Minnesota State Colleges and Universities Centers of Excellence program evaluation

Year 2 (2006-07) progress report

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Introduction and background

Legislation passed by the Minnesota State Legislature in 2005 appropriated $10 million for the biennium to create Centers of Excellence as part of the Minnesota State Colleges and Universities system. Each Center was expected to create effective partnerships between four-year and two-year institutions, demonstrate strong ties to employers, and develop a continuum of academic offerings providing entry points to students at a variety of career points. In addition the law created an expectation for Centers to become regional or national leaders within their areas of education and training.

The authorizing legislation also indicated that each Center would build on strong existing programs, improve performance in related programs, improve employment placement and income expectations of graduates, and integrate the academic and training outcomes with business interests thought to have the best opportunities for growth in the state and regional economies. To further support the sustainability of each Center, each was expected to develop a separate fund for donations dedicated to the Center's work as well as a development and assessment process that would foster continuous improvement and accountability.

In October 2005 the MnSCU Board of Trustees designated four Centers and committed funding to the Centers through fiscal year 2009. The Centers selected for funding were:

- Center for Manufacturing and Applied Engineering (now 360° Center for Manufacturing and Applied Engineering)
- The Minnesota Center for Engineering and Manufacturing Excellence (MNCEME)
- The Center for Strategic Information Technology and Security (CSITS)
- The Center for Integrated Health Science Education and Practice (now called HealthForce Minnesota)

In January 2006 Wilder Research was selected as the consulting firm to carry out the evaluation responsibilities identified in the authorizing legislation and by the Board of Trustees. This document constitutes the second evaluation report prepared by Wilder Research as part of a three-year contract with MnSCU.

The evaluation has two main components: An implementation evaluation to help the Centers and the Office of the Chancellor document challenges and successes in setting up the Centers, and identify and share best practices and lessons learned; and an outcome

evaluation to document short-range, medium-range, and (ultimately) long-range outcomes for Centers, institutions, students, and industry.

A main focus of evaluation activities during this year has been in-depth interviews with 66 industry stakeholders. Findings are also based on a variety of other sources of information including site visits, observation and participation in other meetings, review of documents, and interviews with Center directors, systems office staff, and trustees who visited the Centers in 2006–07. The report also provides information provided by Center directors about leveraged funding and industry involvement. With support from the Chancellor's Office, the report also contains information about students and graduates in Center-related courses and programs. A complete listing of data sources and methods is in the Appendix.

This second-year report focuses on three main areas of interest:

- Activities and accomplishments of the Centers in each of the main areas of effort during 2007. The highlight of this section is detailed information from industry stakeholders about their perceptions of the Centers, and their hopes and expectations related to Center activities and workforce development.

- The goals and operational functions of the Centers of Excellence and how they relate to the current structure of the Minnesota State Colleges and Universities system.

- Stakeholder perceptions about priorities and timeframes within which results can be expected.

The first section describes the three kinds of partnerships that Centers have developed: with industry, with K-12 organizations (and other activities to promote student interest in the Center), and among academic partners.

The second section describes the activities of Centers as whole organizations: how their internal partnership building is developing, and how they are carrying out uniquely Center functions such as marketing and fundraising.

The third section describes the students considered most likely to be affected by Center activities, and graduates from programs associated with the Centers.

The fourth section summarizes outcomes that have been observed to date.

The final section discusses the some of the most important implications of the findings, and suggests some issues to be considered in planning for the ongoing effective support of Center development and success.

Findings about Center implementation: Partnerships

In the first year of the evaluation (2006) the Centers had just received their initial start-up funds in January. Much initial organizing took place during the year, equipment and facilities were upgraded, several new academic programs were developed, and several major grants were received for work related to the Centers. The headline story for the 2006 year, however, was one of relationship building. To a large extent, it was the success of this effort that enabled the other accomplishments that were documented in the 2006 evaluation report.

In 2007, the relationship-building work has not merely continued but also matured. This work started as extraordinary efforts, above and beyond the usual scope of duties for faculty and administrators and their academic and K-12 partners. It is now becoming more of a standard operating practice that is more integrated into the day to day work of the Centers and their institutional partners. The relationships are no longer only between one individual and another individual, but also are beginning to broaden to others at different levels of the organizations involved. They are not only occurring on an as-needed basis, but are being structured more regularly, with an eye to how they can be sustained over the long term. In this way they are institutionalizing and sustaining the new ways of working that the relationship-building has made possible.

As described in the initial logic model (attached in the Appendix), relationships have been built, and new joint work has been initiated, in three different kinds of partnerships:

- Between academic partners and business and industry
- Between academic partners and K-12 educators and organizations
- Among academic partners

The theory of change embodied in the creation of the Centers is that these partnerships will result in increased recruitment of students (and increasingly skilled and diverse students) into strengthened and better coordinated academic programs. In turn, the programs associated with the Center will graduate more students with credentials that are of value to business and industry in their area, thereby strengthening opportunities for students as well as competitiveness for business. In addition, Centers will benefit students and businesses through customized training and other non-credit instruction, as well as applied research to help strengthen industry practices.

Partnership with business and industry

The workforce needs of business and industry were an important consideration in defining the disciplines that were selected for the initial Centers. Moreover, in the stated objectives for Centers of Excellence, two of the three main purposes relate to industry needs ("Meet a demonstrated and critical industry need," and "Provide adaptive and innovative approaches to the evolving needs of the industry and society"). The third objective is to "Leverage the program strengths and other resources of institutional partners."

In view of the centrality of business concerns to the Centers, the main focus of evaluation activities during 2007 was on collecting information about business goals for, participation in, and perceptions of the Centers. We open the 2007 evaluation findings with a review of industry needs and expectations, and Centers' work with business and industry during the year. While this section mainly reflects results of the fall 2007 survey of business stakeholders, we also incorporate findings from other sources, especially site visits.

Roles of business; types of participation

The business stakeholders who were surveyed in fall 2007 cited three main roles for industry in the Centers. In answer to open-ended questions, the most common response themes were:

- **Advise the Centers**. This set of responses includes mainly the idea of providing guidance or information to help the Center make strategic decisions. Other kinds of input mentioned include advising on higher education curriculum or the needs of industry in terms of education or skills.

- **Provide financial or in-kind support.** This includes donations of time, equipment, event sponsorship, scholarships, and employee tuition reimbursement. It may also include some direct financial contribution, usually for specific projects from which the firm expects to receive some form of tangible value in return (such as a marketing campaign to raise interest in the industry, or fee-for-service arrangements such as customized training).

- **"Real-world" involvement.** This includes hiring graduates from Center-affiliated programs, and providing industry experience to students, educators, or both.

During site visits, several industry representatives also mentioned the value they bring to the Centers by communicating a sense of urgency about getting the work done quickly and efficiently. For example:

> There's two roles. First, we provide a sense of impatience for getting things done. Second, we help them with leveraging resources and working together. [It's our role, in a meeting, to say] "You aren't doing that already? You *teach* lean. Why don't you practice it?"

The enabling legislation for the Centers required that selected programs demonstrate "identified commitments from employers that include measurable financial and programmatic commitment to the Center of Excellence on the part of employers who will benefit from the development of the center." In the first two years of work to set up the Centers, contributions from private corporations, industry associations, and corporate foundations totaled slightly over $2.9 million in cash and in-kind donations (not including the value of individual representatives' time). (See below, pages 44-45).

The consensus of most industry representatives and Center staff is that industry stakeholders – when convinced of the value of the Centers – are likely to advocate for public support, but not to provide ongoing operational support themselves. One industry representative, at one of the evaluation Center site visits, bluntly declared that "Industry is here to *get* something, not to *give.*" A different industry representative, in a different site visit, expressed the opinion that financial sustainability of the Centers would have to be based on industry funding, and believed such funding would be forthcoming (provided the Centers demonstrated their ability to provide graduates with the needed skills). However, this appears to be a minority opinion. Furthermore, the kinds of support that this individual envisioned were in the form of tuition reimbursements and fee-for-service arrangements, which are not likely to support most of the ongoing operational costs of the Centers.

There is some interest in having Centers expand their networking from individual businesses to representatives of entire sectors. Currently, networking at this level is done more by the Chancellor and his staff than by Center directors and their staff. However, Center directors report that they are making efforts to expand the levels at which they are partnering. This includes both working upwards to larger-scale business associations, as well as "driving down" the involvement to more front-line, operational level business representatives. In addition, some Centers (especially CSITS and HealthForce) are working to involve business representatives, as they are interested, at more operational levels of the Center, by encouraging them to participate in specific implementation projects.

Business hopes and expectations

While the Centers balance multiple interests of many groups of stakeholders, goals related to job placement and economic growth are of particular interest to business and industry. Sixty-six industry representatives involved with the Centers were surveyed in

fall 2007 about their perceptions of the Centers and their likely impacts. According to these stakeholders, the most important goals for the Centers are the following:

- A better qualified or educated pool of employees available to employers

  92% rated this goal as critical or very important

- An increase in the number of employees available to employers

  88% rated this goal as critical or very important

- Opportunities for industry to influence college curriculum

  85% rated this goal as critical or very important

- Upgraded skills of the workers who are currently in the workforce

  79% rated this goal as critical or very important

Two potential outcomes were identified by over half of business representatives as "critical." These were an increase in the number of employees available to employers, and a better qualified or educated pool of employees available to employers. When the standard of importance includes "very important," six more potential outcomes are added to the list (see Figure 1 below), and the remaining potential outcome that was included in the survey is not far behind at 49 percent. These responses reveal the strength and breadth of expectations that industry partners have for Centers, and the hopes that they have riding on the Centers' potential value to their businesses.

Figure 1 shows the percentage of respondents who rated each potential benefit as either critical or very important. It is notable that, except for a better qualified pool of employees and an increase in the number of employees, no other potential benefit appears among the top five for all four of the Centers. CSITS industry representatives, unlike those of other Centers, place the highest collective priority on upgraded skills of the workers currently in the industry, but a lower average rating on opportunities to influence the college curriculum. MNCEME representatives are the most likely to rate applied research as an important potential benefit, although increasing the numbers and skills of potential employees are still their top priorities.

1. Which of these potential benefits that the Centers of Excellence might produce would you rate as critical or very important?

	360° (N=15)		MNCEME (N=15)		CSITS (N=18)		HealthForce (N=18)		Total (N=66)	
	N	%	N	%	N	%	N	%	N	%
A better qualified or educated pool of employees available to employers	15	100%	15	100%	15	72%	18	100%	61	92%
An increase in the number of employees available to employers	14	93%	15	100%	12	67%	17	95%	58	88%
Opportunity for industry to influence college curriculum	14	93%	14	93%	11	61%	17	94%	56	85%
Upgraded skills of the workers who are currently in the industry	11	73%	12	80%	14	78%	15	83%	52	79%
A more diverse pool of qualified employees	12	80%	10	67%	12	67%	14	78%	48	73%
Opportunities for industry to interact or become familiar with the work of K-12 schools	12	80%	8	53%	6	33%	13	72%	39	59%
Applied research to advance the field and provide new industry practice	7	47%	11	73%	8	44%	8	44%	34	52%
Networking opportunities with industry peers	8	53%	4	27%	12	67%	9	50%	33	50%
Better information to make projections and preparations for future business strategies	8	53%	8	53%	8	44%	8	44%	32	49%

Source: Wilder Research, Telephone survey of business representatives, fall 2007.

In an open-ended question where they could name other possible benefits, industry representatives also reported that they find the Centers valuable as a single point of access for a broad range of programs and services, and for their work to promote the visibility and positive image of the industry and its job opportunities.

Strategies for outreach to business

Business representatives who were surveyed cited outreach to industry as one of the key strategies for success that Centers are currently pursuing. Interesting, a highly-ranked strategy that Centers *should* be doing, or doing more of, was also outreach to industry (which came in second only to more marketing and visibility). Perhaps this prominence on both sides of the coin is reconciled by the observation of multiple Center directors that

it is proving to be harder than anticipated to get business and industry representatives involved.

A variety of strategies are being tried to increase the amount of business participation. These include: regional road shows to describe what the Center has to offer and collect attendees' feedback about what they find interesting; involving a different person, at a different level in a key firm, if the person in the most strategic position does not accept an invitation to participate; and assuring an appropriate mix of industries in the advisory group. One Advisory Board chair also reported that as the Center developed and gained more structure, it became easier to recruit business representatives to the advisory board. It was also reported that the ideal representative for a firm was not the CEO (unless it was very small), but rather the Director of Operations.

Business representatives who were surveyed reported four main benefits that their firms expected to realize as a result of involvement with the Center. In open-ended answers, the main themes of the respondents were:

- **Workers.** Most answers in this theme were framed as an increase in numbers or access to workers. Many respondents also specifically mentioned increased skills in the available labor pool, and some specifically indicated increased skills among current workers.

- **Input into the process.** Industries were very interested in having a say in what higher education is doing to prepare students for jobs in their field. This theme also includes respondents who specifically mentioned the potential for modifying the curriculum, improving career pathways, or articulation among programs.

- **Increased awareness.** This cluster of responses cited the Center's potential to increase public awareness of their specific business or the industry sector as a whole.

