can refer to the interaction of parent and student, teacher and parent, or teacher and student.

Individual and personal characteristics, such as race, gender, age and previous experiences are referred to in the PPCT model as the person. Dissimilarities in attitudes, beliefs and expectations and the individual attributes brought into a social setting are included in this facet (Adamsons et al., 2007; Tudge et al., 2009).

Several indicators affect context. Bronfenbrenner (1979) identified four types of systems that influence an individual's development. The direct environment encircling the individual is considered to be the microsystem (Adamsons et al., 2007). The conceptual model depicts the microsystem as the classroom environment where students have learned academic, technical and employability skills to develop the dispositions, civic mindedness and independent mindedness required to become college and career ready, which ultimately leads to a life-ready individual. Interactions can occur in more than two microsystems, referred to as the mesosystem. Interactions between the student, the parent and the teacher are included in the conceptual model as the mesosystem. Some contexts do not directly involve the individual, but may still influence development. Bronfenbrenner (1979) referred to this context as the exosystem. The conceptual model depicts the exosystem as the community, the home, the school and the world. The final system, the macrosystem, involved in the context of the PPCT model refers to the social influences such as government policies, economic circumstances and cultural expectations (Adamsons et al., 2007).

The final facet of the PPCT model is time (Bronfenbrenner, 2005). This facet represents the passing of time over the developmental stages of an individual. Time can also be represented by the chronological age of the individual or the developmental stage of the family where the individual resides (Adamsons et al., 2007). Constructs within the model align with the four purposes of the school as outlined by Goodlad (1984). Within the systems model, students will develop the academic, technical and employability skills needed to be ready for college and careers dependent upon the person, the process and the context within the overall environment throughout the course of their education (time).

Personal factors, behaviors and environment are the three interrelated sources that directly influence an individual's ability to learn (Bandura, 1986). The cultural environment consists of the community, the home, the school and the world in which a student lives. Bronfenbrenner's theory (1979) referred to this as the exosystem that influences individual development. Within that cultural environment, the mesosystem (Bronfenbrenner, 1979), parents and teachers play an active role in developing students for career success. An adolescents' cognitive and emotional development process has been reliant on adult relationships structured in a community, society or cultural environment (Conley, 2005; Stone and Lewis, 2012). Student interactions with teachers, parents and other adult role models represent the context of the microsystem where individuals develop (Bronfenbrenner, 1979).

Children possess five basic needs for positive development: 1) a personal relationship with a caring adult, 2) a safe place to live, 3) a healthy start toward their future, 4) a marketable skill to use after high school graduation and 5) an opportunity to contribute to their community (Lewis and Morris, 1998). Without proper support systems the modern family life can be unstable. This instability causes deficiencies in students when they go to school (Addison, 1992). Schools and teachers must be aware of their responsibility to provide stable support for students in a welcoming and nurturing environment (Henderson, 1995).

Learning Skills

Learning skills related to dispositions can be difficult to define. The role of the teacher has included that of an adviser to guide students (Trilling and Fadel, 2009). In addition to academic preparation, teachers have also provided social and emotional support during the adolescent developmental process (Stone and Lewis, 2012). Learning and thinking skills, include dispositions, such as positive thinking, clarity in communication, inquisitiveness, questioning and problem posing, innovation, motivation, perseverance/grit, self-esteem, flexibility, creative thinking, responsibility, self-direction and engagement in lifelong learning (Conley, 2014; Duckworth et al., 2007; Partnership for 21st Century Skills, 2009; Stone and Lewis, 2012).

Literacy and Civic Minded Individuals

Developing overall literacy and civic minded individuals is one of the four main purposes of school (Goodlad, 1984). Literacy has been an overarching theme within the education system. Students must be literate in the core and technical areas, but they must also have a sense of literacy as it relates to the world within which they live (Stone and Lewis, 2012). Several interdisciplinary literacy topics were identified from the literature for this research and are included in the literacy component of the conceptual model. A general understanding of agriculture, civics, communications, economics, environment, global awareness, health and technology are necessary for students to become career ready and competitive in the 21st century workplace (Huitt, 1999; NASDCTEc, 2012; NRC, 1988; Partnership for 21st Century Skills, 2009; SCANS,1991; Stone and Lewis, 2012: Trilling and Fadel, 2009).

