9. Articulation: An Extended Model and Educational Pathways to Careers

Jule Dee Scarborough

Articulation refers to a partnership that smoothes the transition from high school to higher education, reduces redundancy in the curriculum or student learning, and, most importantly, helps students understand that high school is not necessarily an educational terminal point. Articulation is the connecting, aligning, or bringing together of parts and interrelating them to form a working, functioning unit, program, or process. It should result in better program alignment and continuity, a reduction in costs and time, better quality, the opportunity for higher-level learning, and sharing of facilities, equipment, and staff across educational institutions. The most important result, however, is the creation of a system for cooperation in the planning, evaluation, and improvement of educational programs and the seamless transition for students across programs.

As simple as the construct sounds, it is not easily accomplished, especially in a context of budget cutbacks, a shortage of educational staff and faculty, and a struggling economy. However, that is exactly the point where articulation can have the greatest results. Articulation must have clear leadership from the top of participating organizations, with defined goals and responsibilities into staff and faculty lines. Each organization must appoint someone who is to be responsible for working through the initial reviews and agreements and maintaining the process and agreements. The most important goal is "common focus," a difficult one to achieve, although statewide initiatives have somewhat reduced the academic turf wars.

Those leading articulation efforts need to understand the principles of efficiency, access, and quality:

- *Efficiency* means that planning should result in cost effectiveness through appropriate enrollments, program management, and the sharing of resources.
- *Access* refers to helping students understand the relationship between education and employment, the spectrum of exit points into jobs or careers. Well-designed articulation programs should result in an expansion of opportunity and employment. The first level of access is when students become knowledgeable and understand their options. Have you ever gone into a high school and asked students what their plans are? Too many of them will respond that they do not know. Nor do they seem to have any vision or understanding of what options are available. Many will give you a general, "Oh, I might go to college or get a job." Truly, they get excited when they begin to see how the puzzle fits together, how courses lead them to jobs and careers and an expanded vision of their opportunities. However, this is difficult to accomplish unless teachers first understand it. That understanding is lacking in many schools. In fact, many times when we have tried to put programs into place for students, teachers openly let us know that they first needed to be educated so that they could become a conduit of information for students.

- *Quality* involves aligning curricula with jobs and careers in actual communities of practice. This is best done through business, industry, and community (BIC) partnerships. By inviting others into the classroom or by having them provide off-campus learning experiences, learning takes on more significant meaning.

  There are two modes of articulation, horizontal and vertical:

- *Horizontal* articulation is a process or mechanism for aligning programs across similar levels, such as middle or high school programs, or all courses across particular levels, such as first-year, second-year, and so on. This should occur as a normal process in most institutions.
- *Vertical* articulation is the focus here, where a process is created for coordinating and interrelating programs across different levels, for example, secondary, 11 and 12, to community college, 13 and 14, and then community college, 13 and 14, into university, 15 and 16. It involves the identification of responsibilities and resources to support quality programs, student access, and program efficiency.

When considering vertical articulation more deeply, time-shortened programs allow for advanced placement of students into higher-level programs to reduce duplication and save time and money. An option is to provide dual credit for high school (secondary) courses that meet community college or advanced-skills programs. Time-shortened is the more commonly used, but the advanced program is also receiving great attention. As more students have to go into debt to pay for their education and there are many more technology jobs and careers available for community college technical-program graduates, there is a greater need for the time-shortened. However, more and more institutions are coordinating 2+2+2 agreements that enable students to get a bachelor's degree by first completing a community college two-year degree, either associate's or applied associate's. These often involve direct articulation, program to program, course to course, and additional credit through testing at the higher level to reduce course duplication. Students cap their technical degree with the final two-years at the university for a bachelor's degree.

It is important to coordinate the institutions in this process. Articulation agreements are as varied as the partnering institutions. Many statewide articulation programs have had positive effects for achieving the historical and fundamental objectives of articulation.