- **Networking and collaboration.** This theme includes a general idea of building professional networks in general, building networks with other businesses, or building networks with the educational community.

Center staff were asked to document the types and extent of industry's involvement in their Centers. Industry involvement shown below (Figure 2) includes time working on the Center's advisory board or on another Center working group. (Industry involvement also involves other in-kind donations, contracting for customized training, and requesting research or consultation. However, due to turnover in leadership at two Centers in the fall at the same time that these data were being collected, it was not possible to obtain

consistent information from all four Centers for these other kinds of involvement during 2006-07.)

Overall, the number of firms and total hours of participation were down in 2007 compared to 2006. However, the number of firms on the Centers' advisory boards, and the estimated hours of time donated by their representatives, rose significantly from 626 total hours in 2006 to 1,660 hours in 2007. This is partly due to the fact that the advisory board for 360° did not begin regular meetings until 2006-07. The overall drop in hours and firms involved for the second year can be expected, as the development phase of the Centers would call for more intensive working group participation during the formation of the Centers. See figure 2 for hours and firms by Center.

2. Industry involvement, 2006-07: Number of firms and types of involvement

		360°	MNCEME	CSITS	Health Force	TOTAL
Center Advisory Board (including subcommittees)	Number of firms (Number of hours)	11 (509)	27 (785)	15 (280)	4 (86)	68 (1,660)
Other Center working group(s)	Number of firms (Number of hours)	27 (377)	12 (131)	46 (1,168)	64 (860)	137 (2,405
Total firms (unduplicated)	***Number of firms***	30	37	48	Unknown	**105+**

Source: Reports prepared by Center directors with assistance from associated department and college representatives; calculations by Wilder Research.

While each Center has an industry advisory board, the boards have somewhat different roles in the different Centers, and these may involve different amounts of time, types of effort, and types of relationship-building.

- HealthForce operates with a shared leadership model, including industry partners and academic institution partners as equals in the Executive Alliance for executive-level guidance and the Design Team for operational discussions and recommendations. All project work groups also include healthcare professionals together with educators.

- CSITS has a separate Board of Advisors, but after initial advice was given this group has not felt the need to continue to meet with equal frequency while the academic partners do the work to implement what the Board advised. However, the Center has involved business representatives – some on the Board of Advisors, and many other who are not – as members of project teams, including a "Board of Activists" to help plan and implement their Open Source initiative.

- MNCEME also has an industry advisory board, but after it identified three areas of strategic interest for the Center, it formed sub-committees to help identify the issues

and implementation strategies and help carry them out. These areas of interest are Customized Training, Pipeline, and Advanced Technologies and Industry Partner Research and Development.

- At 360°, the industry representatives' Advisory Council is slightly broader in representation, and also includes representatives of the Governor's Workforce Development Council (the state-wide workforce policy board) and the Department of Employment and Economic Development.

There is no one of these models that could be pointed to as a "best practice" for other Centers to adopt. Each reflects individual local history and conditions, different needs of different industry sectors, and different strategic emphases embodied in the original proposals. For example, 360° has adopted, as its first and most immediate goal, the recruitment of more students and creation of seamless career pathways to help more of them achieve credentials quickly and efficiently, whereas HealthForce's main emphasis is transforming how healthcare is delivered to patients. MNCEME and CSITS are in between these two in their priorities, which include a mix of increasing enrollments and applied research to help industry forecast and adapt to rapidly changing technology. These different goals require different strategies and time frames.

These differences may also help to explain the wide range of viewpoints on the kinds of value that business representatives report they get from participation. In the survey, respondents were asked, "What one thing most makes you feel that it's worth your time and effort to participate in the Center?" In their open-ended answers, the most common theme was one relating to networking (20% of those surveyed). Examples of how this theme is thought about can be seen in the comments made by industry executives during two different Center site visits:

> I am able to get outside of where I was at, into other [industry] settings and other colleges. It is exciting to hear about what is happening elsewhere.
>
> We are making connections with other industries, on shared issues. I see this as a big benefit. We're exchanging technical information, and talking about joint ventures.

Next most often mentioned were improving the workforce (18%), being involved (17%), taking part in opportunities offered by the Center (14%), and improving awareness of the field (12%).

Other indications of what motivates business representatives to participate may be found in their answers to the survey question, "What one thing most makes the Center uniquely different from any other entity?" Here, the "networking" theme is echoed in the most

common theme among the open-ended answers, which was collaboration between education partners and industry (24%), followed closely by collaboration and partnership in general (17%). Other unique features of the Centers, in business representatives' views, were their ability to work outside of the norm or without the usual restrictions (15%) and the collaboration among the educational institutions (14%).

One other factor that Centers are citing in their outreach efforts, and which industry representatives report to be an attractive feature, is the Centers' openness and responsiveness to business input. In a statement representative of others from the site visits and surveys, one executive reported:

> What's great about the program [i.e., Center] is that they don't *start* with an existing program and assume it's right [for what we need], but rather assess the situation, ask us about our needs, and *develop* what's right.

Once industry representatives are involved, Center staff report that it is important to bring them genuinely "into the kitchen," – that is, make sure they have genuine input into answering key questions about the Center and also in setting the agenda for what questions will be asked. Once advice is given, it is also important to show progress quickly. These considerations help ensure that those who were initially involved remain engaged. Other ways to keep industry engaged, and convinced of the value of their participation, are to have joint meetings together with academic representatives, to ensure that they know they are being heard; and to include education partners on industry board committees, to ensure that business representatives' ideas can be refined with the help of staff who know what kinds of activities will be feasible.

Outcomes expected

The most important outcomes that business expect from the Centers are those that will meet their expected or current workforce needs. Of the stakeholders surveyed in fall 2007, 70 percent expect a change in their own firm's need for workers in the Center's field within the coming five years. Half (48%) can provide a numerical estimate for how much the numbers needed are likely to change, and another 29 percent know it will increase but cannot say by how much. In addition, 29 percent report that a higher proportion of their workers will require a credential, and 15 percent report that their workers will need more sophisticated skills. (Detail tables for this and other survey items are included in the Appendix.)

For the potential benefits mentioned above, the survey asked each respondent to rate how likely they thought the Center was to achieve it, and to say how what they considered the most likely time frame to begin to see results. Their answers to these questions are

summarized in Figure 3 below. After each potential benefit (listed according to the percentage of respondents who considered each critical or very important), the first column shows the percentage who considered this benefit "very likely," and the second shows the percentage who considered it "likely" or "very likely." The third column shows the time frame (in years) that the largest number of respondents considered an adequate amount of time to expect this benefit to take place, and the last column shows the percentage who thought that three years or less was an adequate amount of time.

3. For each potential benefit of the Center, proportion of respondents who regard it as likely; most commonly expected time frame for seeing change; and percent of respondents who expect change within the first three years (N=66)

Potential benefit of the Center	Consider it very likely	Consider it somewhat or very likely	Most common time frame (in years)	Percent within first three years
Better qualified or educated pool of employees available to employers	56%	99%	3-5	44%
Increase in the number of employees available to employers	44%	94%	3-5	43%
Opportunities for industry to influence college curriculum	44%	88%	1-3	56%
Upgrade skills of workers currently in the industry	37%	92%	1-3	61%
A more diverse pool of qualified employees	29%	87%	3-5	36%
Better information to make projections and preparations for future business strategies	18%	78%	1-3	52%
Applied research to advance the field and provide new industry practice	28%	86%	3-5	34%
Networking opportunities with industry peers	63%	94%	<1	50%
Opportunities for industry to interact or become familiar with the work of K-12 schools	26%	85%	1-3	67%

Source: Wilder Research, telephone survey of business representatives, fall 2007.

The percentages shown above are for the four Centers combined. (A fully detailed table showing each Center is in the Appendix.) There are many possible reasons for Center to Center variations. These are likely to include differences in the Centers' industry focus, academic and business partners' priorities, resources, strategies for implementation, and likely many others as well. For example:

- MNCEME and CSITS representatives are most likely to report that "Applied research to advance the field" is very likely (33% each). It is reasonable to see this as an

indication of a level of responsiveness by these Centers to their industry advisors' greater interest in this activity.

- HealthForce representatives are the most likely to report that "Opportunities for industry to interact with K-12" are very likely. This rating likely reflects the multi-sectoral membership of the Center's working groups.

- 360° representatives are the most likely to report that "Upgrade skills of workers currently in the industry" is very likely. Other sources of information did not indicate that customized training was a primary focus of this Center's current activities, so this rating may be more indicative of a general sense of confidence in the Center and its prospects for success.

- 360° and CSITS received "very likely" ratings on more of the possible outcomes than did the other Centers. The survey was conducted in the fall, when both MNCEME and HealthForce were experiencing changes in leadership. Such transition times tend to create uncertainties that affect stakeholder confidence, at least temporarily. Since we have no comparison of perceptions from other points in time, we cannot know how much these ratings may simply reflect such a temporary reaction.

To identify what business consider likely outcomes within the first three years of Center operations (the period that falls within the evaluation time frame), the survey asked, for each outcomes that a respondent expected, "What would you consider an adequate amount of time to expect this benefit to take place?" Those that were expected within three or fewer years, by at least half of respondents, were: opportunities for industry to interact with or become familiar with the work of K-12 schools (67%), upgrade skills of workers currently in the industry (61%), opportunities for industry to influence the college curriculum (56%), better information to make projections and preparation for future business strategies (52%); and networking opportunities with industry peers (50%). The two most critical outcomes (better qualified pool, and increased numbers of available workers) were most often expected to occur within a three-to-five-year window.

Customized training

The preparation of increased numbers, and better-skilled, potential employees takes place mainly through the activities of the education partners, through courses and the other components of academic programs. While business is involved in advising Centers on how to accomplish these goals, it is the work of the affiliated academic programs to see that they are accomplished – although this may often involve business as guest presenters for course components, hosts for interns, or in other ways. By contrast, customized training is typically offered outside of the for-credit academic context, and with

significant participation by the employer who arranges for it and usually pays all or most of the cost for it.

All four of the Centers are exploring ways to better coordinate the customized training activities of their partner institutions. Because customized training is a source of revenue for the partner institutions, it is easy for Centers to be seen as threatening competitors, so the approach to this area has been mostly cautious.

At 360°, the emphasis in 2007 has been on the for-credit career pathways, with customized training activities a matter for future work. As at the other Centers, it is agreed that when the Center does become more involved, it must not supplant or compete with any of the existing customized training activities of its partner institutions.

At each of the other Centers, 2007 saw considerable progress in identifying ways in which the partner institutions could work collaboratively to enhance the opportunities and offerings of each. Each is also working on developing a revenue sharing model in which cooperatively-offered programming can split revenues among the partners.

A challenge to the Centers' efforts to coordinate customized training is the fact that the Center itself is not a legal entity and can not directly receive any share of revenues, even when it uses its own resources to promote the cooperation that makes expanded offerings possible. These promotional activities have included convening all partners to identify current offerings; developing understandings among partners on how they could work together to increase the total number of offerings (and provide better, more flexible service to customer businesses) rather than competing with each other; setting up and coordinating a centralized information point for interested businesses and referring them to the resource that could best meet their needs; and developing brochures and marketing materials.

In some cases, the work of identifying needs and opportunities has been done through Center staff convening the customized training representatives from each partner institution. At MNCEME, a board of advisors subcommittee took the lead in assessing needs and interest, in part because the board's interest in customized training was focused mainly on relatively advanced professional development on the seven disruptive technologies (that is, technologies that disrupt the equilibrium of the market and hence the firm's own base operations).[1] When they were invited to be part of the process, the regular customized training representatives welcomed the opportunity, because it "tapped into a strong readiness for the Center to help coordinate" the work of the separate

[1] The seven disruptive technologies identified the National Council for Advanced Manufacturing are: sensors; micro and nanofabrication; modeling and simulation; reconfigurable tools and systems; smart systems; solid free-form fabrication; and visualization, planning and knowledge management.

institutions. The Center has developed a web-based tool listing all available customized training offerings, to help industry customers find what they need more easily.

At MNCEME, according to the industry subcommittee (and its educator partners), part of the vision for the work of the Center is to "Elevate customized training's voice at the higher education table to capture nontraditional needs in the formulation of funding and programs." Giving a higher priority to noncredit and nontraditional education, through customized training, is also very consistent with MNCEME's high priority on recruiting and supporting more diverse students to become engineers and technicians. If it can be realized, this goal has the potential to introduce significant innovation to the Center's partners.

At HealthForce, many of the projects funded by the Center have focused on innovative ways to deliver instruction to current workers through nontraditional schedules, sites, and instructional methods. Most of these have been for-credit offerings, but some non-credit offerings have also been developed.

Some Centers' goals for customized training are to eventually expand the coordination and "one-stop shopping" option for businesses interested in customized training so that it includes all MnSCU institutions statewide.

Applied research

Another form of service to industry that is separate from the usual for-credit courses and degree programs is the provision of applied research. Only 15 percent of business representatives said that this potential Center benefit was critical (compared to 67% for increased number of potential employees, and 55% for a better qualified pool of potential employees). However, another 37 percent see it as very important. Interest in applied research is particularly high among MNCEME business representatives, 73 percent of whom see it as very important or critical (compared to 44 to 47% at other Centers). However, even at MNCEME interest in applied research is not as high as that in more, and more qualified, potential employees.

