

National Research Center for Career and Technical Education

Using Labor Market Information Within a Program of Study Context-A Webinar with Dr. James Stone, Pradeep Kotamraju, Kim Green and Bruce Steuernagel

Dr. James Stone: Thank you for joining us. Today we'll be talking about a project ... actually two projects that we brought together for this conversation, both of which could probably—we could spend about a day talking about either one. I've asked folks to compress the conversation into a limited amount of time, to provide time for question and answer and feedback from you. We have four panelists.

The report itself was a collaborative effort between the Center for Education and the Workforce (CEW), at Georgetown University, and the National Research Center and the National Association of State Directors of Career and Technical Education. The purpose was to take some earlier work done by the CEW and slice and dice it so it aligned with the career clusters framework.

And this they have done, and we've learned some very interesting things about what that tells us, and Pradeep [Kotamraju] will provide more about that. Kim [Green] will talk about how this information is being used in the field, and possible impact on policy.

A second project then was led by the State Directors, the National Center, and Bruce [Steuernagel] will talk about that, and I've simply identified it as the crosswalking project. Think about it this way: CIP and SOC. And I'll let him say more about that when the time comes.

And then we'll conclude with some thoughts that I will share about programs of study, some work that we have that's ongoing, labor market information, and indeed, the future of career and technical education.

Pradeep Kotamraju: Good afternoon. I am Pradeep Kotamraju. I am the Deputy Director of the National Research Center for Career and Technical Education. As Jim has already pointed out, this is a collaborative effort of three institutions and taking some earlier data and reconstituting that for career clusters. What I'm going to do is just summarize briefly some of the highlights from the report. For those of you who haven't picked up the report, there are three sets of reports there. There is an executive summary report, there is a national report and there is a report that you have state by state. And so you can see the 2018 projections for individual states, and if you haven't done so, please get yourself a [copy](#) of that.

So the first look about the reports, what you have there is one of the things we wanted to do in this report, that was different from the previous one, which was called "Help Wanted," that came out in 2010, was we wanted to stress, given that we have CTE programs both at the high school and at the postsecondary level, we wanted to bring in some information at the high school level, and trying to talk about high-school-level occupations and what the projections for that hold. And so one of the findings that came out is while there are jobs for high school students with a high school degree are in decline, there are still jobs there, and good paying jobs as well.

The second thing that we found was this middle skill workers, that there were jobs there and it varied a lot across the clusters, as we'll look at some charts later on. The other thing that we want to highlight is manufacturing, which, when we were doing this report and

when the "Help Wanted" report was being written, it was at the height or depth of the economic crisis and there was a concern about manufacturing. And that does show up, but interestingly, there are still a lot of jobs in the manufacturing sector that are present in the report with 2008, and projected to 2018. And the recent interest in manufacturing, for example, that has come up, clearly indicates that this is a vital and a vibrant sector to the U.S. economy.

And the fourth thing that this report highlighted was the gender gap and the fact that women, to sort of reach a certain wage level, find that wage level in the middle skill occupations, but even so, they are still paid less than males in the old-line occupations that only require a high school degree. So how the report was put together, Bruce will talk more about that in terms of the crosswalking effort. But as we said, it uses the previous 2010 "Help Wanted" report, and we reorganized this by 16 clusters.

The crosswalking that Jim was referring to, it crosswalks education programs to labor market information, namely connecting education programs that are listed in something called CIP codes, the classification of instructional programs, and link it to the SOC codes, standard occupational classifications. And for that you need a crosswalk. The crosswalk that we used, because all of the analysis in these reports, particularly in this report, rests on choosing a crosswalk and sticking with it. And what we chose, what's called table 7—that for those of you interested are available on the State Director's Web site—it was a crosswalk that was developed by the Office of Vocational and Adult Education, and they contracted with someone who worked a long time on these efforts by the name of Dick Dempsey, and he worked this crosswalk, and we stayed with that. Bruce will talk a little later about how we are trying to sort of modify that crosswalk, and the rationale behind that.

So the chart that I put up here, what I wanted to do is I took the information in the report, and so by education level, looked at where the jobs are or where the occupations are by cluster level, but I also wanted to sort of look at a pathway, so to speak, from high school all the way up to the bachelor's degree, and I'll talk more about that. But one of the things that becomes clearer, as is pointed out in the OECD report, "Learning for Jobs," is that you have to balance student interest, employer needs and supply constraints in order to—and Jim will talk more about programs of study specifically, but programs of study might be one way of looking at this pathway process that certainly is within the current Perkins legislation.

I'll quickly go through these key findings. I think we've talked about some of these. One is that postsecondary education matters. But that's just a necessary condition; occupations also matter, we'll see that in a moment. Jobs for workers with high school diplomas are declining, 37 percent, they're 29 percent in the middle skills. The Center for Education in the Workforce defines the middle skill as someone with some college or an associate degree, and that's how they're defining the middle skill, and that's 29 percent, and bachelor's degree is 34 percent.

The other key findings that we have in this is that again, old-line manufacturing still is declining, but the number of jobs that are going to be available in 2018 are still around 2 million, which is still a large number, and more importantly, as I said before, it is still vital to the U.S. economy. The fastest growing clusters require postsecondary education, but one has to distinguish between fastest growing and also largest demand in some sense. And some of the old-line occupations do have large demand, and in fact, some of those also are in the middle-skill occupations.