Our Focus

We were not always successful in achieving fully developed articulation agreements by the end of an externally funded project because they take time to develop, pilot, and finalize. We were, however, successful in developing an understanding of the process. And if we could not always effect comprehensive program agreements for the sharing of resources, we at least influenced the efforts of individual teachers and professors or clusters of teachers and professors. We made a significant difference in enhancing teachers' understanding of their students' possibilities, revealing clearer pictures of where their courses lead, and helping them find a vision for their role in developing student visions of their future. We also helped to build the capabilities to

achieve informal articulation so that teachers and students understood more about the results of their efforts and where success in particular courses could lead. We applied the SWOT (strengths, weaknesses, opportunities to improve, and threats) approach, with worksheets to organize the discussions. All participants received state teaching and learning standards, state performance indicators, the state Bloom's analysis, and the district curriculum analysis and testing structure as information upon which to base their discussions. Disciplinary groups of secondary teachers and community college and university faculty worked together to gain a deeper understanding of course content, teaching strategies, uses of technology, and student assessment and grading procedures and criteria.

Gap Analyses

We engaged the teachers and professors in performing gap analyses across the areas of (a) course content (standards), (b) technology for teaching and learning, (c) teaching models and pedagogy, and (d) student assessment and grading. When they extended articulation beyond the traditional course or discipline content by and across levels, they began to understand that learning considerations extended well beyond the "what" to the "how," and that particular strategies, processes, and procedures could enhance or hinder teaching and learning across levels. They also learned that they could benefit from one another's perspectives and strategies.

We performed these analyses in three ways:

1. High school to university and high school to community college, having the teachers work individually with each of the professors.
2. Secondary with community college and university professors all together in one session.

   Both 1 and 2 have worked well, but there was some repetition when doing two separate sessions with community college and university professors separately. When meeting separately, teachers may have gained deeper insight. However, it also worked well to have them all together to discuss perceived differences collectively and to have the joint discussion involving all three institutions.
3. Middle school to high school, then high school to higher education.
   It was more difficult for some of the higher-education faculty to work directly with the middle-school level because faculty struggled to relate to the middle school level directly, especially the mathematics professors. On the other hand, some professors had no difficulty at all. The professors were great leaders for these sessions, whether beginning at the middle school level or high school level. Worksheets were used to guide the discussion. (See worksheets and instructions that follow. They are simple and to the point. Discussions went well beyond these questions, and we were surprised at how much could be accomplished in a relatively short amount of time.) The extended discussions included performing gaps analyses of how technology was used for teaching and learning, what teaching models and pedagogies are most effective, and what types of student assessment procedures and grading criteria were used, including connecting assessments to knowledge.

Course Content

Those looking at course-to-course articulation across levels understand that they need to consider course content. What content means may be the question. To high schools, content is based upon student learning standards; for higher education, there are usually broader program/accreditation standards. Therefore, when examining course content, the different types of standards or bases for content must be carefully considered. However, if the examination focuses on concepts, principles, and possibly metacognitive or critical learning skills and other academic skills, such as problem solving, reading, and writing, it is more easily accomplished.

The gaps can be established in a reasonable, and usually relatively short, time period. As mentioned before, secondary teachers are often unclear about the fundamental knowledge concepts, constructs, principles, facts, and processes they are to teach. They may confuse knowledge and "other" more contextual information. They often assess students on "other" contextual information rather than the primary concepts and principles. These sessions between educational levels, on a course-by-course basis, help both groups better understand what should be taught.

Teachers who have experienced our process often comment that they now understand that their courses are not terminal but are part of a continuum, flowing into others at the next level, and that their students need to understand that as well. Professors become aware of the context of learning at the secondary level and gain insight about other hurdles or barriers to learning that secondary teachers face. They gain great insight about the students who are to become their students and a deeper insight into why they are having particular difficulties in getting students to achieve at higher levels.