At both MNCEME and HealthForce, Center representatives (both academic and industry) reported during the evaluators' site visits that applied research had a role to play that was closely related to workforce issues:

> If fewer workers are available, we must address productivity instead through technological advances. – Center director, MNCEME

> We have learned that we can't train enough new workers to solve our problems, so we must design new ways to organize the work, and retrain the workforce to do things in new ways. – Industry executive, HealthForce

However, forecasting future workplace organization and technology is a harder task than expanding programs to train workers to do what they are already doing. Both Centers are attempting to do this by joint, collaborative planning involving academics and industry representatives together. At HealthForce, typically only one or two main, local healthcare partners have been partners in and beneficiaries of the planning through 2007, although a new enterprise (the Healthcare Leadership Cooperative) has been launched to offer consultation on demand to any individual healthcare provider who wishes to contract for its services to help them find better ways to develop and retain their current workforce. At MNCEME, the Center sees its role as a confidential broker that not only helps individual firms, but is also able to connect firms to each other when they feel that their issues are similar enough that they would benefit from working on them together. As part of its business outreach effort, MNCEME is using the slogan "You have needs. We have answers." to solicit business interest in applied research services.

CSITS is also working on developing its role as a provider of applied research. Like MNCEME, it is finding it a challenge to identify businesses that feel they have a need for these services.

Evidence of progress to date

All Centers report considerable progress in development of new relationships with business and industry. Some have also developed additional relationships with representatives from the public sector and other intermediary organizations. Many of these are with businesses that have not previously worked with Minnesota State Colleges or Universities. Of the respondents to the business survey, 38 percent reported that their business had not been involved with any of the Center's academic partners before the Center was formed. By far the most entirely new businesses were associated with CSITS (87% of their respondents), and fewer were with MNCEME (33% new), HealthForce (18%) or 360° (14%). For the most part, new relationships are with individual businesses. Several Directors have had opportunities to address large numbers of business representatives at industry gatherings, but there appear to be few significant new relationships yet at the sector-wide level.

Center directors report that the new and deeper relationships with business have resulted in better understanding of industry's labor needs. One (HealthForce) reports that the joint work of academics and business representatives has allowed them to shift into a new way of thinking about healthcare delivery issues and new kinds of solutions.

Business representatives confirm a largely positive perception of Center progress. Two-thirds (67%) of those surveyed report that their Center has made adequate progress to date. These percentages are highest at CSITS (78%) and 360° (73%), compared to HealthForce (67%) and MNCEME (47%). Although increases in numbers or qualifications of students are not expected this early, most business partners appear to be satisfied that the needed work is being done to lay the groundwork for these to happen.

Certain kinds of more immediate benefits are already reported. Those most commonly mentioned by business representatives are:

- **Access to Center resources.** These include grants for projects or training; use of Center equipment; use of Center space or facilities; and others.
- **Increased awareness of their business or of the industry.** These have occurred through Center advertising efforts, or the Center's use or mention of their products.
- **Networking** with others in education and industry.

There are also some indications that the Centers may be having ripple effects on how businesses operate. For example, one of HealthForce's funded projects, Lean in Healthcare, is reported to have resulted in significantly reduced turnover among its new CNAs (Certified Nursing Assistants). Trainings being offered through MNCEME partners are also affecting workplace practices, by helping manufacturing supervisors learn ways to change corporate culture to boost productivity.

There are a few other changes that show new forms of business-to-business partnership in response to the Center's influence. For example, a WorkForce Investment Board representative on the 360° Director's Council reported that their Board has been inspired by the Center's emphasis on sectoral pathways and is taking steps to reorganize itself along sectoral lines as well. In addition, CSITS is helping to convene industry representatives into user groups that can support and strengthen each others' ways of making the most of their information technology. These ripple effects on business were not looked for in the initial RFP or anticipated in the logic model. However, they may be leading indicators of larger changes in industry. Just as partnership among otherwise competitive academic institutions is allowing the participating colleges and universities to leverage each others' strengths and resources, these new inter-business relationships may help businesses leverage each others' strengths and enable them to take more advantage of the benefits that can be gained from the existence of the Centers.

The Appendix to this report includes additional detailed tables of business survey results, including information about the firms represented by the respondents.

Pipeline development: Partnership with K-12 education and other outreach efforts to promote enrollment

Information for this section of the report is mainly derived from documents and site visits. Unlike business partnerships, this area was not a primary focus of 2007 evaluation efforts.

The Request for Proposals specifically required Centers to include "Connections to PK-12 education that create a pipeline of students and address student readiness" and a "Commitment to non-traditional students including lifelong learners and underrepresented student populations."

To date, this work has mainly included components to affect K-12 students during their regular school day and year, and components to reach K-12 students during their out-of-school time. There have also been some activities to interest adult learners in the Centers' fields, and other, more general, marketing campaigns for the public at large.

Types of K-12 participation

Classroom instruction and other in-school experiences

For their work with K-12 education directly, MNCEME and 360° have partnered with – and significantly expanded – Minnesota activities of Project Lead The Way (PLTW). This is a national, privately-funded project to promote advanced technical education in middle and high schools. Both Centers have helped fund staff to work with schools on its adoption and implementation, and have helped to greatly expand the number of high schools participating from 78 in 2006 to 130 in 2007. MNCEME has been certified by PLTW as a training site and has begun training high school teachers to be PLTW instructors. Project Lead The Way has been shown to have the dual effect of increasing students' awareness and interest in technological fields and increasing their level of preparation for higher education study in these fields.

Both Centers report increased levels of student interest as a result of their investment in PLTW. However, in the context of state and federal educational requirements centering on specific kinds of tests, high schools and middle schools have limited time in their curriculum for electives. Furthermore, the equipment needed to support the PLTW curriculum can be expensive, especially for smaller and rural school districts, many of which are short of funding already and being forced to reduce the number of classes offered.

In addition to its PLTW activities, 360° has developed packets of information for high school teachers and counselors, and has marketed these statewide.

HealthForce has undertaken a number of specific projects. Most of these have been in partnership with Rochester area schools, although they plan to expand the scope of this activity. Some of these have involved training high school teachers and counselors on awareness of healthcare careers and the importance of healthcare education. In partnership with the Healthcare Education Industry Partnership (HEIP), the Center has also hired staff to write curriculum to be included in high school courses.

CSITS has partnered with the Saint Paul Public Schools, but conducts most of its K-12 activities outside of the regular school day. However, Minneapolis Community and Technical College is developing curriculum and instruction for content that can be embedded in the high school curriculum, through training of high school teachers. They will build on strong existing relationships with the Minneapolis Public Schools to introduce this when it is ready. Because of the difficulty of adding new courses to an already crowded curriculum, this curriculum is designed to be integrated into existing classes. The Center has also developed new relationships with other K-12 groups that were not involved with any of its partners prior to the Center's existence.

Post-secondary enrollment options (PSEO) and dual high school-college credit

Both 360° and MNCEME include institutions with pre-existing "career academy" high schools associated with two-year colleges: St. Cloud Technical College's Discovery Academy (360°) and Anoka Community College's STEP program (MNCEME). Both of these offer high school courses on the college campus, and offer simultaneous college credit for selected offerings. Both Centers are working with their academic partners to replicate these at other institutions.

CSITS also offers college-level work to high school students, but avoids some of the administrative difficulties of dual enrollment by offering it through an after-school "Tech Academy" and providing college credit later through examination.

One of the projects supported by HealthForce has recruited 20 high school students from demographic groups that are less likely to go on to post-secondary education and has offered them an accelerated dual-enrollment program. In two years after high school graduation, they will receive a two-year degree, and in just one more year they will receive a baccalaureate. The program was piloted with a group of Rochester students, but now that the curriculum – and the associated support services – have been developed, the program can be replicated anywhere in the state.

Out-of-school experiences

In addition to pipeline development offerings in partnership with regular K-12 schools and school districts, the Centers have all developed or expanded on out-of-school time offerings such as summer camps, competitions and information fairs, and after-school activities. These include:

- 360° sponsored 12 Tech Week and Tech Day events (day camps), up from 5 in 2006; coordinated activities to promote high school student tours of industries, by setting up a data base to allow teachers to readily see what is available, and helping fund transportation costs; and is developing "virtual tours" to bring industry into classrooms by video.

- MNCEME co-sponsored a science fair; participated in the statewide STEM fair and helped organize a regional STEM fair; organized a Rube Goldberg competition; and helped academic partners replicate Itasca Community College's highly successful summer engineering camp for middle school and high school students.

- CSITS offered its Tech Academy as an after-school activity; sponsored a summer math academy for Saint Paul middle school girls, with follow-up meetings during the year after; sponsored "Computer Geek U" for high school students at the East Metro Opportunities Investment Center (OIC); and sponsored campus tours for high school students.

- HeathForce offered 3-day MedCamps (health career day camps) for middle school students, a health careers awareness program for young, diverse students in an after-school program, and participated in a multi-day Career Fair for Winona High School students.

360° and MNCEME report high levels of interest and participation in their summer camps. CSITS, which focused its camps on minority students, reported more challenges with recruitment. In its 2008 programs, CSITS will address this by offering an adaptation of its afterschool Tech Academy through a partnership with Boys and Girls Clubs, which work directly with this population.

The original design for Centers called for "a strong industry, K-12, and college and university partnership." However, it is clear that the industry and higher education roles in such a partnership were expected to be stronger than the K-12 roles, and that pattern is reflected in implementation. Nevertheless, a variety of Center stakeholders report that there is value in having industry representatives directly interacting with K-12 representatives, and that the Centers have increased these kinds of interactions. During the MNCEME site visit, industry representatives indicated an interest in finding ways to

involve K-12 partners as more active partners, in contrast to their current role as more passive recipients of Center invitations and offerings.

Other kinds of student recruitment activities

Recruitment and support of diverse or non-traditional learners

The examples cited above show efforts not only to increase the number of students entering Center programs and the workforce, but also the diversity of those students. Three-quarters (73%) of business representatives said that greater diversity of employees was very important or critical. When asked about the kinds of diversity in which they were interested, just over half (54%) said that racial, ethnic, and/or cultural diversity was an interest, and 23 percent were interested in gender diversity. In addition, half (50%) mentioned diversity of background, experiences, skills, and/or education. (Respondents could give more than one answer.)

HealthForce has had several projects that have reached out to minority and immigrant groups, including some to help support and retain them once they have entered higher education. These include not only efforts to recruit diverse high school students, but also (beginning in 2008) efforts to create a bridge program to help adult learners to prepare for and access higher education programs. CSITS has targeted its Tech Academy camps toward girls and minority students. MNCEME has convened a Women's Round Table to explore ways to recruit and support women in the field. MNCEME has also worked directly with the university's student professional societies for women and African Americans to support them and to explore ways to add chapters at the Center's associated two-year institutions, with the four-year student members as mentors for their two-year peers.

General marketing of the field and/or the Center

In addition to promotion of interest among current K-12 students, Centers have worked on a variety of more broad awareness and marketing efforts.

The different Centers face different challenges in stimulating interest in their respective industries. The general public perception about information technology is that jobs have evaporated or been moved offshore, whereas in fact, the projected job growth in these fields is large. For applied engineering and manufacturing, there are two perceptions to combat: first, that the field is dirty, dangerous, and/or boring; and second, that there are few jobs and little career mobility. As one 360° faculty member said:

> It's hard to get dad to shell out $30,000 [for tuition for a manufacturing degree] to train for an industry that just laid dad off.

Center marketing materials provide rebuttals for these perceptions.

360° developed a branding and marketing campaign, launched a newly-designed web site, and advertised the Center in billboards, radio, and print media. They have also worked with representatives of the National Association of Manufacturers to secure industry funding to develop Minnesota participation in NAM's "Dream It Do It" marketing campaign to promote the image of modern manufacturing as a dynamic, attractive field with excellent career potential. The Office of the Chancellor is helping to coordinate discussions with MNCEME to explore statewide participation in this campaign.

CSITS, with Minnesota Online funding, is developing web-based learning objects to introduce users to information technology careers, which will be suitable not only for high school students, teachers, and guidance counselors, but also WorkForce Center staff and customers.

HealthForce faces a different kind of public perception challenge. It is well known that there is a shortage of healthcare workers, including at well-paid levels such as Registered Nurses. However, at the lower-skilled entry levels such as Certified Nursing Assistant (CNA), the job can be less attractive than some first-time employees expect, leading to high turnover rates. In response, the Center has helped in the development of a number of mobile simulation labs that can take high-interest introductions to healthcare careers to a variety of locations, including not only high schools and middle schools but also healthcare and community settings. While encouraging people to consider careers in the field, the simulation also allows realistic views of what those careers would be like, helping to prevent people from going through the training only to regret it later.