And then, again, the issue of the gender gap is women are still earning less and have to reach middle-skill status in order to sort of be at least closer to par in some sense. This is a

chart that comes from the previous report. You can read that for yourself, but the last bullet is interesting, because 31 percent of young workers with associate degrees earn more than those with a bachelor's degree. A lot of—George Boggs, who used to be the previous president of AACC, the American Association of Community Colleges, talked about community colleges as being the new graduate school where people would go out and get a bachelor's degree and then come back to the community colleges to get an associate's or technical degree.

I will quickly go through, these are just numbers out there to highlight some of the issues that I just talked about. One of the things this report does, and there's a whole chapter in there, is trying to look at essentially what is the wage dispersion that exists among these clusters, and they use a different criteria. They use something called the minimum earning threshold, and that is defined as \$35,000, which is 150 percent of the federal poverty level for a family of four, and you can see that by education level, what it's indicating there is the percent earning more than 35K, and that percent rises as education levels rise. Interestingly, for high school dropouts and high school graduates, it's one in four—it's 19, and 36 percent.

Again, the same broken up by clusters, to show who are above or below this \$35,000 annual income, and you can see that more clusters fall below that, because as you'll see from the next chart, there's a wider variation or dispersion in the wages. But a lot of the above-average earnings clusters are in areas that are also growing quickly. And interestingly, STEM tops that list, but I have a feeling ... and Bruce will talk a little more about the role of STEM within the crosswalking process.

Here's again the dispersion that you have in terms of wage. In some of these, the starting wage, if you want to call that, is at a higher level, but it probably doesn't increase much as education levels rise. But in some cases, dispersion would be quite significant. The hospitality industry, for example, would be one of those.

This chart, I know you probably can't see much. What we did here is to take two sets of data. We took data from the NCS high school transcript study, and we took data from the iPads and tried to look at "the supply" out there, in these clusters, and we used the Perkins framework of participants and concentrators at the high school level, and then used education levels at the postsecondary level. And these are the top six clusters that, in terms of "the supply" and what we can draw from this table is the following. The implications that come from this is that CTE students are participating in the old-line clusters such as business computer and information sciences. But basically what you have there is it implies that high school graduates are enrolling and completing courses, the skills that today's economies require.

Also, the several career clusters are same for participants and concentrators at the high school level. What it indicates, at the high school level, there are a significant amount of students that are taking a sufficient amount of career and technical education that's preparing them for postsecondary education. I will recommend you to go and look at the recent book that has come out, by Stone and Morgan—and he'll talk more about that.

Health care is one of the areas that has a clearly defined path, that we know, in some sense, and is the top postsecondary cluster—all community colleges offer some form of a health care program. Again, in the old-line clusters, what you have is—one of the studies, the work that we are doing at the National Research Center is looking at the different typology of high school students, career and technical education students, that take three or more Carnegie credits but are mixing and matching CTE areas, occupational areas. They're taking

more than three, and my sense is they're doing this in terms of preparing themselves for postsecondary education.

Again, at the secondary level, students are choosing clusters that—the math and science requirements have increased the debatable proposition, and I will defer to Dr. Stone on this, about in terms of how much math and science is required. That's still a debatable proposition. And finally, again, manufacturing, construction and transportation, those are the associate's degrees. They seem to be moving toward areas that the economy is requiring. I'll just give you an anecdote. Several years ago I worked on—for one of the colleges in Minnesota, and I was looking at that data, in terms of these different areas, and I found that the students, if you recall, this was the data around 2003/2004, I found that the students were able to make a quick switch at that time, manufacturing was declining, and many of those students had already shifted toward health care.

So the choice was in some sense they made shifts in their career preparation area, within a matter of two years in some. And so when we looked at that, and again looking at this data, it became clear to me that students at least are choosing areas and becoming knowledgeable to what's going on in the economy. One final statistic that I will leave you with is there is another national dataset called the Beginning Postsecondary, and some of the analysis that we are doing from that indicates that in the previous version, '96 to 2011, about 40 percent of students that entered in 1996 left for whatever reason, left their education.

In the recent 2004 to 2009, it's still a high number but it has fallen to about 34 percent. So students are aware that it's important for them to stay within school and complete their high school degree and beyond, in order to be successful in this labor market. So I'll stop here, and then turn it over to Kim.

Kim Green: I don't have any slides. I have one. Fabulous, thank you, Jim.

I'm Kim Green. I'm Executive Director of the National Association of State Directors of Career Technical Education, and I want to say, this report, for us, at the national level, came at a really wonderful time. Because the debates at the national policy level are really about trying to connect education with workforce development and economic development. And so to have a study that is kind of hard evidence that not only gives the national snapshot but also provides information for each individual state, really bringing home the message and the importance of that connection, was really timely for this to come out.

It also was really important because a lot of people are talking about college and career readiness. And those words kind of roll off of people's tongue, but not really understanding that ultimately, college readiness is a means to career readiness, and ultimately hopefully getting a job. And so it's important to be able to present information to a whole variety of stakeholders—policymakers, parents, students, decision-makers about programs, about what really truly are the needs of a labor market. And so for me, this report is really starting to capture data in a way that makes it usable for parents and policymakers to begin to kind of articulate, if you're a parent trying to think about what areas you might want to have your child focus on, because you actually want them to be employable, this has information in a very easy way for you to look at it.

But as a practitioner, looking at program development, this also has information that might inform decisions that you're going to make about where you choose to invest or prioritize investing in programs. And certainly, at the national policy conversation about the future of career technical education, we've often talked about the importance of the connection to the

labor market and to employers. That's what makes CTE unique. But Perkins IV brought onto the forefront a conversation or interjecting a connection to high-skill, high-wage, high-demand occupations.