Of particular interest is the impending need for agricultural literacy (NRC, 1988). In 1986, the National FFA Organization reported an estimate of 4.5% of all high school students to be enrolled in an agriculture course. Today, nearly 1,000,000 students are enrolled in school-based agricultural education programs (NAAE, 2015). The idea of agricultural literacy became a focus when the National Research Council (1988) implied that agriculture should be taught to all students, not just the small number of students interested in an agriculturally related career.

Along with learning and thinking skills, students should be literate and equipped with the necessary skills to advance in the world as citizens (Hurtado and DeAngelo, 2012). Civic mindedness has referred to one's tendency to engage in activities to help their community (Merriam-Webster, n.d.). Conley (2005) referred to civic skills as habits of mind. Habits of mind have been referred to as behaviors that are associated with academic success and are foundational skills required for lifelong learning (Conley, 2005).

Academic and Technical Knowledge and Skills

Academic and technical knowledge and skills are acquired through core and career and technical education (CTE) courses. Teachers have educated students in core and career and technical education courses to impart the academic and technical knowledge and skills that have been important for college and career readiness. Basic knowledge and skills have been taught in high school core courses, which consist of English/language arts, mathematics, science, government/economics, humanities/arts, foreign languages and history/geography. CTE has provided students with core academic skills, employability skills and job-specific, technical skills related to a career pathway. CTE programs have been grouped within sixteen career clusters that focus on preparing students to be college and career ready (ACTE, n.d.). Research has indicated that student participation in CTE programs has decreased the high school drop-out rate when one CTE course has been

taken for every two academic classes (Plank et al., 2005). CTE courses have provided contextual "real world" learning experiences that have engaged students and exposed them to opportunities to transfer and apply those skills in occupational settings (Berns and Erickson, 2001; Stone and Alfeld, 2004).

Career and Life Skills

Throughout the educational process, important career and life skills have been gained as students learn to apply both academic and technical knowledge to transfer into the employability skills required to be career ready. Employability skills have typically been considered to be personal qualities or work habits an individual possesses (Stone and Lewis, 2012). A nationwide comparative analysis of soft skills conducted in 2011 identified employability skills as communication skills, decision making/problem solving skills, self-management skills, teamwork skills, professional skills, experiences and leadership skills (Crawford et al., 2011).

Life skills are identified as: accountability, adaptability, ethics, leadership, people skills, personal productivity, responsibility, self-direction and social responsibility. Although many effective teachers include life skills in their instruction, these skills are challenging to deliberately integrate into the curriculum (Partnership for 21st Century Skills, 2009).

Life Ready Individuals

With the global population on the rise there has been much concern for our world with regard to the impending challenge to feed 9 billion people by 2050 in a sustainable manner (FAO, 2011). As future leaders are being prepared to be college and career ready, they need to be equipped with the knowledge, skills and dispositions to be critical thinkers and problem solvers. They need to be able to transfer the information learned in the classroom into contextual, real world experiences (Carnevale et al., 2011; Schmidt et al., 2012). Developing independent-minded, lifelong learners that are prepared to meet the challenges of the 21st century workplace is the ultimate goal of the collaborative efforts described in the Conceptual Model for the Study of Student Readiness in the 21st Century.

The purpose of this research was to utilize the results of a literature review to develop a conceptual framework to study the development of college and career readiness for high school students. The objectives of this research were to identify 21st century employability skills currently used to determine career readiness for high school students and to design a conceptual framework to reveal a systems approach to college and career readiness based on the literature review from the first objective.

Materials and Methods

This theoretical research sought to create a conceptual model and determine a common framework for the knowledge, skills and dispositions that are required of students to be college and career ready in the 21st century. A key word search was initiated throughout six professional journals: the Journal of Agricultural Education, the Journal of Career and Technical Education, the Journal of Career Development, the Journal of Teacher Education, the Journal of Technology Education and the North American Colleges and Teachers of Agriculture Journal. Key words included: soft skills, career decision making, college and career readiness, career and employability skills, 21st century employability skills, knowledge and dispositions. The search results were extremely limited.

As a result, an additional search beyond the six selected journals was explored. The expertise of the University of Florida librarian was utilized to assist in the exhaustive search through several data bases, which included ProQuest and EBSCOhost. Finally, a Google Scholar search was conducted using the same key words. Limited empirical evidence was found specific to the researchers' objective of interest. It was concluded there was a gap in the literature with regard to research in the area of college and career readiness. This study sought to develop a conceptual model that can be used as a framework to assist educators to prepare students to be both college and career ready.