As these examples illustrate, the Centers are beginning to reach out not only to public education partners but also to organizations such as WorkForce Centers that serve adults already in the workforce. Since 65 percent of the people who will be in the workforce in 2025 are already in it – and the number of current adults who have less than a two-year degree outnumbers all expected high school graduates for the next 18 years – outreach in this direction has much to offer in the way of increased enrollments and future workers. However, the needs of such learners for academic preparation and support while enrolled are often very different from those of traditional 18- to 22-year olds. It is therefore understandable that the Centers may wish to be deliberate in expanding activities in this direction until others are well institutionalized.

The variety of recruitment activities can be challenging for Centers, and each handles the organization and coordination in a different way. HealthForce projects are independently proposed by healthcare–academic work teams, and selected for funding based on their fit with the Center's priorities. At MNCEME, the Industry Advisory Board has a Pipeline

subcommittee that sets priorities and oversees the work. At CSITS, outreach to prospective students is organized by a Center staff member, in cooperation with the partner institutions. At 360°, each college organizes its own recruitment, but it is done in the context of the Center's extensive work to develop and market both the overall Center and the field of manufacturing, and also the more specific Seamless Career Pathways model (which will be described in more detail below). At the two more decentralized Centers (MNCEME and HealthForce) there appears to be some perception that it would be beneficial to have more coordination of the work.

Impact on student enrollments

All four Centers are confident that their efforts will increase enrollments, and two (360° and CSITS), based on feedback from faculty, report that these increases were starting to be evident in certain courses and programs by fall 2007.

Challenges to this work include the expensive nature of healthcare and technologically-concentrated engineering programs, which give institutions disincentives to increase the numbers of expensive course sections.

Nevertheless, it is expected that the partnership with K-12 and other outreach work will increase the numbers of students entering programs associated with the Centers. It is also expected to increase the level of qualification of those students, and increase the diversity of those students. Each of these considerations is interrelated. Historical patterns have contributed to depressed numbers and skills of minority group members attending higher education. Programs that seek to rapidly increase numbers of students may find it difficult to incorporate support features to ensure that traditionally underrepresented groups are included or receive the different kinds of support that are most helpful to them. It is a significant challenge for Centers to seek to simultaneously increase all three of these measures.

Partnership among higher education institutions

Partnerships among Minnesota State Colleges and Universities are at the heart of each Center of Excellence. On the one hand, partnerships with industry allow Centers to be aware of industry needs and identify opportunities for students, and partnerships with K-12 organizations help Centers recruit potential students. On the other hand, partnerships among the higher education institutions is how Centers are able to accomplish the objectives of leveraging program strengths and resources and providing adaptive and innovative educational approaches to meet industry needs.

This section describes Center work with academic partners during 2007. The main data sources for the section are site visit notes, observations from other meetings, and analysis of a variety of documents including annual reports, informational materials for business partners and students, and other material on Center web sites.

Role of academic partners in the Center

Although Centers are expected to promote innovations in recruitment, programs, and articulation, Centers do not themselves have any control over admissions, instruction, program approval, or award of degrees. They also lack legal standing to receive and control funding. They depend on the partner universities and colleges to carry out all of these, and other traditional academic functions. Centers vary in the extent to which the college and university administration are involved, the kind and amount of faculty involvement, and the extent to which the administrators of the lead university exercise control or delegate it to committees made up of representatives of all the academic partners.

In addition to each institution's geographic area of interest, the different kinds of institutions have different educational missions. While each institution has a unique mission, some generalizations apply. Community colleges offer pre-baccalaureate general academic programs of study as well as occupational programs in which all credits will transfer toward a four-year baccalaureate. Technical colleges offer preparation for skilled occupations that do not require a baccalaureate degree; unlike community colleges, they do not guarantee that credits earned in such programs are transferable toward a four-year degree. State universities, which offer four-year and graduate degrees, take pride in the placement of graduates in jobs in related career fields, but have a wider educational mission beyond just job preparation.

These different kinds of missions give the different academic partners a variety of reasons for participating in the Centers, and a variety of strengths they can contribute as well as risks they must accept in return for participation. Such risks include the potential need to change familiar and tested ways of controlling academic standards, or changing how grant funds or customized training contracts are sought and shared.

As is true for partnerships with other kinds of Center partners, stakeholders have found that important components of effective collaborative participation include:

- Promoting the Center and its work among each institution's own internal and external networks.

- Ensuring that each institution's needs and expectations are clearly articulated, and bringing creative ideas for how those can be collaboratively met in the shared context of the Center.

- Ensuring that top decision-making representatives of each organization are kept informed of the Center's work and bring innovative ideas and resources to it.

- Ensuring that operational-level members of each organization are kept aware of the Center and how it may affect their work, and have opportunities to participate.

Faculty role

Involvement of faculty (not just administrators) in Center activities helps to ensure that insights and needs of industry are moved closer to the student level. This is where there are the strongest opportunities to continue to strengthen courses and programs, and spark practical thinking about ways to best serve students. In addition, connections among faculty across institutions help to spread innovation and best practices and, potentially, a sense of common purpose.

During 2007, each of the Centers has involved faculty of their partner institutions. HealthForce continues to include faculty as partners with industry (and sometimes K-12) representatives on each of their Center-funded projects, and other Centers have also involved faculty as individuals or small groups in specific projects. In addition, 360°, MNCEME, and CSITS have each convened one or more large-scale, cross-institutional faculty retreats or summits to discuss curriculum and programs and explore opportunities for articulation. Center directors report that these gatherings were very productive.

Even at Centers where faculty have been most significantly involved, directors report that the involvement to date includes a minority of faculty in the Center-affiliated programs. For those who do become involved, participation offers a variety of benefits, including opportunities to develop new programs, acquire new or upgraded equipment or software, and recruit more students to their programs and courses. In addition, directors report that faculty found the cross-institutional gatherings energizing, and were able to exchange a variety of tips and knowledge "even down to the classroom level" with ideas for how to present material.

Consistently, Center directors report that participation by faculty is restricted by their limited availability of time. This is an issue that faculty also share with administrators. While Centers have been able to use Center funds to pay for release time, this solution is not always possible because often "there is no time left to buy." In addition, for any lengthy project that requires release from course responsibilities, the advance notice

needed for departments to arrange for alternate staffing can be a longer lead time than is practical for a Center that has flexibility and responsiveness as part of its mission.

It is hoped that Centers can help spark innovations not only in what courses are offered, but also in instructional methods, especially for more flexible, extended and on-line learning. To date, faculty have expressed little interest in receiving professional development on these topics. However, the exchange of ideas at the cross-institutional gatherings suggests that this is not due to a lack of interest in strengthening instructional practices. It is possible that opportunities for such development will be welcomed when they are connected to specific occasions for which they will be needed (such as when particular new on-line courses are under development), or when the sharing of knowledge is among peers rather than from a trainer brought in from outside or arranged by the institution or department.

Equipment and facilities

One of the most immediate changes created by the Centers has been a significant investment in new or upgraded equipment and facilities. This was a major use of Center funds during 2006, and it has continued during 2007, sometimes as a match for college or industry resources. As both directors and industry representatives point out, the more up-to-date equipment and facilities have in turn strengthened both individual courses and entire programs. To cite just a single but representative example, a new state-of-the-art industrial automation lab at Minnesota State University, Mankato (part of MNCEME) allows students at all levels of study to learn skills in several advanced technology areas, including sensors, modeling and simulation, reconfigurable tools, fabrication, and planning. Advanced students are able to use the equipment to create capstone projects in which they design new applications with industries that employ automation systems.

Several programs with upgraded equipment report increased enrollments. Improved facilities have also allowed programs to do more outreach to potential students, either by featuring them in campus tours or using them as settings for sponsored camps and activities. The upgraded equipment and facilities have benefited not only the students enrolled in Center-affiliated programs, but also a wider pool of students, through improvements in curriculum and instruction, and sometimes entirely new programs.

New courses

Many new courses have been developed and offered in departments and programs associated with the Centers. Except at HealthForce, where some of the Center's grant funds have been used to develop courses, different people can have different opinions on the extent to which the Centers are responsible for their development.

A non-exhaustive summary of new course activity is shown below. This is based on a variety of print and interview sources, none of which was primarily intended to produce a definitive list of new courses. It should be considered reasonably representative, but not complete.

- CSITS has developed six new IP (Internet Protocol) Telephony courses that are thought to be unique in the U.S. These will be available for offering through customized training or as part of a certificate or A.A.S. program. In addition to availability through the CSITS academic partners, the courses will also be commercially marketed, making them available (after instructors receive training) by other institutions wishing to adopt them.

- MNCEME, through its lead university Minnesota State University, Mankato, is exploring remote delivery of upper division courses in the Northeast Higher Education District. Additionally, Alexandria Technical College is developing 13 new courses in science and mathematics. New content has also been added to existing courses, especially where laboratory and simulation facilities have been strengthened.

- HealthForce grant funds supported the development of 28 new for-credit courses in critical care nursing, computer science and biology, and nursing assistant training. Additional non-credit offerings were also developed, some in partnership with the local WorkForce Center.

- In the development of new courses as well as programs, 360° has worked on streamlining program and curriculum development to respond quickly as the need becomes evident.

The development of new courses can be more time-consuming than either the industry or academic partners wish. In trying to meet the Center goal of being flexible and responsive, some Centers report that they are able to shorten the timeline for new course development by building on already existing courses. Existing courses can also be "harvested" and re-packaged for industry as customized training. By coordinating this process across multiple institutions, Centers are able to leverage existing resources better than any individual institution could do on its own.

New programs

As with new courses, new credential programs are also developed by departments, so it is again difficult to attribute their creation to the Centers. However, all four Centers have been involved in the development of new programs, including the following:

- 360°: At Bemidji State University, a new Engineering Technology B.S. program and a new Applied Engineering B.A.S program. At Central Lakes College, a new Applied Engineering Technology A.A.S. program (approved in 2007, to start in the fall of 2008).

- CSITS: At Metropolitan State University, a new Risk Management/Information Security on-line graduate certificate program (approved in 2007, started January 2008). At Inver Hills Community College, a new IP Telephony certificate program and concentration within an A.A.S. program (started before the Center was formed, but speeded up with help from the Center).

- MNCEME: At South Central College, a new two-year program in Civil Technology.

- HealthForce helped support the development of a new shared doctorate in Nursing Practice, which will be jointly offered by Winona State University, Minnesota State University, Mankato, Metropolitan State University, and Moorhead State University.

Several more new programs are currently in development or pending approval. These include more on-line certificate programs at Minneapolis Community and Technical College, as part of CSITS; two-year Mechatronics programs at South Central College, Hennepin Technical College, and Anoka Technical College, as part of MNCEME; and a new Clinical Laboratory Science program with HealthForce support, in partnership with the University of Minnesota Center for Allied Health. In addition, 360° will be identifying existing programs within its career pathways model that would have the potential for new certificates or specializations.

The Centers can be helpful in the development of new programs in some of the same ways as for the development of new courses, by facilitating the identification and sharing of good models among multiple institutions.

Compared to replicating or updating an existing program, a greater challenge is to be ahead of the trends and able to prepare appropriate education or training for newly emerging technologies or skill needs.

Articulation among programs

Better coordination among programs, to help students progress with minimal gaps or loss of credits, is of high interest to business stakeholders. Efforts during 2007 include (but are not limited to) the following:

- 360° has developed a Seamless Career Pathways model that links together all the programs that are associated with the Center, shows the credentials available for each

and the progressions that are possible from shorter and lower-level to upper-level programs, and the kinds of jobs and careers that are available for each. These are supported by a set of six Memorandums of Understanding among institutions that enable "block transfer" of courses with no loss of credit. The transfer agreements includes articulation with Project Lead The Way courses that can be taken in high school.

- CSITS: Articulations that have been developed include arrangement for college credit to be awarded by exam for Tech Academy work taken during high school, as well as a new articulation between an A.A.S. in Network Security at Inver Hills Community College to the Computer Information Systems program at Metropolitan State University. Although the program relationships have not been packaged in the same unified way as at 360°, CSITS has also developed a set of marketing materials for students that show progressions within each of five career areas, as well as projected job growth and salaries.

- MNCEME has established course equivalency tables between all the two-year partners and Minnesota State University, Mankato, to facilitate university admissions and transfer assessments. In addition, three articulation agreements have been approved from Anoka Technical College, Hennepin Technical College, and South Central College, two others are in the process of review, and arrangements for the recognition of high school Project Lead The Way courses are under development.

- HealthForce activities around program articulation relate to the shared programs in Nursing Practice and Clinical Laboratory Science (mentioned above), both of which include some academic institutions that are not otherwise involved in the Center. HealthForce is also currently developing articulation arrangements between Pine Technical College and Winona State University for a variety of science and health science programs that are in demand in rural areas.

Articulation efforts are based on a philosophy of "no dead ends" for students in Center-affiliated programs. The career pathways are intended to ensure that students can choose any of a number of different entry points and exit points, and that exits can always be understood to be temporary until the student re-enters to start the next level.