And as we work with the states, that connection to high-skill, high-wage, high-demand, has varied tremendously from state to state in terms of whether or not people made that a priority, and where they directed their Perkins funds. Some people didn't have the information with which to make decisions. So now we have a report that every state can turn to and look at, and see what are the demands that our state is going to have, what are the projections? And so if we're going to start tying our federal funds, as we're starting to hear might be the case in the future, to where the labor market demand is, we now have a base of evidence that is consistent from state to state to pull from. So I think that's really a powerful resource.

We also—so as I started to think about how we're hearing people—states and local practitioners using this information, for me it kind of fell into four buckets. The first is kind of a guidance and advisement tool, the second is really an opportunity to build partnerships, the third is really about informing program planning, and the fourth is an accountability or data-driven decision-making kind of tool. So I want to walk through each one of those.

The first, I think, is the quickest and easiest, which is guidance and advisement. So how many people, when they think about helping advise students, do they actually look at labor market information? To me, this is kind of a ready-made resource for counselors across the country in secondary education and postsecondary education, to very quickly begin a conversation with parents and students about what the opportunities are, as we go forward. Not necessarily is it that it's going to dictate "you're only going to be able to go into these five areas," but it is one metric, one factor I think that's important for parents and students and counselors to have, in terms of the work that they're doing and advising students about the realities of the labor market.

The second is partnerships. One of the ways that we've heard states really starting to use this information is engaging in conversations with governors' offices, with state departments of labor, with economic development advisors, chambers of commerce, where people are saying, what do we need to do to stimulate the economy in our state. This resource now begins to build a bridge between the education world and the economic development world, and it's in a language that both parties understand. So we start to see, okay, how do you really make sure that your education system is viewed as, and is engaged in the strategy to, help rebuild your state's economy.

So for me, this is a real opportunity to begin to build those connections. There's also I think opportunities for partnerships. So one of the kind of unintended consequences of this is we see industry groups look at the list for their state, and say "I'm not on the top five." And so immediately they start to get worried about, "oh my gosh, now all the funding is going to go away from where we are." Well, it begins the conversation to say, you know, we have jobs in every sector in the economy. This is where we're seeing the most growth, and we're also seeing what the educational pipeline needs to look like, to support the needs of industry.

So I think that it's an opportunity—I started looking at some of the states and realizing that our audiovisual communication is one of the areas that actually is one of the top five in those states. And that was an aha moment for me, because people probably think, the arts, well there aren't any jobs in there. But when you look at the description of what is in that cluster, in communications and some of the journalism jobs, it actually is a high demand. So for me, this is also myth-busting, right? A lot of people have perceptions about where jobs

are, where job growth is, or where it isn't, based on perhaps their own experiences. So this begins to be able to have a conversation with industry groups as well as perhaps the press, a kind of myth-busting about what the realities are in terms of labor market growth.

So program planning is probably the most obvious one. It's stated in the report as something that is a priority in terms of how we would like to have this data used, and I certainly think that the state by state report is a fabulous resource for state-level policymakers, as well as local practitioners, to start to dig in and look at the analysis for your state, and to see whether or not it jives with kind of what your road map is for where the growth is. And when you're looking at program approval, does this pass the litmus test of where you're prioritizing your resources or not.

I would say a caution that I don't think that this is the only metric that people should use, in terms of whether or not you fund or de-fund a program. Some people have worried about that, to say, "Oh, the only things now people are going to want to fund are the clusters, the top five clusters for our state." That's not what we're saying, but it definitely is another facet in terms of the decision-making. When you look at perhaps the reserve fund that states have, if you're going to incentivize new programs, maybe you look at the top five clusters that you have and see whether or not you want to prioritize the creation of some new programs, or prioritize them in terms of an investment in rehabbing or reinventing or investing new equipment or resources into these five areas. So I think that there are a lot of ways to think about how you can use this information in the top five clusters in your state to inform program and planning.

It also, I think, could be used to start to see what offerings do you have at the secondary level, and what offerings are at the postsecondary level. It's clear from this report that postsecondary education is a priority, and so to see, in terms of your conversation and articulation between secondary and postsecondary education, do you have the infrastructure in your state to support the top five areas that your state is saying the growth will be in. So program planning I think is definitely a resource and a way to use this report.

And the last is accountability and data-driven decision-making. And certainly in this economy, we know that the public as well as the press and policymakers want us to make decisions based on data, and in CTE, we herald ourselves as being responsive to employers. And so I think it's incumbent upon us to look at this data and say if we're truly going to meet the demands of employers we've got to look at where the jobs are, and that has to in some way inform our decision-making. When we talk about the skills gap, we have to be honest about the conversation, say do we and are we preparing a pipeline of individuals to fulfill the needs of our economy? And if the answer is no, then we have to have a conversation about where we prioritize our programs.

So I think that from an accountability standpoint, and in terms of the response to the public about the skills gap, and also reflecting on where we choose to invest our resources and make data-driven decisions, this information can be tremendously helpful to our community. So I think that I'll stop there. It was a pleasure to be a partner in this, and to have conversation about it being around the 16 career clusters, and not just the traditional areas of CTE, to me was really revealing to see that a lot of the growth that we have in our economy is in fact in kind of the newer CTE areas, in a lot of states, and to really start to think about what do our enrollments look like in those areas.

If we look at our Perkins reports, we have enrollments by the 16 career clusters. We can start to see—although I know the statisticians and labor economists would kind of shirk at my saying look at the enrollment reports and then look at this and see how you're doing in

terms of preparedness, but I'm a lobbyist, so I can look at data that way. And to start to kind of see whether or not there is—what kind of effort do you need to put forth, in terms of both program offerings, as well as the guidance and advisement about letting people know what jobs are out there, and what do those jobs really look like.