Results and Discussion

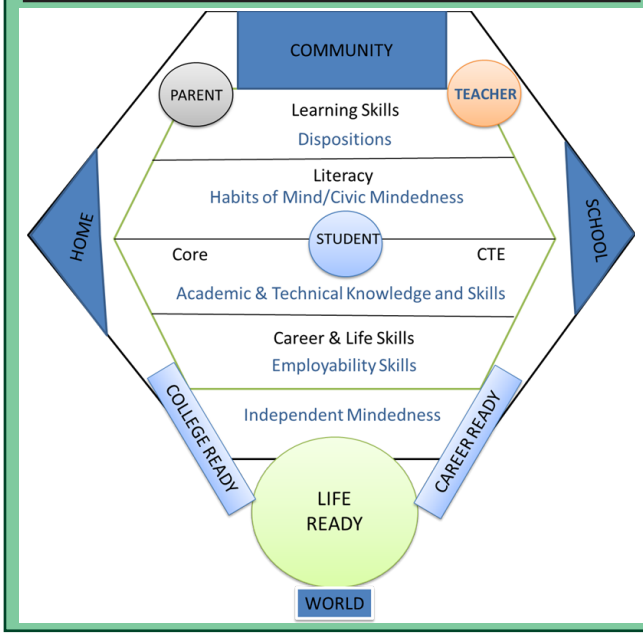
Based on the exhaustive literature review that was conducted to identify 21st century employability skills relevant to career readiness for high school students, a total of nine seminal pieces of literature were identified and utilized as the focus for this research. Table 1 outlines the nine seminal pieces of literature providing the skill terminology and a list of the knowledge, skills and dispositions associated with each reference. Each list of skills from the nine identified resources was categorized and data were logged into a spreadsheet to determine commonalities among the identified list of skills. Constructs were then developed to incorporate groups of common skills into major categories. Nine constructs arose from the extensive literature review of 21st century employability skills. Those constructs were summarized as: learning skills, life skills, career skills, social skills, knowledge competencies, incidental learning skills, dispositions, experiences and interdisciplinary topics. Each construct included five to ten skills to represent the general categories of knowledge, skills and dispositions required of students to be career ready in the 21st century. Table 2 provides a summary of the nine constructs and related skills. The majority of the knowledge, skills and dispositions identified from the literature review were rated moderately or highly important by Florida secondary teachers (n = 191) from core and career and technical education disciplines (DiBenedetto, 2015).

The Conceptual Model for the Study of Student Readiness in the 21st Century was developed to provide an accurate systems-approach to prepare students to be both college and career ready. As students develop within this model they become independent minded, life

Table 1. Summary of Literature Identifying 21st Century Career Readiness Skills

Reference	Skill Terminology	List of Knowledge, Skills and Dispositions
Stone and Lewis, 2012.	SCANS-based, 21st century interdisciplinary themes	critical thinking, creative thinking, problem solving, responsibility, proficiency, self-management, integrity/honesty, learning and innovation, life and career, information, media, technology, global awareness, financial, economic, business, and entrepreneurial literacy, health, civic, and environmental literacy
Crawford, Lang, Fink, Dalton, and Fielitz, 2011.	Skill Clusters	problem solving, collaboration, grit, work habits/ethic, time management, technology, self-management, leadership, teamwork, innovation, creative thinking, engagement in life-long learning, self-direction, related work or internship, teamwork, project management, cross disciplinary, community engagement, international engagement
Partnership for 21st Century Skills, 2009.	21st Century Learning Model	critical thinking skills, problem solving, collaboration, contextual learning, reasoning: inductive and deductive, time management, people skills/social responsibility, communication, technology, health, leadership, responsibility, innovation, adaptability, creativity, personal productivity, self-direction
Conley, 2014.	College and Career Readiness	critical thinking, collaboration, contextual learning, grit, time management, goal management, organizational skills, social responsibility, integrity, technology, economic, civic, self-management, proficiency, motivation, adaptability, creativity, engagement in life-long learning, self-direction, confidence
CTE Technical Assistance Center of New York, 2013.	Career Readiness and Career and Technical Education	critical thinking, problem solving, collaboration, contextual learning, self-direction, responsibility, self-management
NASDCTEc, 2012.	Career Ready Practices	critical thinking, problem solving, employ research strategies, career decision making, social responsibility, diversity, integrity, self-management, communication, technology, health, environmental, economic, civic, global competence, cross-cultural awareness, leadership, teamwork, social awareness, perseverance, creativity, engagement in life-long learning
ACT, 2010.	Work Readiness Standards and Benchmarks	collaboration, integrity, communication, adaptability
Soland, Hamilton, and Stecher, 2013.	21st Century Competencies	critical thinking, collaboration, grit, communication, global competence, leadership, motivation, creativity, engagement in life-long learning, self-direction
SCANS, 1991.	Work Place Know-how	problem solving, reasoning, employ research strategies, career decision making, time management, people skills, social responsibility, ethical responsibility, integrity, communication, technology, economic, global competence, diversity, systems thinking, self-management, leadership, teamwork, responsibility, self-esteem, creativity, engagement in life-long learning, self-direction