This philosophy is not always easy to apply in practice, given the different missions of the different kinds of institutions and programs in the Minnesota State Colleges and Universities system. For example, an A.A.S. (Associate of Applied Science) degree is intended as a highly hands-on program. It is excellent for preparing a student well and quickly for certain kinds of jobs that industry needs. It is not a good match for the first two years of a baccalaureate degree. However, a standard progression among students in

the three technical Centers is to enter a career after a two-year degree. If they return for a four-year degree it is usually later, and often with tuition reimbursement from their employers. Students and their employers are sometimes disappointed to discover that the efficiency of preparation for an immediate job does not necessarily provide as good a preparation for the credential required for a later, more skilled job.

Some forms of accreditation, especially those that are more prestigious, can also reduce programs' flexibility to give credit for work taken in other programs that did not have comparable accreditation. Articulation of programs involves the agreement that the earlier program meets all expected content and quality standards for the later program. Due diligence to ensure that these conditions are met requires considerable time from faculty and administrators. Furthermore, since courses and programs evolve, genuine "living" articulations can only be sustained through on-going relationships and communication following initial agreements.

360° has addressed articulation challenges in two ways that appear to be unique among the Centers. First, the creation of a Bachelor of Applied Science degree made available a four-year baccalaureate for which the applied two-year programs would be good preparation (unlike the more academically-oriented Bachelor of Science). In addition, the method by which the program articulations were arranged was based on memorandums of understanding rather than the more formal process for articulation agreements. In these memorandums of understanding, the faculty at Bemidji State University essentially agreed that even if not all prior credits met the prerequisites for the second half of the baccalaureate, they would be prepared to admit the students and work with them to help them address any gaps in their preparation.

Changes in how courses are delivered

All four Centers are working not only on the development of new courses and programs, but also changes in how instruction is made available. This includes more course sharing among institutions as well as more nontraditional instruction such as simulation, on-line learning, remote instruction using video technology, blended instruction combining on-site and remote components, mobile laboratory and simulation units, and flexible class times. Three Centers (CSITS, MNCEME, and HealthForce) have helped to develop mobile simulation, robotic, or laboratory units that can be taken to high school, industry, or community locations. MNCEME has also helped two partners develop joint robotic machine centers that can be linked together.

These developments serve several purposes. They will help introduce more potential students to the kinds of work that the Centers can help them prepare for. They also allow enrollment by more nontraditional students, including working professionals as well as

part-time students with families to care for, who would not usually be able to attend classes on campus during the daytimes. In addition, they allow more for-credit and non-credit customized instruction to be delivered at work sites.

Changes in student support and student opportunities

Initial expectations for the Centers include not only increasing student numbers but also increasing student diversity and improving connections among programs so that students could stay in programs longer and increase their movement upward through related programs.

Previous kinds and amounts of student advising and support, however well suited to the original mix of students, are likely to need some adjustment to meet the different needs of a more diverse student population with different programmatic expectations. So far, MNCEME and HealthForce appear to have the most developed plans for recruitment of more diverse students, and to have done the most to begin developing new and augmented support for them. By contrast, CSITS already has the most diverse student body, and may have less need for additional support.

MNCEME has been working closely with the pre-professional student organizations on the Minnesota State University, Mankato campus (American Society of Mechanical Engineers, American Society of Civil Engineers, National Society of Black Engineers, and Society of Women Engineers) and is exploring ways to expand these to the two-year partners. They have also identified a successful learning community model in place at Itasca Community College that they are working to replicate elsewhere among the Center partners, and plans in 2008 call for further identification of ways to develop support systems for previously under-represented student groups.

In its projects to recruit and retain nontraditional students, HealthForce has also included a cohort or learning community model. One of the key tasks undertaken by the Center's partner in the high school bridge program, Workforce Development Inc., is to be aware of and find solutions for students' support needs.

CSITS and 360° have devoted more of their efforts toward the development of print and web-based informational materials for students and prospective students. In addition to helping them be aware of the Center as a resource, these also spell out career and educational opportunities.

Other changes in student opportunities and experiences

A new student opportunity being offered by CSITS is student membership in the Center. This free service is open to any current or former IT student from any Minnesota state

college or university, and helps them learn about and access a variety of Center resources and activities, including career assessment, applied learning opportunities, on-line job postings and informational interviews. A web portal also allows student members to post resumes and employers to post job openings, and both groups to search for matches.

Several Centers have expressed an interest in increasing student opportunities for internships and other opportunities to apply their learning in real-world settings. In harmony with the strongly-expressed needs and priorities of industry partners, there has been less emphasis on this work to date than on development of courses and programs and student recruitment. However, some work has begun to explore ways of increasing these opportunities, especially at CSITS. One challenge that is likely to need resolution – which has also been described as a challenge in the development of applied research opportunities for faculty and students – is the proprietary nature of much of industry partners' work and/or the sensitivity of information technology work.

Another challenge more specific to the internship plans at CSITS is funding. The Center hopes to be able to place students as "community interns" in low-income communities or private or charter schools where information technology is being developed in order to bridge the "digital divide." Such organizations are less likely than most commercial settings to have funds to support such internships, so other funds will need to be sought, and there must be an entity that is able to assume the risk of being the employer of record for the intern. As is discussed later in this report, the Centers' lack of standing as legal entities currently restrict their ability to undertake either of these tasks.

Findings: Centers and their activities

The preceding sections have described activities carried out in various kinds of partnership, or through the work of those partners. This section describes the Centers as overall entities, and the activities that are (at least most commonly) carried out directly by Center staff or their governance bodies.

Sources of information for this section include discussions and observations at site visits and other meetings, Center and system documents and web sites, the survey of business representatives, and, secondarily, interviews with Center directors and Office of the Chancellor staff.

Center structure and governance

Centers differ somewhat from each other both in the formal chains of command between the Center director and the administration of the lead university, and also in the division of responsibilities and relationships among the academic and industry partners. Formal organization charts were available for three of the four Centers, but site visits, observations at other group events, and document reviews made it clear that informal relationship patterns within the Centers have at least as much influence on Center functioning as do the official, formal structures.

For the majority of 2007, each director reported to an academic administrator at the host university – a dean, provost, or vice president. (The current director of HealthForce now reports directly to the university president.) However, unlike a department or college with such a reporting relationship, a Center is not a legal entity. Among other implications, this means that Centers are not allowed to receive funds directly, either as a donation or as a share of increased tuition or earned revenue. Each Center has a governance structure that includes all its academic partners, but the directors officially report to the administration of the host four-year institutions, which are also ultimately accountable for Center funds. One result of this arrangement is that the host university administrations have the power, if they choose, to determine the amount of authority the Centers' governing bodies can exercise over those funds.

One of the most important functions of an organizational structure or governance model is to establish clear and effective accountability. From observations during site visits and other group gatherings, as well as document reviews, we were able to identify what appeared to be relatively consistent patterns of authority and accountability in the Centers. In MNCEME and HealthForce, in general, primary accountability for the Center appears to follow the formal lines of authority that link the director upward

through the host university's administrative structure, and the lead institution's academic partners appear to operate in a more consultative (rather than decision-making) role. In 360° and CSITS, it appears that the primary accountability for Center operations is more shared among the partners – mainly among academic partners, and to a lesser extent between academic and business partners. A representative of one of these academic partners reported that the development of this Center culture of mutual accountability was a key factor in helping the Center achieve its focus and ability to operate effectively:

> When we really began to be who we are was when we realized we were accountable to each other [for the Center funding], and decided *how* to account to each other for how it was disbursed and used … [without micromanaging each other]."

The director's role is one of leadership without formal authority. To accomplish the Centers' tasks, which depend so heavily on the actions of partners, the director must be the holder of a strong vision and able to communicate it so as to motivate partners to participate, take responsibility, and follow through. Stakeholders value the directors' role in creating a respectful team environment, and holding partners accountable and helping groups arrive at decisions. Communicating is vital: with Center staff, host university administration, and higher education, industry, and K-12 partners. Furthermore, the directors must also be the visible face of the Center, the person who goes outside of existing partners and helps make the Center known to the wider community. Finally, the director needs to simultaneously balance two critical, complementary abilities: to nurture and communicate the overall vision well to a variety of stakeholders (the strategic level); and to develop and manage the detailed, day-to-day tasks necessary to implement the vision (the tactical and managerial level).

One particular tension in the role of the director is between the value of being a knowledgeable insider, in order to understand and be effective within a large and complicated statewide system, versus the value of being an outsider, with new perspectives and experiences and contacts from other settings. The evidence to date does not clearly suggest that one of these is more important than the other.

One Center, HealthForce, focused in its first two years on a lean staffing model that relied on volunteers and a few consultants for most day-to-day tasks of the Center. This has now been found to limit the Center's ability to carry out its work, and the Center is now adding staff. Other Centers gradually hired staff starting in the first year, and most now have three or four in addition to the director. The hiring process (creating and posting new staff positions) has often been described as frustrating, owing to the Centers' lack of formal identity and the unique nature of the positions to be filled. However, evaluators heard fewer comments about this difficulty during 2007 – perhaps this is

because the process has become easier with experience, or perhaps because those involved have become accustomed to the difficulty and no longer comment about it.

In addition to the role of the director to motivate partners' activity, and the role of Center staff to coordinate and/or implement activity, Centers have shown other more formal strategies for prioritizing and encouraging collective action by the partners. One is through distribution of funds for jointly agreed-upon purposes, such as to upgrade equipment, develop courses, or organize events for industry, K-12 teachers or students, or other groups. HealthForce and CSITS appear to have done the most to combine grant-making, convening, and seeking of partners for collaborative projects, and in doing so appear to be emulating many of the functions of a foundation or workforce intermediary organization.

Creating and sustaining partnerships

Partnerships are an increasing common strategic response of many different kinds of organizations in the face of competitive pressures in a rapidly changing environment. Partnerships among entities with different specialties allows each entity to acquire newly-needed competencies by alliances instead of having to develop them internally. When conditions change again, new alliances can be formed. When they work, partnerships help all their members by allowing each to complement each other and benefit from each others' different strengths. Although this strategy avoids the necessity of developing all the partners' capacities in-house, it nevertheless requires each partner organization to develop entirely new skills for forming and maintaining partnerships.

The primary partnership formed by each of the Centers is that among the academic institutions. According to the business representatives surveyed, the Centers' coordination of activities across several campuses makes them uniquely different from individual Minnesota state colleges and universities, and is one of their main selling points for industry.

As described in the earlier section on partnerships among academic institutions, this work has been challenging at times, but has also produced significant successes. The main challenges reflect on-going "structural tensions." This is what one academic partner called the set of dynamics that exist between the different colleges and universities when they are part of the same overall system but have different roles and missions and a history of competing with each other. But as this representative observed, "That's why you need to create a Center. But don't overstate the difficulties, either – we're all still at the table. We've gotten things started."

In fact, a common theme among all four Centers is that once they feel they have the initial partnership figured out, they are likely to be interested in expanding to include more institutions. HealthForce has already added not only additional partners from within the state colleges and universities system, but also with parts of the University of Minnesota as well as some private colleges.

Just as the Centers see potential or current value in expanding their range of partnerships, so also do some of the component institutions. One two-year college that is part of more than one Center has been so satisfied with the benefits that their senior college leadership hope to form more partnerships in the coming five years, and feel that their experience with the Centers have helped them learn how to do that.

In discussions during the site visits, academic and industry partners both provided a number of lessons learned about what makes the partnerships work well.

- **Communication.** The first stage of partnership development was found to require considerable time in face-to-face meetings to enable the development of solid relationships. Once these were developed, it was then possible to switch to greater reliance on technology.

- **Stability.** This also promotes the necessary relationship building. "For a while, there was lots of coming and going [on the governance committee]. Then we decided on the need for stability, and that let us form relationships, which allowed us to develop trust – and that trust is what makes us effective."

- **The right mix of partners.** It is important that each partner be able to contribute something that is of value to the other partners, and that each partner be able to identify something of value that they gain from the group that they are not able to attain on their own. "People can see how they can advance their *own* programs through cooperation." In addition, stability of organizational partners helps. Once the relationship building has begun, most Centers feel that an initial period of stable membership is important before expanding.

- **A clear mission that is agreed by all.** This includes agreement on a single agenda (or set of strategic priorities), leadership that helps partners keep their focus on their shared goals, and discipline to select only activities that promote those goals and priorities. "It took time to figure out who 'we' were, and what we were supposed to do. Now we've developed a personality, a culture, and a direction. 'We' have been born. Now we are ready to show the world who we are."

- **Time, trust, and patience** to develop and practice new ways of operating. One industry representative reported that his Center's partnership was successful because the participating institutions "are allied, but not in each others' turf. No one's bull is being gored or market being overrun." However, "it takes time to build new ways of doing things, before you can change the old ways of doing things."

- **Spreading the involvement** both upward to policy-making and resource-controlling levels of participating organizations *and* outward to operational levels.

While heeding the advice above not to overstate the challenges, it is still helpful to understand where the "rubbing points" are so they can be addressed. These include:

- Accommodating to partners enough to obtain the advantage of collaboration, while still maintaining institutional identity (or integrity). In a summer workshop on partnership that featured a successful multi-state academic collaboration, guest presenters described how they had worked through similar challenges, which included "changing quite a few policies without changing standards."[2]

- Centers themselves may face similar challenges in balancing individual and collective issues. In a report on Center activities, one director highlighted the challenge of developing a unique Center identity, and showcasing the value of this new, collaborative entity, while still recognizing and capitalizing on the strengths – and reputations – of the partner institutions.