And I guess the last thing I would say is, as Perkins has had a strong focus on gender equity, I think this report just reminds us how much further we have to go, and how much work we have to continue to focus on the equity issues that face our nation. So just kind of underscoring that priority. So with that, I'll turn it over to Bruce.

Bruce Steuernagel: Thank you, Kim. Good afternoon. My name is Bruce Steuernagel, and I've been working as a consultant on both of the projects here, the career cluster publication as well as the crosswalk validation project. Just to give you a brief background, I worked for 22 years as a labor market analyst in the research office of the Minnesota Employment Security Agency, and also ten years as a labor market analyst with the Minnesota State Colleges and Universities System office. So I, I guess, look on it as a blessing of having worked on both the demand and the supply side of data.

Just to review a little bit, the report provided labor market information that was accumulated or aggregated into the 16 career clusters, in order to enable CTE program planners to better understand their area's labor market. It also helped to develop programs of study that are aligned with demand and to provide valuable career information to students.

Just a brief background as to what we mean by labor market information, or LMI. It's data that are available on a particular geographic area, and this includes industry employment, hours and earnings, unemployment estimates, industry and occupational employment projections, wage information, including the current level, the average wage or the median wage as well as trends in wages. Industry average hours and earnings—some states do job vacancy surveys to estimate the number of job vacancies by occupation, or the job vacancy rate. It also includes typical educational and training levels that are required for various occupations, and also the supply of graduates from related training programs.

Every state has a labor market information office, and most of that data are collected and produced and analyzed by the state economic security agencies, in cooperation with the Bureau of Labor Statistics. In addition, there are labor force characteristics data such as gender, number of people employed by occupation by gender, or wages by gender, educational attainment and so forth, that are collected by the current population survey and the Census Bureau's American Community Survey.

So in this particular report that we're looking at today, the career cluster report, much of the data that's included there on wages by gender, wage levels by educational attainment and occupation, were based on the American Community Survey data. The postsecondary educational data are collected annually through the IPEDS survey, by the National Center for Education Statistics.

Just one other note on data, Kim asked me before our session started about substate data. We have publications here that are for the national average by states, but most states will do projections of occupational employment or industry employment for substate regions. For example, Minnesota makes their projections for six substate areas, so that is something also that would benefit program planners to get information that's even more geographically specific to their area.

So the kind of questions that are answered by the labor market data in the publication are which career clusters are projected to have the most job openings, which are projected to be the fastest growing? Secondly, what level of education is typically required for jobs in this career cluster, and to what extent is there upskilling in the cluster, this trend—employers are expecting individuals with more analytical skills, problem-solving skills that are typically associated with higher levels of training and education. Which career clusters have above-average wages? And so the data are collected and available to help you to identify high-demand, high-skill and high-wage jobs.

One other note, I guess, because we've had some questions about the educational attainment data, and the data that's collected through the American Community Survey would be information about people who are actually working a job in these various occupations. So it's giving you an idea of the educational attainment of those probably 25 years and older, who are currently working. And as a result, there's a variety of educational levels. It's not necessarily the current educational requirements that might be, for example, in a licensed occupation. In legislation there might be a requirement that this particular person have a master's degree, or bachelor's degree. People who have been working in occupational fields over 25 or 30 years entered the occupation based on a credential that was required then. So just to keep that in mind with this particular publication, that there could be some differences. It's basically reflecting the educational attainment of people that are currently working.

Kind of shifting to the second project that we're talking about this afternoon, it's important to note that the career cluster data in the report is based on the current unique assignments of occupations by the standard occupational classification to the 16 career clusters. And those occupational assignments are listed in the back of the publication. I'll show you, for instance, which occupations have been included in agriculture or in government and so forth. So that's an important piece of information to know.

And those crosswalks, as Pradeep said, were developed in 2006/2007, in this Perkins table 7. The career clusters themselves are kind of a mixture of industry-based definitions, as well as function-based occupations. So for example, you have the manufacturing cluster, and transportation and health. On the other hand, you have a cluster that is called marketing, or you have an information technology cluster, and those occupations in marketing are, you know, found in retail trade, they're found in a number of industry areas, but it's more a function of a particular occupation. Similarly, with information technology, that nowadays is found across every industry. It's a particular skill that's providing services to the company in terms of technology.

So one of the goals of our second project in terms of the validation of the crosswalk that was used was to look at the definitions, you might say the assignments of academic program CIP codes, and a little bit later we'll look at the assignment of occupational codes to these clusters. And quite frankly, using a different cluster definition, or a group of occupations, could produce some different results in this report. And for instance, looking at STEM—in this report, STEM and information technology are two separate career clusters. There are a number of definitions that are used for STEM. The National Science Foundation has a definition that includes scientists and mathematicians, information technology and social science occupations. The Bureau of Labor Statistics has a definition of STEM, and each state might have their own definition. But when you're looking at data, you have to have some idea of, well, which occupations do we put in these clusters.

So over time, what's happened here, since the 2006 and 2007, there have been some changes in pathways and clusters and so forth, that would behoove us to take another look

at the definition. So for example, there's now an accounting pathway in the finance cluster. Well, this report is based on the table 7. Accountants were assigned to the business cluster, and nowadays I would assume that if you have an accounting pathway, that you would expect to have accountants in the accounting pathway.