Technology

In our attempts to deepen this exchange, we realized that students faced other learning difficulties when transitioning across courses. Not only did they struggle with knowledge and skill gaps, but they had to contend with the different uses of technology, the types of teaching models, the types of learning assessments, and how grades were determined. Therefore, we began to include consideration of these as part of the gaps analyses, to make the point that students might not perform to their potential for a variety of reasons, only one of which was a knowledge or skill gap.

For example, a special mathematics task force brought to the discussion the possibility that students were struggling with the transition from high school or community college courses to our university courses because of the philosophy about technology. At the university, students were not allowed to use calculators during the mathematics exams to ensure that they achieved concept attainment. However, the local community college rewrote all of their mathematics exams to ensure concept attainment when permitting the use of technology. Students claimed that the university's no-calculators policy was preventing them from performing at their best level. Possibly, the students had never achieved concept understanding and therefore could not perform without the technology, but it is also possible that they did achieve concept mastery and were simply confused when the technology was taken away.

We did not perform a study to determine what really happened. What was important was that educators realized that changes in the uses of technology might also require changes in other

areas, such as curriculum, teaching models, assessment of knowledge/skills, and grading criteria. Therefore, it was important to have educators across levels discuss how technology was to be used for teaching and learning and agree on operational strategies so that students could transition across levels successfully. This usually meant that an assessment must be revised to ensure the measurement of knowledge when using technology.

Regardless of the reason, we found that the discussion across levels helped to deepen the understanding of how technology could affect teaching and learning and also identify any gap in uses and expectations across levels. Therefore, we treated this area of consideration the same as one for content analysis. The teacher/professor group discussed the uses of technology and left with ideas to incorporate into their own courses and an understanding of student learning and performing issues.

Teaching Models and Styles

Secondary schools may actually be in advance of community colleges and universities in striving to enhance teaching and learning through the use of varied teaching models, especially more active ones that go beyond traditional lectures. This means that students who move on from the secondary schools confront yet another challenge as they enter the world of the formal lecture. (Universities often try to mitigate the challenge, at least in courses that have large enrollments, by providing optional review sessions where students can meet, usually with graduate teaching assistants, to review or question what they do not understand.) The most effective teachers, regardless of institution or level, intuitively use the more active learning models without realizing it, and those less effective or motivated rely on lectures.

In our initiatives, the discussions seemed to help those who were less creative, knowledgeable, or more intimidated realize that they, too, could accomplish more active learning and authentic and performance-based learning in their courses. Because this program component usually came early in the sequence, before the teachers had taken the teaching models and styles workshops, and also because most professors had not researched teaching models, we provided Joyce and Weil's (2000) 22 models as a baseline for the discussions.

Student Assessment

Student transition across various types of assessment procedures can also affect performance or an educator's understanding of concept attainment. Throughout this report, we allude to the disparity between what is taught and what seems to be measured through assessment procedures. “Test or test items are meant to be useful indicators of valued real world performances” (Linn & Baker, 1996, as cited in National Society for the Study of Education, 1996, p. 85). We are trying to move the secondary teachers to more authentic and performance-based measurement and improved traditional tests, but it is important to note that higher education has the same concerns.

Many higher-education faculty do realize that their assessment measures are weak, not well designed or not well connected to what is actually being taught. The “good” educators teach substantial knowledge and then measure at least at recall (Bloom’s knowledge level); however, there are probably an equal number, proportionally across institutional types and levels, who do this poorly or not at all. When we included this area for discussion and they shared their measurements, procedures, and processes, we identified the gaps and discussed the content of the

measurements, striving to link test items and performances with the knowledge and skills being taught.