- Inertia, bureaucracy, and resistance to change. The natural and long-standing ways of doing things are hard to change, especially when a large and complex organization has been built up that reinforces them in every place other than the point of innovation. Ways of doing things that Centers may need to change, in order to accomplish their missions, include such varied innovations as hiring staff with working relationships and responsibilities to more than one institution; sharing customized training leads among institutions that have previously been competitors for the revenue; or learning to work outside of one's own academic discipline and think of issues from a different perspective.

Different directors have somewhat differing perspectives on the extent to which bureaucracy – the system's usual ways of doing things – impede innovation. For the most part, some of the earlier annoyances appear to be working themselves out. Furthermore, other issues that may appear to industry or other outside observers to be

[2] Baer, L.L., & Duin, A.H. (2005). *Exploring success indicators for partnerships.* The quotation is from page 9 of this study, which describes this and other similar partnerships.

examples of turf protection or bureaucracy may well be seen by academics as quality control or differences in missions of the different institutions.

Some industry representatives at site visits discussed the possibility that the Centers may have positive, unanticipated effects of sparking additional partnership *among* businesses. They have the same need as the colleges and universities to adapt flexibly to change in a competitive environment, and some comments at the meetings we observed suggest that some industry representatives are thinking about ways that they can adopt more partnerships of their own, or make more use of those made available through the Centers. An industry executive discussed the need to change how his firm does business, and the difficulty of getting such change started, and then reflected, "But now I have others at the table with me to help me do it – and at a higher level than others who are within my organization." In a related vein, but at a different Center, a representative from a different industry sector expressed the hope that the Centers would expand their sphere of operation from partnering with a collection of individual firms to more institutional relationships with industry organizations.

Branding, public relations, marketing, and recognition

All four Centers have increased their marketing activities, and their levels of visibility, during 2007. This is strongly endorsed by the business partners, who identified marketing and public relations both as one of the most important strategies that Centers were currently engaging in, and as one of the most important strategy areas in which the Centers should be doing more.

While some initial public relations and marketing was needed in the first year, to gain enough visibility to begin recruiting student and industry attention and participation, marketing has been easier in 2007 when there has been more of a Center identity. As one Center representative stated during a site visit, "We waited until we figured out 'who we are.' [Now we have done that,] now we are ready to identify our audiences and the key messages for each of them."

Examples of some of the activities to promote the Centers during 2007 include the name changes of two centers (360° and HealthForce), both of which were also accompanied by the launch of significantly re-designed web sites. 360° also purchased advertisements in a variety of media, including billboards, radio, and MySpace, resulting in increased traffic on their web site with its new information materials about the seamless career pathways. MNCEME, which has won major awards for its marketing materials, conducted its branding campaign in 2006, and has continued to build on the same consistent themes and materials. Additional recognition activities in 2007 have included

working with students to help them prepare for competitions not only in their technical readiness but also in their presentation, thereby ensuring that "they arrive well branded, looking professional." CSITS has developed visibility through its web site and portal, as well as through sponsorship of numerous conferences and other events for professionals, and has banners at the partner institutions that advertise their membership in the Center.

Funding and related sustainability considerations

Effective, enduring, but flexible partnerships are one necessary component of Center sustainability. Increased visibility and recognition is an important contributing factor. The first thing that most people think of in connection with Center sustainability, however, is funding. From site visits in the spring, other meetings and conversations during the year, and interviews in the fall, it has been clear that all four Centers have focused much attention and effort during 2007 on the identification of ways to develop reliable and diverse funding streams to ensure the continued viability of their operations.

- Governance and advisory groups have discussed kinds of services or products that have the potential to generate stable revenues.
- Customized training units have worked across institutional lines to coordinate their offerings and draw in more customers to Center-affiliated courses.
- HealthForce and CSITS have developed specific projects to a point where they are now poised to begin generating revenues.
- 360° has retained a consultant to help identify and assess the potential of possible long-term funding models.

Several consistent challenges are cited in connection with all of these efforts. Across Centers, the following themes have been often reiterated by a variety of stakeholders:

- Four years of guaranteed funding is not likely to be enough to permit Centers to ramp up to a level of operation where they can generate, on their own, the funding they need to continue.
- When Centers were set up, it was assumed that business and industry would be significant sources of funding for the longer-term operations of the Centers. However, industry partners have discouraged Centers from harboring such expectations. Businesses do not feel that they have enough resources to contribute at this level. They expect Centers to be maintained based mainly on public funding, which they are prepared to help advocate for. They are also prepared to contribute

directly to the work of the Centers, but primarily for specific projects, rather than for ongoing general operations.

- Earned revenue through sales of products and services may require delicate negotiations about intellectual property rights. It is likely that the complicated new partnerships in which Centers are involved will require new understandings of how such property rights may be shared.

- Finally, as mentioned earlier, the fact that Centers have no legal status within the host institutions or the system prevents them from seeking or receiving funds, even for the sale of services or products that their activities or funds produce.

If the Centers are successful, as expected, in increasing student enrollments in for-credit and non-credit courses and programs, then under current institutional funding structures the colleges and departments that are associated with the Centers will benefit financially. (An exception is for new sections in content areas that are expensive to offer.) At all four Centers there have been some preliminary discussions about the possibility that, in the long term, Center operating costs may be at least partly paid for by a share of the increased institutional revenue that they have helped to produce through these efforts. However, the fiscal structure of the system overall, as well as of individual institutions, currently makes such an arrangement unlikely without significant system change.

Funding leveraged by the Centers to date

In each of the first two years, evaluators have asked Center staff to report on funds that the Center (that is, its associated programs) received that were "either entirely for the direct benefit or use of the Center, or were leveraged for a department or program because of its association with the Center." Because the Centers of Excellence are not legal fiscal entities, however, accounting for and reporting the funds they leverage can be problematic and open to a variety of interpretations.

It is hard to provide a meaningful comparison from one year to the next because of the difficulty of properly accounting for funding that is awarded during one year for expenditure over multiple years. Since we asked for information about amounts received during the fiscal year, the information has been provided in a form that reports funds at the point they are awarded, without reference to the time period over which they will be expended (financial activity versus economic activity). This can be misleading when dealing with three significant types of funding: multi-year grants or contracts, endowed funding, and in-kind donations of equipment or materials.

Comparing one Center to another is also problematic, in large part because of the inherent differences of the fields in which the Centers operate. These cause differences in Center strategies, as well as different funding needs and opportunities.

These issues are explained in more depth in the sections below.

Overall numbers

Based on preliminary figures provided to the evaluators, an estimated $10,401,383 was leveraged through Center activities over the course of the two years they have been operating (above and beyond the funding awarded to the Centers for start-up). (See Figure 4 below.) Of this, 72 percent was leveraged from public sources – mainly Federal, state, and local governments, including MnSCU colleges and universities and special funds administered by the Office of the Chancellor. The remaining 28 percent of the total funds were leveraged from private sources such as industry partners or businesses, corporate foundations, and philanthropic organizations. These private funds include cash donations for student scholarships or sponsorship of camps, seminars, and events; in-kind donations of equipment or materials; and grants, contract, or other cash donations.

4. Funds leveraged by the Centers of Excellence, 2005-2007

	Overall Leveraged Funding	Dollars	Percent of total dollars	Number of sources
Public sources of funding	Office of the Chancellor special projects funds	$1,621,490	16%	9
	Other MnSCU colleges and universities	$944,148	9%	15
	Local (school, city, county)	$96,600	1%	6
	Other (non-MnSCU) state agencies	$2,518,014	24%	10
	Federal	$2,303,373	22%	6
Private funding	Scholarships or sponsorship (e.g. camps or seminars)	$496,312	5%	37
	In-kind donations or equipment	$1,465,244	14%	25
	Other grants, contracts, or funding	$956,202	9%	26
Total		**$10,401,383**	Unduplicated sources: **123**	

Source: Reports prepared by Center directors with assistance from associated department and college representatives; calculations by Wilder Research.

Comparing funds from year to year

The first two years of leveraged funding are not strictly comparable because the first year included a certain amount of one-time funds granted either for start-up activities or for supporting operations over a number of years. Thus, the second year funding represents a more realistic base year for assessing ongoing funding activities of the Centers.

Other difficulties arise from the necessity of reporting funds based on the year they are granted, rather than spread out over the multiple years during which they are used. Three particular types of funding pose the largest issues of year to year reporting inaccuracies:

- **Multi-year grants and contracts.** Under current reporting, the entire dollar balance of the grant or contract is recorded for the year it was awarded, even though the funding would actually be received over a number of years. For example. In 2006, the Minnesota Job Skills Partnership (MJSP) made a large three-year grant to CSITS. The grant included $243,310 from MJSP, $180,216 from other grant partners and $1,082,844 of in-kind donations – all of it booked in 2006.

- **Endowed funds.** Endowment funds that are donated to generate interest which the Centers then use for ongoing purposes are also recorded as lump-sum, one-time donations. Thus a $60,000 gift to 360° to endow scholarships for students at Pine Technical College was counted once in 2006, rather than having the interest recognized each year.

- Equipment and materials donations. In-kind donations make up the largest source of Center funding from private sources, and constitute about 14 percent of overall leveraged funding. They are a particularly important component of the support received from private industry, especially for the two manufacturing Centers. For example, the Engine Dyno program at Northwest Technical College, associated with 360°, received $7,400 worth of engine parts from various businesses. While the parts will be used by students at Northwest Technical College for years to come, the entire $7,400 value of these parts was recorded for 2006.

The numbers

From the estimates compiled, it would appear that leveraged funding dropped significantly from 2006 to 2007. Funding recorded in 2007 was only equal to about a quarter of the $8,135,585 recorded in 2006. However, these numbers are misleading in part because of the factors discussed above. The evaluation team would prefer to represent these funds in a more accurate accounting method. However, the large number of different fiscal hosts, and hence account locations, for these funds make it prohibitively difficult to try to do so. As a result, and largely due to the Centers' lack of

status as a separate fiscal entity, the 2006 numbers are significantly overstated while the 2007 numbers are significantly understated. See figure 5.

5. Public and private leveraged funding, by year

	2006		2007	
	Dollars	Number of sources	Dollars	Number of sources
Public funding	$5,997,217	27	$1,486,408	19
Private funding	$2,138,368	49	$779,390	39
Total funding	**$8,135,585**	**68**	**$2,265,798**	**55**

Source: Reports prepared by Center directors with assistance from associated department and college representatives; calculations by Wilder Research.

Note: See discussion in text concerning interpretation of these figures.

Comparing funds by Center

Issues also arise when comparing funds leveraged across the four Centers. These issues differ slightly from those previously mentioned, but are often a result of the same factors that hinder accurate reporting across years.

Interpretation

One of the main issues that may affect the accuracy of comparing leveraged funding across Centers is the interpretation of what constitutes funds leveraged by each Center. Because the Centers lack the legal structure to operate as fiscal agents themselves, funds must be directed to legal fiscal agents. These fiscal agents are often institutions or departments that are involved with the Center. However, because the funds are diverted to these entities, which may have had a hand in leveraging those funds, an interpretation of the Center's involvement in the leveraging of those funds must be made. This interpretation results in inconsistencies in how different Centers decide what to report as leveraged funding. These do not at all arise from any entity calculating funds the wrong way, or intentionally calculating differently from other entities. Rather, it is a result of the necessity of making interpretative decisions about what funds have been leveraged. However, under the current structure of the Centers, the only way to account for their leveraged funds is by relying on these individual judgments, since the Centers cannot and do not manage and account for funds directly.

Inherent differences in the sectors

The fact that the Centers operate in the contexts of different industries or fields creates issues when comparing leveraged funding across the four Centers.

Some leveraging strategies yield more quantifiable results than others. Each Center uses strategies they feel will be most effective in their particular field. Because of these differing strategies, Centers may put different value on different funding streams.

This is particularly relevant when looking at HealthForce, which has engaged a micro-granting strategy that is similar to micro-lending strategies that are increasingly used in philanthropic giving. The idea behind this strategy is to "seed" a number of different opportunities for change in the industry. However, this strategy makes potential funds that may be leveraged through this means impossible to account for, because they are not leveraged specifically to institutions that are part of the Center. This is in effect creating an external leveraging of funds, in a model of change that seeks to decentralize the effect away from the Center itself.

For example, HealthForce awarded Fairview Health Services a grant to increase the number of low-income, high-priority students who go through the nursing program at Minneapolis Community and Technical College. It is logical to think that this grant essentially leveraged funding from Fairview and other sources through their work to increase diversity among the nursing student population. However, whatever funds (or equivalent in-kind value) were leveraged cannot be accounted for in the way that CSITS, for example, is able to directly account for $12,000 of corporate sponsorship of its Cyber Defense Competition.

Different industries offer different amounts of leveraging opportunities. The manufacturing Centers, for example, have a great need for equipment and consumable materials. This in turn offers a unique opportunity for the private manufacturing industry to provide in-kind support to manufacturing programs at Center schools.