So those are some of the reasons to go through this validation project, to look at changes in pathways. There's also changes in the SOC codes. Now we have SOC 2010, we have the classification of instructional programs 2010, so they're new occupations, they're new programs, and there are programs, codes that have been dropped. So there's a reason to update it. The crosswalk validation project initially is focused on the CIP, or classification of instructional programs assignments to clusters, because of the importance of having national standardization for accountability reporting. It's important to have each state using kind of the same categorization of their programs, and there was some concern among state directors about how those particular CIP codes are assigned to particular clusters.

So at this point, what we've done is to use the table 7 CIP cluster assignments and compared them to the Occupational Supply Demand System unit of analysis cluster assignments. The Occupational Supply Demand System developed these units of analysis from earlier work, and I think there are 220-some units of analysis which are comparisons of occupational codes and occupational programs. So you get a more detailed level than just pathways.

And we've gone through to look at making some recommended adjustments, if necessary, based on some decision rules, and some of the factors or things that we've taken into consideration when we're making these adjustments are looking at the employment by industry of occupations related to the program. So in other words, if you have an engineering technician program, and a very high percentage of engineering technicians are employed in manufacturing, that that would be a good reason to put the engineering technician programs in a manufacturing cluster. Or, looking at the skills of the particular occupation as it's related to that program. There's a program called agriculture journalism/communication type of cluster assignment. So we've looked at those questions.

Also, the existing pathway definitions, and as I mentioned before, there are some new pathway titles—accounting and marketing—as kind of separate ones. At this point we've completed going through all the CIP codes and have made some recommendations, have sent that dataset to a group of experts for their review and recommendations, which are expected back in the next 10 days. Then after that, based on sort of an agreement among that group, and perhaps another slightly larger group, as to the decision rules that we're using—it seems that these rules are giving us more consistency and reasonableness—then we'll go to the new 2010 codes that are available, because there are some new codes and there are some that will be dropped, and update our CIP assignments. And then we'll look at doing the same kind of activity for the occupational assignments, and review those for consistency and reasonableness. Thank you.

Dr. James Stone: First, thank you all very much. I just have a few comments I wanted to share, and as they've been talking I've been making more notes, so hopefully I can remember all of them. But let me begin with a couple of observations. I received actually last night or very early this morning, before we even began, an e-mail from an occasional correspondent who is an auto tech teacher in New York, who follows our work and saw this. He raised some interesting questions about the use of labor market data driving decision-making. And I paraphrased this as these three bullets, that are sort of caveats.

And that is to say that, especially at the secondary level, career and technical education performs at least three functions, and historically we've talked about this in the literature. That is, one role of career and technical education is to expose young people to the notion of work and working. That is to say, what does it mean to be a productive citizen in our economy? That takes many forms, and we also know that especially with work that we've done here at the Center, and also work that SREB and others have done, that you can engage young people in developing their academic skills in a context, a context they find more engaging than sitting in, say, an academic class. And we've been very effective at developing young people's understanding of mathematics and literacy.

And then finally, the third purpose has, again, historically been to actually prepare young people to move into the workplace. So these are three functions that have historically been part of what we do, especially at the secondary level. Another point that my colleague made was that often times, and again, there are some data that support this, someone might be in say a trade and construction program, old language, might be in a program in X. And the skills that they learn, whether they be specific or broad based, are applicable to other areas, that may not be directly related to the focus or the context that's being taught. So I think it's important that we keep these in mind, as we think about how we might use these data.

The other point that I would make is that career and technical education provides many means, I will call them, for achieving the multiple targets that we have for today's students. So for example, I think most of us understand that to be truly effective in delivering career and technical education, there are three what I like to call pedagogic opportunities. By the way, it's a form of shameless promotion. There is some information about a book that's coming out, so you can pick up a brochure at our table out there.

I mean, the coin in the realm in most education settings is the classroom. So there are groups of students working with a teacher. We know that—we're beginning to understand that how you handle that in-class pedagogic opportunity really matters. There seems to be a lot of power in getting young people engaged in problems, or problems that are wrapped inside projects, and those themselves are contextualized. Gene Bottoms likes to talk about productive struggle. One of the things that he points out is when you compare Danish, what they would call vocational education and what we call career and technical education, in their culture, in their schools, they will present young people with a problem. And they say, okay, the first thing you have to do is to figure out potential solutions, and you have to design a plan. Then you have to go through these various steps of what it takes to actually engineer a solution, whereas in most American classrooms, we would say here are five things you need to do, there's the supplies over there, and we're going to move immediately to the sort of hands-on part and we forget the thinking, planning and understanding part. And I think again, there's a lot we can learn.

But the notion—there's classroom instruction, and then there's work-based learning. There was reference made to the OECD report, "Learning for Jobs," as well as I think most of you by now have read "Pathways to Prosperity," who make a very compelling case for expanding young people's engagement with what those of us in the academy laughingly call the real world, where we actually have them out working with and among adults, in an adult setting. And again, we have many ways of doing that. And then finally, there are the career-tech student organizations, that are at minimum one of the best places to address the other kinds, the other domains of knowledge and understanding necessary to be successful in whatever the cluster may be.

We used to call them soft skills, they've been known as SCAN skills. We now have the skills for a 21st century workplace. All of these kinds of generalizable occupational work readiness

skills, we have a pedagogic opportunity that is not used in sufficient amounts. With these as sort of the framework, we have multiple ways in which we can deliver career and technical education. In traditional comprehensive high schools, to be sure, we have—I'm not sure of the exact number, at least 1200 or perhaps more, 1800—regional, what might be called career-tech, centers across the country.