Performance-based teaching, learning, and assessment are familiar to many educators, especially those in technology or vocational education, but they are new to many in general education. For example, those in mathematics consider a complex word problem as problem-based and performance-based; those in more technical fields would consider something performance-based when it requires the manipulation of conditions, materials, principles, facts, or theories under particular constraints to accomplish a design, build a model, or solve a more authentic problem. In these discussions, it is important to define what is meant by "authentic," "problem-based," "performance-based," and the like. Typically, it should mean that students are given a set of conditions that may or may not be manipulated (particular constraints, materials, information) and are expected to perform problem solving at the higher levels of Bloom's Taxonomy of learning, meaning at least application, synthesis, analysis, and evaluation, preferably at the final evaluation level within a more authentic context. The revised Bloom's Taxonomy is becoming more appropriate for today's learning, as it includes "create" as the higher learning level (Anderson & Krathwohl, 2001). Ultimately, the analysis of content to be measured, and the procedures and processes for doing that, should identify all gaps, strengths, weaknesses, and possibilities for improvements, focusing on both traditional and more authentic, or performance-based, measurement designs and procedures and linking them to the knowledge and skills to be learned.

Grading

Grading is a difficult area to assess. However, the discussion helps improve and reassess the connection between what is being taught and then measured, how well knowledge and skills are being measured, and finally to what level students are learning if using Bloom's or Bloom's Revised Taxonomy as a metric for levels of learning or critical thinking. Are grades subjective or objective? Are they based on concept attainment of "real" knowledge? Are they based upon memorization or can students use knowledge to solve problems? Can they analyze, make rationalized judgments, reason through procedures and processes, and base decisions upon logical and rational evaluation where solid judgments are made? And, very importantly, do students understand how they are to be graded? Is there a clear rubric? Is there a connection between course knowledge and skills and measurement? Are criteria established and clear to inform students how teachers arrive at their grades?

Each professor is different; each teacher is different. And, for many, if not most, there has been very little, if any, education or training about how to design and develop good measurements, with a clear understanding of the criteria upon which grades will be based. Many still do not understand outcomes, standards, or competencies conceptually. Many do not know how to analyze their knowledge content to determine what and how to assess.

We discussed how grading occurred, what it was based upon, as well as the gaps or differences between individuals and across levels. We raised questions about the appropriateness of grading parameters for different age groups or developmental stages, and most importantly asked if grades reflected or provided evidence of real learning of substantial knowledge. Individuals should leave with an expanded horizon about grading structures and

learn to question the integrity of their own structures and criteria. However, if the participants all use the same strategies, or have similar strengths or weaknesses, it might be good to have someone else lead the discussions.

In summary, the discussion on course-to-course articulation should extend *well beyond* course-content knowledge or skills, delving into how learning occurs; how teaching is accomplished; what models, strategies, processes, and procedures are used; how student assessment is accomplished; and then ultimately, how students are graded. It should result in gap analyses in these areas, leading into self-analyses through comparisons across individuals and discipline levels. We used worksheets with initial leaders.

Usually, everyone participated as equals. Somewhat to our surprise, we never encountered the perception by teachers that higher education faculty would be dictating to them. Secondary school teachers were more than willing to hear the higher-education faculty describe what was needed or required, and the faculty responded with encouragement about what helped students to succeed more readily. The care and concern for teachers exhibited by our professors was something special to observe. Teachers left commenting that they understood that their course or high school level was not terminal and that they had a great informal support group only a phone call away. Possibly the greatest result of these sessions was that most participants left wanting (a) to strengthen the integrity and quality of their own courses and (b) remain connected across groups.

Agenda

The following agenda was compiled based on experience at several venues and incorporated participants from both the community college and the university.

- The day begins by setting the context within which the secondary teachers work. Participants review the district curriculum, establish that it is standards based, and review what is supposed to be accomplished by level.
- Next come presentations about admission and placement requirements for community college and university mathematics, science, and English; how placement tests work; the requirements for being placed into particular general education courses; and how articulation occurs between the community college and university.
- A communities-of-practice roundtable validates educational requirements. Representatives from industrial or community sectors make presentations about what is expected of employees at various levels of employment. They review academic requirements as well as other types of industry-specific requirements.
- There is an extended opportunity for questions and then reflection in small groups.
- The second half of the day is spent in the gaps analyses described above, culminating in the completion of the summary worksheets and evaluations.