The numbers

The breakdown of leveraged funding by Center (Figure 6) illustrates the variations between the Centers and their respective industries. A comparison across Centers of private vs. public sources of funding shows this contrast nicely. The two centers focused on manufacturing had very similar funding patterns, each raising three-quarters or more of their funds from public sources.

In contrast, CSITS, the information technology center, raised almost two-thirds of its funding from private sources, while HealthForce shows a lower total amount of funding

with a mix that almost completely public. However, the HealthForce figures do not include funds generated for related activities that were not formally run through Center accounts, as explained above.

6. Public and private leveraged funding by Center

	Public	Private	Total	Number of sources
360°	$2,394,512	$866,176	**$3,260,688**	**55**
MNCEME	$3,705,158	$725,772	**$4,430,930**	**33**
CSITS	$721,355	$1,310,810	**$2,032,165**	**26**
HealthForce	$662,600	$15,000	**$677,600**	**15**
Total	$7,483,625	$2,917,758	**$10,401,383**	**129**
% of total	71.9%	28.1%		

Source: Reports prepared by Center directors with assistance from associated department and college representatives; calculations by Wilder Research.

Note: See discussion in text concerning interpretation of these figures.

Relationship of Centers with the overall Minnesota State Colleges and Universities system

Centers of Excellence are not only expected to be points of innovation within the overall state colleges and universities system. It has been made clear, on numerous occasions and by many different representatives of the system, that they are also expected to be pilots for innovations that can be emulated more broadly and deeply, to help the entire system become more flexible and responsive.

The work plan adopted by the Office of the Chancellor for their work with the Centers includes the following main components:

- Serving as the primary point of contact to help directors as needed with such issues as budgets, faculty/human resources, public relations, and system alignment
- Promoting the Centers of Excellence
- Equitably allocating available funds, and identifying other opportunities to raise additional funds
- Integrating the successes of the Centers into systems practices and policies, and addressing barriers to Centers' success

- Evaluating policy or implementation barriers to faculty participation (such as intellectual property rights issues, or barriers to participation in research)
- Supporting the development of strong collaborative partnerships, to help Centers succeed, and to serve as a model for other parts of the system
- Develop Centers' capacity to leverage system-level resources and partner with other system-level initiatives

Center directors expressed appreciation for the support they receive from the Office of the Chancellor. The kinds of discussions about this help that evaluators heard over the course of the year appeared to reflect helpful responsiveness to specific requests and situations, rather than a sense that the system office had a specific role to play proactively. As with all the other new relationships that Centers have had to establish and define, the relationships with representatives of the overall system also appear to be still under development, and still in need of further clarification.

Business representatives who were surveyed felt that funding was the statewide system's most important role to play in helping Centers succeed. The other roles most commonly mentioned by business partners are as follows (along with the percentage whose comments fell into each of these themes):

- Funding, or providing financial support (42%)
- Reducing restrictions, barriers, or red tape (19%)
- Marketing, public relations, helping Centers gain visibility (16%)
- Philosophical or ceremonial support; being a champion for the Centers (16%)
- Advising, providing direction and vision, holding Centers accountable (15%)

With respect to funding, it was clear from discussions at site visits that Centers have strong interest in receiving help at the system level with fundraising. They would appreciate help from the Minnesota State Colleges and Universities Foundation, either individually or through help to coordinate the fundraising efforts of the four Centers.

There is no clear consensus on how the system office could help to address "red tape" kinds of barriers. These occur at many different points in the system, and the Center liaison staff in the Office of the Chancellor are not always able to address them. Many of these stress points operate within the institutions, and those at the host universities are the ones that are most likely to affect the Centers' day-to-day operations. Perhaps systems

staff could find ways to encourage university administrators to be more flexible – however, such direct intervention would not be consistent with the usual kinds of relationships between the institutions and the Office of the Chancellor.

Specific issues that were highlighted over the course of the year include:

Timing. The length of time required to approve new courses makes it hard for Centers to respond rapidly to needs that are expressed by industry partners. The same applies to the length of advance notice needed by colleges in order to plan for replacement instructors, when Centers wish to pay for faculty time for a special assignment.

Incentives for and against system change. The incentives for institutions to be flexible and adapt to Center's needs for change appear to be often outweighed by the incentives for them to maintain their usual ways of doing things. Individual programs and administrators may be convinced of the importance of the Center's shared goals in the context of Center meetings, but the proportion of any institution that is directly involved with the Center tends to be small compared to the overall institution. This likely makes it difficult for those who are involved in the Center to have the leverage needed to change practices of the overall institution.

A variety of Center stakeholders expressed a desire for the Office of the Chancellor to do more to "pound the table" to encourage more flexibility from non-Center parts of the participating institutions. An industry representative felt that

> Students, the economy, and technology are changing. Institutions must also change. But the system expects them to follow the old rules while they are doing so. Maybe the rules need to change, too.

One significant contribution of the Office of the Chancellor during 2007 was an all-day workshop on Best Practices for Partnering, attended by diverse teams of Center stakeholders, and featuring a variety of presenters including representatives of a very successful, mature partnership of ten different state universities.

Promotional support. Center stakeholders would appreciate more help with visibility and marketing. This hope was typically expressed with a certain degree of caution, because while Centers would like to have the system's expertise and resources to help them get their messages out, they are also concerned that they not lose control of how their messages are communicated.

Stating these specific issues should in no way detract from the overall message that the Office of the Chancellor has been seen as supportive and helpful.

Findings: Students and Graduates

Eventually, the work of the Centers is expected to result in increased student enrollments. As students move through and graduate from programs, graduation numbers are also expected to increase. Centers themselves do not teach courses, authorize programs, or grant degrees; these core academic functions continue to be the responsibility of the academic units that are associated with the Centers. The growth in student and graduate numbers represents one of many ways in which academic partners in the Centers are expected to benefit from their participation in the Centers.

As described in the 2006 evaluation report, the lack of direct linkage between Centers and students or programs makes the identification of effects on students challenging. In 2006, Wilder Research had the help of the Centers, associated programs, and staff of the Office of the Chancellor to develop lists of programs most closely associated with each Center. Based on these lists, the first evaluation report included numbers and characteristics of graduates of those programs during academic year 2005-06, the year in which Centers were first formed. In this report we use the same lists of programs (updated) to include similar descriptive information about graduates of programs during 2006-07.

A different method was required for identifying current students most likely to be affected by Center activities. At community colleges and universities, not all students identify specific programs of study before completing a degree, and other students' identified programs may be out of date. During 2007 Wilder again had the help of the Centers, associated programs, and Chancellor's Office staff to identify lists of courses that each Center considers most likely to include students in Center-affiliated programs, while not being of such general applicability as to also enroll a high percentage of other students.

As part of this 2007 report, data on students and graduates were analyzed to understand the numbers and characteristics of students potentially affected by Center activities. For two important reasons, although two years of data are available, both should be considered to be part of the baseline – that is, representing a description of conditions before the Centers began to have an effect. These reasons are:

- The Centers existed for only a short time prior to fiscal year 2007 (academic year 2006-07), the second of these two years. They were named in October 2005, and received their initial funding in January 2006.

- Although a half year had elapsed between initial Center funding and the start of the 2006-07 academic year (the second for which data are available), a great amount of

organizational work is required in the start-up of an entity as large and complex as a Center of Excellence. Relatively few changes had been made in academic programs that would affect either numbers or characteristics of students or graduates for the year.

Together, these factors make it unlikely that any change in the data presented here was caused by or even correlated to the Centers' work. For the graduate data in particular, we judge that it is best interpreted as a two-year baseline representative of the Center student population before Center activities. The same is mostly true for the student data, which is unlikely to show changes that can be directly attributed to the Centers' work. However, in some cases (such as short-duration certificate programs targeted for Center attention in the first year) student data may provide an early indication of how the Centers' work might affect longer term change.

Students most likely to be affected by Center activities

How students were identified

As mentioned earlier, any effect that may be attributed to the Centers will likely be seen in student populations before showing in graduate numbers. However, identifying which students are most likely to be affected is not a trivial exercise. Because the declared major status of students is unreliable, students were identified by the coursework in which they were enrolled. After identifying a group of programs most likely to be influenced by Center activities, courses within those programs were selected so as to represent a core set of classes that would include the students most likely to be participating in Center-related programs.

Wilder Research, the Centers, and the MnSCU Chancellor's Office worked closely in defining the sets of courses to be analyzed. The choice involved a trade-off much like the "signal-to-noise" trade-off involved in some engineering and information technology problems. We attempted to produce a "signal" sensitive enough to reflect reasonably small and early changes, while also being free from excess "noise" (false positives) that could potentially obscure accurate measure of such change.

This trade-off ultimately became a choice between lower-level coursework (classes that are a part of more general science fields) and higher-level coursework (classes more identified with specific degree pathways). Lower-level courses tend to provide higher sensitivity in their signal, and thus have more potential for showing very early change. However, they can also introduce an unacceptable amount of noise with their broad enrollments across academic fields. Higher-level courses provide much less noise due to a higher certainty that students taking these courses are pursuing degrees in a particular

(and identifiable) set of programs. However, these higher-level courses provide less sensitivity due to the amount of time it takes students to work through the prerequisite pathway of classes. In the end, the methods used in identifying students for this project relies more on higher-level courses to ensure a clear signal, even though this choice may reduce our ability to detect early changes caused by the Centers.

Numbers of students identified

Through the method described above, 19,814 students were identified as taking at least one core Center-related course during fiscal year 2007 (06-07 school year). This number includes 16,113 students enrolled in for-credit courses and 4,448 students enrolled in non-credit courses. This represents an overall increase of 6 percent for credit students and 4 percent for non-credit students. Increases in credit students were relatively even across centers. The change in non-credit students varies drastically, with MNCEME increasing by 49 percent and 360° decreasing by 30 percent. HealthForce has the most students (8,668 credit and 3,526 non-credit) and CSITS has the fewest (1,464 credit and 0 non-credit). See figure 7 for the numbers of students by fiscal year and Center.

7. Total number of for-credit and non-credit students by Center

	For-credit students				Non-credit students			
	Students		Change		Students		Change	
	FY06	FY07	N	%	FY06	FY07	N	%
360	2,286	2,445	159	7%	733	511	(222)	(30%)
MNCEME	3,264	3,536	272	8%	275	411	136	49%
CSITS	1,404	1,464	60	4%	0	0	-	-
HealthForce	8,274	8,668	394	5%	3,258	3,526	268	8%
OVERALL	**15,228**	**16,113**	**885**	**6%**	**4,266**	**4,448**	**182**	**4%**

Source: Courses identified by the Centers, data from the Office of the Chancellor; calculations by Wilder Research.

Intensity of concentration in Center-related courses

Due to the method of selecting students it is important to understand the intensity with which these students are concentrating their enrollment in Center-related courses. The amount of enrollment is measured for for-credit students by the number of credit hours, and for non-credit students by the number of actual contact hours. Overall, the 16,113 for-credit students took 313,267 credit hours during the year, and of these, 148,116 (47%) of the credit hours were in the Center-identified core courses. For non-credits students, the proportion of contact hours that were Center-related was much higher at 82 percent (80,467credits) of the 98,057 total contact hours. Furthermore, 86 percent of non-credit students took *all* of their hours in Center-related core courses.

As expected, the more credits that are taken, the lower the proportion of those that are Center-related. Students taking relatively few credits (four or fewer, or 1 or 2 classes during the year), are likely to be in a certificate or similar program that has coursework narrowly focused in the field. Students taking 15-27 credits (1-2 semesters) during the year are more likely to be in a four-year program that would have a greater level of general education requirements and therefore a lower proportion of core Center-related courses. See figure 8 for a breakdown of the relationship between credits and intensity of core courses.

8. Total hours and proportion of Center-related credits taken by for-credit students, 2007

Total credits taken	FY07 students	Proportion of total credits taken in core courses					All CoE credits
		Ave	0-24%	25-49%	50-74%	75-100%	
0-4 credits	2,356	98%	0%	1%	1%	98%	95%
5-14 credits	3,792	67%	10%	24%	20%	46%	41%
15-27 credits	4,900	49%	41%	15%	11%	33%	19%
28+ credits	5,065	42%	49%	13%	10%	28%	8%

Source: Courses identified by the Centers, data from the Office of the Chancellor; calculations by Wilder Research.

Students of color

The characteristics of students taking Center-related courses is largely unchanged from 2006 to 2007. Foreign national students maintain an equal number and proportion of the Center student population, a somewhat surprising result because there were no foreign nationals among the 2007 graduates (as shown later in this report). There is also little change in the proportion of U.S. students of color and U.S. white students. Therefore, since overall Center enrollment rose, the absolute number of U.S. students of color in the Centers rose by 275, or 12 percent. CSITS has the largest proportion of U.S. students of color; this is mainly due to their three campuses being located in a large urban area. MNCEME had the largest increase in Center students of color. Our estimates[3] show a 34 percent increase in numbers (115 students), which equals a modest 2 percentage point increase in the proportion of students of color at MNCEME. See figure 9.