We have career academies that have gained new interest, in fact, new emphasis from the Administration, and the budget that they're putting forward, I believe—and Kim, correct me if I'm wrong—is it \$1 billion they want to devote to career academies and expanding them? And so they represent another way, another framework, if you will, for organizing schools to deliver quality career and technical education.

And then finally, we have something that I think, at least in my mind, is somewhat new and really intriguing, and it's what I'd call an industry-driven program of study. We're finding at least two examples that I'll just briefly mention. One is Toyota manufacturing in Georgetown, Kentucky. The industry, Toyota manufacturing, has actually on its own, without any sort of policy support, decided they're very concerned about the future workforce in advanced manufacturing. They're working with local high schools, they're working with the local community colleges and they're actually bringing young people in 11th and 12th grade for honest, intensive, on-the-shop-floor kinds of—we might call it apprenticeship; it's not exactly like that, but it gives them that work-based learning experience. They then can move into the community college program, moving towards advanced manufacturing that's delivered on the shop floor through Toyota. Those young people, then, upon successful completion of that, can move into employment with Toyota, and/or move on to programs they've developed with a four-year college for a bachelor's degree in manufacturing management, or they're working with a local university in an engineering program.

So what they've done is really created what we might call a program of study. It's not language they would use, but that's what it is. Another example is IBM with their P-TECH High School in New York City. They're opening five more in Chicago this year, at least that's the plan at the moment. P-TECH is a six-year high school that is designed to begin young people on a very focused journey from ninth grade to employment in IBM with a community college credential. It's exciting, it's new. So we'll have to sort of pay attention to how that works out.

So there are many structures and there are many approaches that we can use, but when we think about labor market projections, and the kind of work that we're sharing with you here today, there are some ways in which we can think about these data. There are what I call projective and reactive, and the projective are the kinds of things that the CEW, working with us and the State Directors, have used to create these cluster reports. They're saying, looking out 10 years, based on assumptions, based on data, this is what we think is going to happen. So as Kim said, if you're advising young people, well, pay attention to this and you may want to ignore that, and it's a very useful document for that purpose.

A short-term kind of approach, one that's more reactive in nature, is one that's called burning glass, and what this does is it sort of scrapes the Web, looking for real-time job opening information, and provides immediate—real-time is the best way to put it—information probably more targeted towards older adults, who are looking to where they might want to focus their especially postsecondary education and training opportunities to more quickly engage in the labor market. It has certain advantages, to be sure.

But another one that is implied in this report, and Kim indeed actually suggested it, is something called a sector-strategy approach. And what this is—this is actually a fairly rigorous methodology, again by economists. By the way, I remind you all of Harry Truman's admonition, and what he looked for in an economist, and that was a one-armed economist. Because he was so tired of all of his economic advisors saying, "but on the other hand." So Bruce, that one's for you. No amputations necessary.

But let me give you an example. In Kentucky they're using this for strategic planning, and with the analysis that they've done for the state, and again, I'll emphasize as Bruce did, they have regional variations on this theme, but for Kentucky, they've identified five target industry sectors. Now it's interesting, for example, they talk not about energy—they're focusing more on energy transmission and actually less on creation. And that is, we can create the energy, but how do we move it from where it is to where it's needed?

Transportation and logistics—manufacturing, automobile and air craft manufacturing—not building the airplanes themselves, but parts manufacturing, for Boeing, for example, and others. And then health care of course and then business services, research and development. Essentially what the state's saying is this is where they intend to invest state resources going down the road. So one of the options for career and technical education is to think about, how do we align with these longer term investments? Because in a perfect world, the kinds of investments the state is making over here would align with the kinds of investments the state is making over here in education. Because we have a consumer-driven model of education, which explains, for example, in 2000 to—the early aughts, I'll call it—there was an incredible spike in forensic science programs. Why? Because we had "CSI Miami," "CSI New York," "CSI Los Angeles," "CSI South Brooklyn"—I don't know what the last one was.

Television is a powerful career guidance school, and it's mostly useless, and loses young people off in different directions. You know, young people saw that show and they thought, well if I go into this program, I'm going to come out with two possible outcomes aside from a good job. I'm going to be a studly dude or a hot chick, and that's going to be one of the two things. So having this kind of alignment makes an awful lot of sense, especially in an era of scarce resources.

So how do we draw back our consumer-driven approach at the high school level or at the community technical college level, where we offer classes often times in programs based on student demand that may be inconsistent with the actual needs? So we over-supply because of demand, and we under-supply with needs. Right now, as I think all of you are aware, there's a huge outcry from the manufacturing industry. They are desperate. The 2 million workers that Pradeep mentioned, right now, most manufacturing workers look like me, geezily white dudes, and they're leaving the scene. And there is not a pipeline, because ... It's true. I'm a GWD, kind of one of the new demographics, and soon to add an S in front of that, senile geezily white dude. I'm sorry, what was I talking about? ... The challenge in this is, is this notion of alignment with scarce resources, let me leave it there.

One of the things, and this was actually a graphic that would kind of roll this up, that again, it's in the form of a caveat. It is not reasonable to expect a young person to arrive in the high school scene, ninth grade or tenth grade or even 11th grade, or even after high school, and expect that they can make reasonably sound, rational decisions. Let me take out the word rational, thinking about young adults—sound decisions—because they have insufficient information. They have insufficient information, both in terms of opportunities, what's out there, but insufficient information in terms of themselves. We must have a viable, robust,

intensive series of career development opportunities that, as this model suggests, and career development theorists would suggest, begin in the elementary schools.