Examples and Comments from Professors

Each year's agenda was somewhat different. During the first year, the chemistry and biochemistry duo engaged teachers in the SWOT analysis. As strengths for student learning,

they identified that students wanted to learn, wanted learning to be relevant to life, and that to be successful, students had to attend and have extracurricular activities available. For teachers, the strengths identified were that teachers should want to teach, be eager to please, be enthusiastic about the subject, be available to students, and provide relevant applications. For commonly encountered weaknesses, they listed that students lacked study skills, showed low attendance, and lacked motivation and background knowledge. Educator teaching weaknesses included biases against students, lack of subject knowledge, poor attitudes, and lack of organization. Opportunities to improve student learning were greatly influenced by lack of resources, negative peer pressure, crowded classrooms, and fear of violence; teaching was affected by lack of materials, fear of losing one's job, fear of violence, threats from students, and lack of administrative support. Rockford was a district in perpetual turmoil and politically charged, which showed in the less positive responses. After performing this analysis, professors and teachers felt prepared to engage in a later discussion about articulation.

These discussions helped professors determine what they could develop to offer in teacher classrooms, as well as what to design special workshops around. The chemistry and biochemistry professors designed a two-day "green" chemistry workshop for teachers. They determined that the district's chemistry curriculum and Northern Illinois University's (NIU) general education introductory courses dovetailed nicely, but that there was a difference in the level of coverage and a need to reinforce concepts. However, the courses were similar and there were no serious redundancies.

The university English professors created an articulation website to provide teachers with a resource to which to refer students. They incorporated the community college information, which made it an easy-to-use joint site for articulation and other purposes. The teachers liked this approach. The English group identified gaps in expectations for how well students could perform and what they expected to be able to teach them. Teachers gained insight about language arts longitudinally and vented about problems and frustrations related to their students, facilities, and curriculum. They mentioned that when participating jointly with both community college and university professors leading, there was a better examination of differences between community college and university composition classes. They shared texts, syllabi, and assignments. The gaps analysis provided insight for the professors, leading some to continue to participate in annual articulation activities between secondary and higher education.

Teacher Reflections, Evaluations, and Comments

Comments centered upon improving weaknesses, describing strengths, listing new ideas for approaching teaching and learning, finding resources, discussing partnership activities, offering ideas for counselors and teachers to work on together with students, suggesting new uses for using and sharing technology, suggesting new connections with higher education, requesting assistance with responses from professors, BIC partners in communities of practice, and more. Teachers and professors identified new teaching models they could try, standards that they covered well, and others that they needed to better address, as well as new learning activities, projects, and problems they could incorporate, and ideas for better assessments. The engineering technology professors from the community college and the university worked with the vocational or technology education teachers. They identified a need to understand how students learn best,

how to assist them with particular knowledge and skills, and how to reduce their anxiety and improve learning. There was an interest in more authentic and performance-based learning and assessment and how to design rubrics with better criteria and levels. The teachers began to make comments about new visions for themselves in their teaching.

This session was a great segue into the overall general program. Almost everything that the teachers said they wanted more of was included in the program sequence to come later. The session also served to help teachers orient themselves about the learning to come. Each group's summations on articulation documented what they had learned about each level, identifying gaps across curriculum or knowledge and skills, redundancy, assessment, student performance expectations, use of technology for teaching, learning, assessment, teaching models, grading structures, and other topics. Many teachers mentioned that they would like more time to work with individual courses and professors across higher-education institutions, for professional collaboration and also partnership activities in their classrooms with secondary students. They expressed an interest in articulation agreements. Most said they wanted to close gaps identified in the analyses. In Chicago, we were able to achieve fully articulated agreements between high schools and the city community colleges. However, the turmoil in the Rockford district prevented us from establishing fully developed articulation agreements for either specific courses or programs.

Finally, teacher evaluations of these sessions, over the years of the grant-funded project, remained extremely positive. The very few less positive responses were on state evaluation questions that did not directly relate to the program component but were required for the state recertification program.