Figure 1. Conceptual model for the study of student readiness in the 21st century



ready individuals that are prepared to be responsible citizens in the world in which they live. See Figure 1.

Teachers need support to prepare students to be career ready. Research-based pedagogical approaches must continually be incorporated into teaching practices (Partnership for 21st Century Skills, 2009). Students learn career skills in an environment that is built to support their needs. Opportunities and experiences for students to engage in learning skills, academic and technical knowledge and skills and employability skills are provided within a system that includes the home and the parent, the school and the teacher. In this environment both academic and career and technical education courses are included in the curriculum. In addition, support from the community and industry provides opportunities for civic engagement.

Recommendations

To support the need to address the problem of determining a common definition of college and career readiness, it is recommended that the conceptual model designed by this research along with the nine constructs identified to prepare students to be college and career ready in the 21st century, be utilized as a common framework by post-secondary teachers/educators, business and industry and in high school and post-secondary curriculum to better prepare students for the challenges they will face when they graduate from high school and enter college or a career. In addition, discussions between industry leaders, school administrators, teacher educators and teachers/educators (secondary and post-secondary) need to occur to determine who is responsible for teaching career readiness to high school students. The Conceptual Model for the study of Student Readiness in the 21st Century indicates a systems approach is needed to prepare students to be both college and career ready and ultimately life ready. No single individual can be solely responsible to prepare students for the challenges they will face as they enter post-secondary education or a career. The system includes a variety of individuals (student, teachers, parents, community leaders and industry support) and a curriculum that is defined by the knowledge, skills and dispositions identified in the nine constructs that emerged from this research. Further research should seek to explore the perceptions

Table 2. Knowledge, skills, and dispositions required of high school students to be career ready in the 21st century

Constructs	
Learning Skills	Knowledge, Skills, and Dispositions
	Contextual Learning
	Critical thinking
	Initiative
	Perseverance/Grit
	Problem Solving
	Reasoning
	Self-direction
Life Skills	
	Accountability
	Goal management
	Organizational skills
	Problem solving
	Social/cross-cultural skills
	Time management
Career Skills	
	Career decision making
	Job search skills
	Productivity
	Responsibility
	Work habits/ethics
Social Skills	
	Understanding diversity
	Ethical responsibility
	Honesty
	Integrity
	Social responsibility
Knowledge Competencies	
	Decision making
	Innovation
	Proficiency
	Personal productivity
	Teamwork
Incidental Learning Skills	
	Adaptability
	Confidence
	Decision making
	Flexibility
	Leadership
	People skills
	Productivity
	Proficiency
	Initiative/self-direction
	Teamwork
Dispositions	
	Creativity/creative thinking
	Engagement in life-long learning
	Flexibility
	Innovation
	Motivation
	Perseverance/grit
	Personal productivity
	Responsibility
	Self-direction/self-discipline
	Self-esteem
Experiences	
	Career related work experience/internship
	Community engagement
	Cross disciplinary connections
	International engagement
	Leadership
	Project management
	Teamwork
Interdisciplinary Topics	
	Agriculture
	Civics
	Communications
	Economics
	Environment
	Global awareness
	Health
	Technology

of post-secondary teachers/educators, high school administrators, curriculum developers, business and industry leaders and parents with regard to importance and responsibility to teach career readiness skills to students. Findings gleaned from additional research can potentially assist in creating opportunities for discussion, which will provide better understanding for assigning responsibility to those individuals that will serve the best interest of high school students as they are prepared to graduate from high school and enter college or a career.

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