We cannot just assume that watching "CSI" or watching "iCarly"—I have two grandkids living with me now, I watch a lot of "iCarly"—or watching whatever it may be, is going to provide them the adequate kind of guidance to begin to make meaningful and important decisions that will affect their future selves. The idea of wrapping this—and that's what the green arrow suggests—into whatever you may call it, an individualized graduation plan, that begins at no later than middle school, and is developmental in nature, that it's an ongoing document.

One of the most intriguing examples of that I saw, and again, linking to real information such as in the reports here, the one I saw began in eighth grade, and counselor, parents, students sat down and they developed this. They said, "okay, well I want to be in something—medical." The question that's put to the child was, and to the parents, and to the counselor, well, people who are successful in that career, what do they look like? What did they do and how did they get there? Well yes, you've got to take a lot of science, that's a given, probably take a lot of math, take a lot of whatever, but what else do they do? What sort of hobbies did they have? What sort of clubs did they belong to? That was all part of this individualized graduation plan.

And as one progressed in eighth grade—it was a five year plan, took them through high school. In ninth grade it was a five year plan, took them one year after. In tenth grade it was a five year plan, had them planning two years after. By the time they graduated they had a five year plan for their career. Developmental guidance with parents, with student, having this ongoing conversation. This is the kind of thing that we need to undergird all of this thing that we call life.

So I think most of you are familiar with the minimal requirements for a program of study. We are, as you probably know, engaged in three longitudinal studies right now, looking at programs of study. I'm not going to say much about them right now, for two reasons. One is time is very short. The second of which is, is that these are studies still in progress, and we have a lot of early lessons, two of which I will mention here. One is, is we're learning that partnerships—Kim mentioned the notion of partnerships—partnerships are absolutely vital and critical. Not only partnerships with business and industry, as you might think about, but the partnerships between secondary and postsecondary. We've been at this a long time, folks, okay? Since really the middle 1980s. We've been trying to figure out how you get a community college or university person to sit down and have a meaningful conversation with a high school teacher, at whatever level you want to think about it. And we're still having this conversation, we're still having this challenge.

There are some wonderful models out there, where this has really worked well. There's one in a nearby community in Kentucky, for example, that we've had a chance to look at, and there are others that we're documenting.

The other thing again, going back to the guidance career development piece—this is emerging in the context of programs of study. We actually have evidence now that shows what happens when you actually do this, you really make an effort, and that's our study that we're looking at the impact of the law in South Carolina that required this expanded career guidance/career development component.

In fact, one of the things we're doing right now is we've launched the National Programs of Study Institute. We're working four states? Five states? Oh yes, three states and one

territory. And we're taking the lessons learned from the research and we're trying to help them think through how they move their program of study to the next level, at least with these two foci.

Now, in the form of a picture, then, because I like to draw pictures as some of you know, if we think about college and career ready, and for those of you of my generation, CCR is not Creedence Clearwater Revival, just to make that clear—college and career ready—we really have to begin with the state policy in the lower left-hand corner—right-hand corner, my apologies—and the industry cluster information such as we have here, and the connection between those two is sort of the beginning point.

We take the components of a quality career and technical education program, we package them in a career pathway, using whatever sort of mechanisms, comprehensive high schools, regional centers, some combination, middle college high schools. We have all of these kind of structural ways to organize this, and they all can work, as long as we are thoughtful about what we put into those structures.

And then leading on a career pathway that will yield what I would argue are the three skill sets necessary to be truly college and career ready. Clearly there are academic skills that have expression in the workplace, there are employability skills—call them SCANS, call them 21st century—and then specific technical skills that employers actually hire for. If you need a welder, that person has to be able to run a bead without blowing a hole in the metal, it's that simple. So we have different kinds of skill sets, all of which are needed in the workplace.

I always like to leave with this philosophical consideration: Paul Barton made this observation in a report that was in 2006, and I think it still has resonance today, and that is we have to keep in mind that no matter what our aspirations are for all young people who start ninth grade, depending on whose numbers you want to believe, perhaps as many as a third of them will never finish high school. Some will get a GED, and what the labor market data will tell you is that's about like not having a high school credential. Some will do other things, but we have a substantial percentage who will never finish high school, and if you look at other data, like in the "Pathways to Prosperity" report, they pointed out that by the later '20s, only about 40 percent of adults at that point have some kind of postsecondary credential, two or four years.

So you've got this 60 percent out there, or a number close to that, for whom high school is it. High school—we have to figure out how to make it matter, especially for those young people, for whom that is it, in terms of any sort of formal education and training, and the answer—I mean, the answer is very complex, we don't have time to get to it here, but as we think about this notion, as we think about sort of reserving all the real skill training for after 12th grade, we have to keep in mind we are then locking out an awful lot of young people who might benefit from it. Because many of them are developmentally ready at 15 or 16 to move into these kind of arenas. And by the way, the effect of that also is that sort of really relevant education engages a lot more kids, and we have what is piling up to be a small mountain of data that shows that career and technical education in sufficient quantity actually keeps kids in school, the necessary first condition to any other conversation we want to have.

So as we think about the use of labor market data and we think about how best to help that shape what we're doing, we also have to keep in mind that high school itself, we have to figure out ways to make it more useful and meaningful to young people, as opposed to creating a new middle school so that high school is nothing more than another marker on the way to something else that is necessary to be successful in life.

So with that, what I'd like to do is open it up for questions, online, in the audience, and would ask that you don't be shy, and my two colleagues are pointing at the microphone in the center, which means if you would like to ask a question, please feel free, but you must step up to the mic, and we'll see if there's any online stuff coming in. So if you want to direct it to an individual, feel free; if you want to throw it out, we'll have the panel.