Table 9.1 Summation on Articulation Worksheet

Name:_____ Subject Area: _____

Summation on Articulation

A.	Identify where there are serious gaps between the curriculums that are covered at each level.
B.	Identify where there is redundancy in curriculum across levels.
C.	Determine where there are serious gaps between what is taught and what is assessed.
D.	Determine where there are serious gaps in student performance expectations.
E.	Determine where there is overlap in student performance expectations.
F.	Determine where there are serious differences in the types of technology used by teachers/ professors as well as serious differences in what technology students are required or permitted to use.
G.	Determine where there is consistency in use of teaching models.
H.	Determine where there are differences in the use of teaching models.
I.	Determine where there are serious differences in the grading structure across grade levels.
J.	Sum up weaknesses.
K.	Sum up strengths.
	Wrap up question: Where would you like to go from here on articulation?

Table 9.2 Curricular Standards or Knowledge Base Worksheet

Curricular Standards or Knowledge Base								
Middle School			High School			College or University		
Standards & Curriculum		Resources	Standards & Curriculum		Resources	Standards & Curriculum		Resources
Discussion: Identify gaps, overlaps and/or appropriately articulated steps between **high school and college/university.**								
Discuss the similar standards that are taught in **middle school**: degree of difference, if any.								
Discuss the **topics** through which the standards are taught.								
Discuss the differences and similarities in use of resources - exchange ideas.								
Content Area_____								

Table 9.3 Technology Worksheet

Technology		
Course: _____		Course: _____
Middle School	High School	College or University
Technology Use (T, S)	Technology Use (T, S)	Technology Use (T, S)
Discussion: Compare gaps and/or appropriately articulated uses of technology **for teaching by staff.**		
Compare gaps and/or appropriately articulated uses of technology for learning **by students.**		
What can be done to close these gaps?		
Discuss how this compares to the use of technology in the **middle school** in the same areas.		

Table 9.4 Teaching Models Worksheet

Teaching Models					
Middle School		High School		College or University	
Model	Bloom	Model	Bloom	Model	Bloom
Discussion: Is any one model used more than any other model, or less than any other?					
Are students being exposed to a variety of appropriate models at all levels?					
(See Models list and descriptions) (Joyce & Weil, 2000)					

Table 9.5 Assessments Worksheet

Assessments								
Middle School			High School			College or University		
Assessments (T, P, PP)	Level	Bloom	Assessments (T, P, PP)	Level	Bloom	Assessments (T, P, PP)	Level	Bloom
Discussion: Compare the gaps between what is taught and what is assessed.								
Compare the differences or similarities in level of expectation (difficulty level).								
Compare the levels of Bloom required in the assessment between MS, HS, and College or University.								

Literature Sample Related to Articulation

Literature on this topic is easily accessible through ERIC or OCLC FirstSearch. The articles are diverse and address various topics mentioned above. For example: Just and Adams (1997), Pucel and Sundre (1999), and Doty (1994) discuss tech prep programs, especially the 2+2 articulated program aspect where secondary schools articulate either courses or programs with corresponding community college partners. They discuss articulation agreements and processes, issues, barriers, strategies, articulation designs, and examples and results. Doty presents 14 principles for tech prep at the high school level.

Although tech prep programs have been in the press since the 1980s, there are few studies that examine their success or determine outcomes. Just and Adams study 13 tech prep consortia in Ohio. They discuss the articulation agreements between high schools and community colleges, but also include the extension to 2+2+2 to include the final two years in a bachelor's capstone. They provide examples and discussion. Pucel and Sundre, however, study the extent to which eight consortia in Minnesota articulated tech prep programs that were actually being implemented and monitored to ensure that student benefits were realized. The findings of their qualitative study indicate that the programs were not achieving some of the most basic goals set by the U.S. Department of Education (USDE) for a seamless, non-duplicative curriculum. They argue that the findings should alert policymakers to the need to revise the tech prep program or put a compliance system in place to ensure that funds were expended appropriately and programs were accountable to prescribed goals.

Hayes (1995), Hershey, Siverberg, and Ownes (1995), and Grubb and Bragg (1997) all present less than encouraging information about whether tech prep was accomplishing its goals. Bailey et al. (2002) and Greenberg (1992) discuss the role of dual enrollment for easing transition between high school and postsecondary education. Crist et al. (2002) describe Minnesota's efforts to improve student success after high school by trying to understand the challenges faced by its students, educators, and institutions. Their efforts resulted in several innovative initiatives, including tech prep and school-to-work programs, developmental programs, postsecondary enrollment options, and the alignment of graduation standards for college preparation, early assessment, and charter schools. The authors recommend that to prepare students for success in higher education, there should be an information campaign, support for implementing best practices, and documentation of student success. In addition, a report on Canada's Northwest Territories provides similar information about a framework to help high school students and adults make successful transitions into and through postsecondary institutions. Stanley (1994) also describes a school-to-college-to-career transition model. Clark and Woloszyk (2002) support community college involvement in the preparation of technical educators by allowing students to transfer their technical degree from the community college as their teaching major at the university. This is usually viewed as inappropriate by universities, but that viewpoint may begin to change as community colleges take on an expanded role in higher education.

Floyd et al. (2002) discuss community colleges involved in teacher education. They note that more than 80% of community colleges supported articulation models and had university articulation agreements that enabled teacher-education students to earn the first two years of their degree at the community college and then transfer to a university. More importantly, they

identify questions concerning the role of community colleges in teacher preparation. How far should community colleges go in addressing the goals of teacher education?

Hendley (1997) establishes that universities, especially their engineering programs, overlooked thousands of potential engineering students at community colleges while complaining that they could not find enough qualified students for their programs. With almost 50% of all college freshmen, especially women and minorities, starting at community colleges, that seems neglectful and shortsighted. Hendley considers the state of community college engineering education, transfer barriers, and efforts to improve transfer rates. Chatman (2001) reports how important the community college will be for serving an expanded population. In California's three-tiered higher education system, the community college to four year transfer programs were going to be stretched while striving to address the anticipated growth and increased demand since they were committed to open access and selective admissions and to accomplish racially and ethnically diverse access. The population growth could increase community college enrollment by 36%, with an associated increase in transfers. California had transfer articulation agreements or contracts between universities and community colleges for a prescribed curriculum and required performance. Students enrolling in these contractual agreements were slightly more likely to graduate from the university than other transfers.

The Seattle Community College and University of Washington (Campbell et al., 2002) have a Coordinated Studies program developed to ease anxiety for students about transferring to a four-year university. These are theme-based interdisciplinary programs or learning communities. Themes focus on inquiry, identifying issues, solving problems, and generating solutions. Burstein (1996) discusses transfer and articulation agreements and programs at the higher education level. For example, he discusses the Illinois Board of Higher Education's statewide articulation initiative to develop a model general education curriculum that would ease the transfer of students across institutions. Also, the Arizona Board of Regents (1996), in its *Report of the Transfer Articulation Task Force*, describes a model transfer system for the state community colleges and universities. It discusses a new management system, advising system, and computer-based information system.

Rifkin (1996) also discusses transfer and articulation policies, beginning with an historical perspective, the rather new involvement of state agencies and its impact, a need to collect better data on students as they passed through two-year institutions, and equal access for underrepresented groups. He makes a critical point of discussing the differences between high- and low-transfer colleges and whether the community college emphasized transfer to a bachelor's program as an academic objective with services to support that transfer. He considers the impact of tech prep, where high schools articulated with community college (and then university) programs and cites authors who wrote in depth on the subject.

Finally, although about global education between high schools and colleges, Stevenson (2001) provides a prototype model, including steps for articulating between high schools and colleges. Helpful guidelines for articulation can also be found easily in tech prep information from USDE or CORD.