Question: Hello, I'm Dr. Crystal Taylor from Newport News Public School. My question is specific to the state of Virginia. In Virginia we have a great need for manufacturers, and I know that in your book, it does mention how in Virginia, the marketing, sales and service cluster is the largest cluster overall, and where the growth is. So my question is, do you have any ideas, any suggestions, any marketing tips for us that are in the state of Virginia—and I'm currently the supervisor for career and technical education. How am I going to get my young people in to manufacturing careers? And that is the big question. We can show parents this data all day, but we really have to figure out how are we going to get our students into these clusters where there is a big demand.

Kim Green: I will say, you know, a number of the industry groups come to us and say, "parents and students don't find these occupations interesting." So I think we all feel like we're misunderstood. And so it is about getting, I think, parents and students in to see what work looks like, and getting professionals in front of them to break the stereotypes, and the myths about what is it like to be in those professions, when we know research says parents are still one of the most influential points of data for students in terms of making choices about whether or not they enroll in programs.

So I think it is a matter of convincing parents that these occupations or clusters are something that is not just kind of a dirty line work, but they can see the progression and the opportunities that are presented to them. So to me, career fairs are more than just about kids, it's about getting the parents into those areas too, and understanding kind of really what it means to work in those fields.

The IT cluster has the same problem. Parents saw the IT field as there's that IT bust that happened, and so a lot of people who were in those sectors lost their jobs, so they're worried about directing their children to go into those fields. So I think it's building confidence and knowledge about what it really means to be in those areas. The National Association of Manufacturers has done—and they've been working with a number of communities specifically in this area of educating the public about what occupations in the manufacturing sector look like. So they might have some resources that can help you.

Question: ... How do we get this out and put it into work? I guess is the first question I have for you, and that's probably a marketing-type deal.

Dr. James Stone: What's the second question? Let's get that out here real quickly if we can.

Question: And the second question is, I guess it directly relates to the first question. Can I have this PowerPoint or do I already have it? Because I'll do some marketing myself.

Dr. James Stone: By the way, thank you for asking that question about the resources. These materials will be made available, we'll have them up online. The question about marketing, if you will.

Kim Green: I think that this is one of the challenges about change and how quickly the education system can respond, right? Because, some of you've heard me say, I do High Schools That Work technical assistance visits for my professional development and I always ask, why do you have the programs that you offer? And the top two answers you get are we've got teachers who teach this and kids like these classes. Both of those are valid answers, but we have the opportunity to interject now a third answer, which is that we're talking about a connection to the labor market. And I think that the spin here is, not to get political, but it takes something from the Occupy movement, that we've got kids who went through college and can't get jobs. So we're in an economy where it's okay to talk about jobs because people are worried about the future for their kids.

So to be able to now interject into school board conversations and parent conversations and guidance conversations that ultimately our community thrives and our students thrive when they get a job. And so we're bringing in a new piece of information that's important for all of them to consider when they're trying to do their planning, when they're trying to select whether programs go away or they need to create new programs. So I think it's got to be introduced in the context of the current environment as opposed to kind of challenging we've had this teacher who's taught the same program for 50 years and is never going to change because people get very defensive.

Some of the best programs I've seen are when you get teachers engaged and maybe require some kind of teacher externship where they're going into industry and they get re-engaged and excited about opportunities that they see that their students can have. And so they might transform. So that notion of partnership with industry coming together to both motivate parents and build awareness but also transition what's happening in the classroom is another powerful, I think, opportunity.

Bruce Steuernagel: Just to take this idea of an individual learning plan, kind of a career plan, just by offering that as a way that students can consider what they're interested in and then simply say, "well, look up and see how many people are employed in that field in your area." Connect them to the data I think would help to market the data but also raises that here are resources that are available and should be considered as you go along with your plan.

The other point I just want to make is it's kind of like, well, what have you done for me lately? This 2008 data—well, there's more recent data, the Bureau of Labor Statistics just released their 2010-2020 projections. So the point of data is that it's always changing and the labor market is always changing. So it's important to keep current information in front of students.

Kim Green: I would just add that if you decide to get on the route of having an individual graduation plan there is a free resources on the careerclusters.org site that is targeted at middle school age literacy that you can take and rank order the 16 career clusters from the top one to the bottom. That's a resource to just begin the conversation about where your personal preferences lie.

Dr. James Stone: I'll go back to my picture here one more time in response to that question. As part of this individualized learning plan, individualized graduate plan, if a students and the parents in the middle school say "my kid is going to college and we want to target this area," among the things will they learn are the sort of academic credentials required. And probably sometime around 9th grade they're going to figure out if that young person is on track to be eligible, if you will, to continue in that direction. Now, as you well know, many countries test and they track and all that. We'll never do that. But this allows a

more gentle way of having a meaningful conversation when the parent keeps insisting my kid's going to college and the kid consistently gets C-/C+ grades, that's a way to help illustrate the disconnect and help them think about a number of issues, not the least of which is maybe you ought to think about something where other kinds of skill sets might be more useful, that your young child might be more adaptable to.

We are unfortunately at the end of our time. I would suggest a couple of things. First of all, visit our [Web site](#). Information about this and including this Webinar will be posted there, but also we have information on programs of study, curriculum integration, professional development, accountability data—a lot of really cool stuff. The other thing that we will do is that we'll take the questions that came in and if you have other questions, feel free to send them to us and we will post responses. So if you're online, feel free to continue to send questions. I apologize for the delay due to technology but we will post answers online. So with that again, I want to thank my panelists. And thank you both home here and abroad, and have a good conference.