Bibliography

Academic Senate for California Community Colleges. (2000, May). The use, effectiveness, and awareness of the intersegmental general education transfer curriculum (IGETC): An evaluation. Intersegmental Committee of Academic Senates.

Anderson, L.W., & Krathwohl, D.R. (Eds.). (2001). *A taxonomy for learning, teaching, and assessment. A revision of Bloom's taxonomy of educational objectives.* New York: Longman.

Anonymous. (1998). Getting in, staying in, getting out: A plan for post-secondary student success. Retrieved from http://siksik.learnnet.nt.ca/ECE/College_Career/careers/career/Pu_blications/PDFCAREER/gettingIn.pdf.

Arizona Board of Regents. (1996). *Report of the transfer articulation task force.* Arizona Board of Regents and the State Board of Directors for Community Colleges of Arizona.

Bailey, T.R., Hughes, K.L., & Karp, M.M. (2002). What role can dual enrollment programs play in easing the transition between high school and postsecondary education? *Preparing America's Future*: *The High School Symposium.*

Burstein, M. (1996). Sources and information: The transfer function and community colleges. *New Directions for Community Colleges, 96* (87-96).

Campbell, L., Collins, M.A., & Hinckley, G. (2002). Climbing out of the well. ERIC

Chatman, S. (2001, June). Take the community college route to a selective public university degree. *Student Affairs Research and Information.*

Clark, B.S., & Woloszyk, C.A. (2002, December). *Sustaining innovation in career and technical education.* Annual Conference of the Association for Career and Technical Education.

Crist, C., Jacquart, M., & Shupe, D.A. (2002, March). *Improving the performance of high school students: Focusing on connections and transitions taking place in Minnesota.* Office of Vocational and Adult Education.

Doty, C. R. (1994). Tech-prep articulation: Is this an answer for the forgotten half? ERIC database.

Floyd, D.L., Friedel, J.N., & Mulder, A. E. (2002, Nov. 21). Community colleges and teacher education: A challenging and controversial issue in higher education. Annual Meeting of the Association for the Study of Higher Education.

Greenberg, A.R. (1992, March). High school-college partnerships: Conceptual models, programs, and issues. *The George Washington University Higher Education Reports.*

Grubb, N.W., & Bragg, D. (1997, Winter). The community college agenda: Making connections in times of change. *NCRVE Centerwork, 8* (4), 5-6.

Hayes, R. (1995, January). State tech prep initiatives: A national survey. *Tech Directions, 54*(6), 10-12.

Hendley, V. (1997). Recruiters hear a "me, too!" from community college students. *ASEE Prism*, *6*, (20-26).

Hershey, A., Silverberg, M., & Owens, T. (1995). *The diverse forms of tech-prep: Implementation approaches in ten local consortia*. Princeton, NJ: Mathematica Policy Research.

Joyce, B., & Weil, M. (1996). *Models of teaching* (6^{5h} ed.). Needham, MA: Allyn & Bacon.

Just, D.A., & Adams, D.A. (1997). The art of articulation: Connecting the dots. New *Directions for Community Colleges, 97,* 29-39.

National Society for the Study of Education. (1996). Performance-based student assessment: Challenges and possibilities. In *Ninety-fifth Yearbook of the National Society for the Study of Education.* J. B. Baron and D.P. Wolf (Eds.). Chicago, IL: University of Chicago Press.

Pucel, D.J., & Sundre, S.K. (1999). Tech prep articulation: Is it working? *Journal of Industrial Teacher Education, 37*(1), 26-37.

Rifkin, T. (1996). Transfer and articulation policies implications for practice. *New Directions for Community Colleges, 96*, 77-85.

Stanley, P. (1994, December). School-to-college-to-career transition model project. American Vocational Association Convention.

Stevenson, J.M. (2001). Global education between high schools and colleges: Challenges for metaphysics, epistemology and axiology in the curriculum. Retrieved from www.cis.yale.edu/pieris/stevenson.paper.html.