9. Estimated* number and proportion of Center-related students of color (for-credit students only)

		FY06		FY07		Estimated change		
		N	%	N	%	N	%	% point**
Overall	U.S. student of color	2,342	15%	2,617	16%	275	12%	1%
	Non-resident	577	4%	578	4%	1	0%	0%
	U.S. white	12,309	81%	12,918	80%	609	5%	(1%)
U.S. CoE students of color	360°	253	11%	244	10%	(9)	(4%)	(1% pt)
	MNCEME	337	10%	452	13%	115	34%	2% pt
	CSITS	342	24%	390	27%	48	14%	2% pt
	HealthForce	1,422	17%	1,522	17%	118	8%	1% pt

Source: Courses identified by the Centers, data from the Office of the Chancellor; calculations by Wilder Research.

*Notes: * Estimates were calculated to impute values for missing data, to permit meaningful comparisons between years. Values that are missing are presumed to have the same distribution as is found in data that are known. Because data are more likely to be missing for students of color, these students may be underrepresented as a result of these imputations, and any inaccuracy of estimation will be greater with higher levels of missing data. Data were missing for 8% of students in FY06 and for 7% in FY07 See Figure A39 in the appendix for details on missing data for the estimates of students of color shown in this chart.*

***The percentage point change is the difference between the percentage in one year and the percentage in the other year (e.g. 5% minus 4% = 1 percentage point difference). It is different from "percent increase" because it is not proportional to the size of the starting point. A one percentage point increase from 4% to 5% would be a 25 percent increase, whereas a one percentage point increase from 10% to 11% would be only a 20 percent increase. Percentage point changes may not equal the difference between the percents shown in the table, due to rounding.*

[3] Estimates were calculated to impute values for missing data, to permit meaningful comparisons between years. Values that are missing are presumed to have the same distribution as is found in data that are known.

Female students

Overall, one-half (50%) of identified students are female. However, this overall number hides widely varying proportions of female students at the individual Centers. For example, HealthForce enrolls large numbers of female students (80% of all students) while the manufacturing and engineering Centers (MNCEME and 360°) only have 7 percent and 15 percent female students, respectively. CSITS falls in the middle with 37 percent female students. There was little proportional or real change in the numbers of female Center students from 2006 to 2007. See figure 10.

10. Estimated* female students by Center (for-credit students only)

	FY06		FY07		Estimated change		
	N	%	N	%	N	%	% point**
360°	403	18%	365	15%	(37)	(9%)	(3%)
MNCEME	269	8%	264	7%	(5)	(2%)	(1%)
CSITS	521	37%	547	37%	27	5%	0%
HealthForce	6,667	81%	6,931	80%	264	4%	(1%)
Overall	**7,872**	**52%**	**8,107**	**50%**	**235**	**3%**	**(1%)**

Source: Courses identified by the Centers, data from the Office of the Chancellor; calculations by Wilder Research.

*Notes: * Estimates were calculated to impute values for missing data, to permit meaningful comparisons between years. Values that are missing are presumed to have the same distribution as is found in data that are known. Data were missing for 2% of students in both FY06 and FY07. See Figure A39 in the appendix for details on missing data for the estimates of female student shown in this chart.*

*** The percentage point change is the difference between the percentage in one year and the percentage in the other year (e.g. 5% minus 4% = 1 percentage point difference). It is different from "percent increase" because it is not proportional to the size of the starting point. A one percentage point increase from 4% to 5% would be a 25 percent increase, whereas a one percentage point increase from 10% to 11% would be only a 20 percent increase. Percentage point changes may not equal the difference between the percents shown in the table, due to rounding.*

First-generation college students

The Minnesota definition of a first generation college student is one who does not have any parent who attended college. Overall, there is a slight decrease in the estimated numbers (-179 students and -4%) and proportions (-3% points) of first-generation college students in the Center-related courses. This decrease is consistent across almost all of the Centers. The exception is MNCEME, which has a slight increase in the numbers (40 students or 4%) but still decreases slightly (-1%) in the proportion of first-generation college students. See figure 11.

11. Estimated* first-generation college students by Center (for-credit students only)

	FY06		FY07		Estimated change		
	N	%	N	%	N	%	% point*
360°	707	31%	664	27%	(43)	(6%)	(4% pt)
MNCEME	926	28%	966	27%	40	4%	(1% pt)
CSITS	449	32%	431	29%	(18)	(4%)	(3% pt)
HealthForce	2,868	35%	2,709	31%	(159)	(6%)	(3% pt)
Overall	**4,975**	**33%**	**4,796**	**30%**	**(179)**	**(4%)**	**(3% pt)**

Source: Courses identified by the Centers, data from the Office of the Chancellor; calculations by Wilder Research.

*Notes: * Estimates were calculated to impute values for missing data, to permit meaningful comparisons between years. Values that are missing are presumed to have the same distribution as is found in data that are known. Because data is more likely to be missing for first-generation college students, these students may be underrepresented as a result of these imputations, and any inaccuracy of estimation will be greater with higher levels of missing data. Data were missing for 23% of students in FY06 and for 21% in FY07. See Figure A39 in the appendix for details on missing data for the estimates of first-generation college students shown in this chart.*

*** The percentage point change is the difference between the percentage in one year and the percentage in the other year (e.g. 5% minus 4% = 1 percentage point difference). It is different from "percent increase" because it is not proportional to the size of the starting point. A one percentage point increase from 4% to 5% would be a 25 percent increase, whereas a one percentage point increase from 10% to 11% would be only a 20 percent increase. Percentage point changes may not equal the difference between the percents shown in the table, due to rounding.*

Non-credit students

Analysis of Center-related students has focused primarily on the for-credit students identified. This is mainly due to their greater overall numbers for analysis and lower levels of missing data, which makes estimating numbers and change more accurate. However, a quick comparison shows that non-credit students are more likely to be students of color, female, first-generation college students, and older. The most significant demographic difference is age. Almost one in four (23%) of non-credit Center-related students are 45 years or older, while only 7 percent of for-credit students are 45 or older. The proportional change in demographic characteristics from 2006 to 2007 is very similar for credit and non-credit students. See figure 12.

12. Estimates* of demographic characteristics of credit and non-credit Center students

		FY06		FY07		Estimated change		
		N	%	N	%	N	%	% point**
For-Credit students	U.S. Students of Color	2,342	15%	2,617	16%	275	12%	1%
	Female students	7,872	52%	8,107	50%	235	3%	(1%)
	1st generation college student	4,975	33%	4,796	30%	(179)	(4%)	(3% pt)
	Students 35-44 years old	1,782	12%	1,818	11%	37	2%	(<1% pt)
	Students 45+ years old	1,139	7%	1,071	7%	(68)	(6%)	(1% pt)
Non Credit students	U.S. Students of Color	809	19%	1,021	23%	211	26%	4% pt
	Female students	2,937	69%	2,855	64%	(82)	(3%)	(5% pt)
	1st generation college student	1,692	40%	1,701	38%	9	1%	(1% pt)
	Students 35-44 years old	789	18%	829	19%	40	5%	<1% pt
	Students 45+ years old	1,144	27%	1,017	23%	(127)	(11%)	(4%pt)

Source: *Courses identified by the Centers, data from the Office of the Chancellor; calculations by Wilder Research.*

Notes: ** Estimates were calculated to impute values for missing data, to permit meaningful comparisons between years. Values that are missing are presumed to have the same distribution as is found in data that are known. Because data is more likely to be missing for students of color and first-generation students, these data may be underrepresented as a result of these imputations, and any inaccuracy of estimation will be greater with higher levels of missing data. There is considerably more missing data for non-credit students than for for-credit students. See Figure A39 in the appendix for a complete listing of the missing data for the estimates shown in this chart.*

*** The percentage point change is the difference between the percentage in one year and the percentage in the other year (e.g. 5% minus 4% = 1 percentage point difference). It is different from "percent increase" because it is not proportional to the size of the starting point. A one percentage point increase from 4% to 5% would be a 25 percent increase, whereas a one percentage point increase from 10% to 11% would be only a 20 percent increase. Percentage point changes shown in this table may not equal the difference between the percents shown in the table, due to rounding.*

Graduates of Center-affiliated programs

Overall, 2,771 graduates received 3,103 awards from Center-related programs in the 2007 fiscal year. This represents a moderate decrease in graduates (-9%) and a very slight decrease in awards (-2%) from 2006. This is mainly due to a large drop (-22%) in the number of certificates awarded. However, the overall decrease in awards is minimized by considerable increases in diplomas (13%) and 2-year degrees (23%). Together, diplomas and two-year degrees account for over half (54%) of the total awards in the 2007 fiscal year. See figure 13.

13. Total graduates and awards by type

	FY06	FY07	Change	
	Number	Number	N	%
Overall Total Grads	**3,037**	**2,771**	**(266)**	**(9%)**
Certificate awarded	1,233	966	(267)	(22%)
Diplomas awarded	684	772	88	13%
2-year degrees	738	908	170	23%
4-year degrees	421	390	(31)	(7%)
Graduate awards	77	67	(10)	(13%)
Total awards	*3,153*	*3,103*	*(50)*	*(2%)*

Source: Programs identified by the Centers, data from the Office of the Chancellor; calculations by Wilder Research.

Graduates of color

In fiscal year 2007, one in four (25%) graduates of Center-related programs were U.S. students of color. This includes 14 percent African-American, 7 percent Asian, 2 percent Hispanic or Latino, and 1 percent American-Indian or Native Hawaiian. Somewhat surprisingly, there were no foreign national graduates in fiscal year 2007; this is a drop from an estimated 132 (4%) non-U.S. graduates in fiscal year 2006. Therefore, proportions of graduates of color increased at all award levels and U.S. white graduates increased proportionally at all award levels except certificates (which experienced little effect from the drop in foreign nationals).

There appears to be real growth in graduates of color beyond the proportional growth resulting from the loss of foreign national graduates. Our estimates show that the numbers of U.S. graduates of color increased at every award level. Furthermore, this increase exceeds growth in overall graduates and overcomes reduction in overall graduates where a reduction exists. For example, our estimates show that graduates of

color receiving diplomas or two-year degrees increases by 41 percent in 2007, which is nearly triple the 13 percent increase in total diplomas and two-year degree awards this year. Conversely, four-year degrees decrease by 7 percent overall but the number of four-year degrees awarded to U.S. students of color increases by 73 percent. That being said, these changes can likely only be attributed to factors outside of the Centers, due to the time period under examination. See figure 14 for details on the estimates of graduation numbers for U.S. students of color.

14. Estimated* numbers and proportion of total graduate populations: Graduates of color

	FY06		FY07		Estimated change		
	N	%	N	%	N	%	% point**
Unduplicated Graduates	583	19%	680	25%	97	17%	5% pt
Certificates awarded	338	31%	375	42%	24	6%	11%
Diplomas/2-year degrees	174	13%	236	15%	75	41%	2%
4-year degrees	27	8%	49	16%	26	74%	7%
Graduate degrees	6	10%	15	28%	12	154%	19%

Source: *Programs identified by the Centers, data from the Office of the Chancellor; calculations by Wilder Research.*

Notes: ** Estimates were calculated to impute values for missing data, to permit meaningful comparisons between years. Values that are missing are presumed to have the same distribution as is found in data that are known. Because data is more likely to be missing for graduates of color, these graduates may be underrepresented as a result of these imputations, and any inaccuracy of estimation will be greater with higher levels of missing data. Data were missing for 10% of graduates in FY06 and for 7% in FY07. See Figure A40 in the appendix for details of the missing data for the estimates of graduates of color shown in this chart.*

*** The percentage point change is the difference between the percentage in one year and the percentage in the other year (e.g. 5% minus 4% = 1 percentage point difference). It is different from "percent increase" because it is not proportional to the size of the starting point. A one percentage point increase from 4% to 5% would be a 25 percent increase, whereas a one percentage point increase from 10% to 11% would be only a 20 percent increase. Percentage point changes may not equal the difference between the percents shown in the table, due to rounding.*

Female graduates

The total number of female graduates declined in 2007 compared to 2006. Three of the four Centers of Excellence (360, MNCEME, and CSITS) are focused in fields that have a historically high number of males while the remaining Center (HealthForce) is in a field that has traditionally had higher numbers of women. The number of female graduates at all the Centers decreased by 359 students, or 18 percent. Understandably, most of this decrease is at HealthForce which is predominately female. However, the relatively small numbers of female graduates at the other three Centers also show considerable decreases in numbers and proportion of total graduates in the 2007 fiscal year. Because of this drop in female graduates, their share of total graduates fell from 67 percent in 2006 to 61 percent in 2007. See figure 15.

15. Estimated* numbers, proportions, and change: Female graduates

	FY06		FY07		Estimated change		
	N	%	N	%	N	%	% point **
360°	50	18%	45	12%	(4)	(9%)	(5% pt)
MNCEME	57	12%	35	8%	(22)	(38%)	(4% pt)
CSITS	38	29%	23	16%	(15)	(40%)	(13% pt)
HealthForce	1,876	87%	1,570	86%	(305)	(16%)	(1% pt)
Overall	**2,036**	**67%**	**1,677**	**61%**	**(359)**	**(18%)**	**(7% pt)**

Source: Programs identified by the Centers, data from the Office of the Chancellor; calculations by Wilder Research.

*Notes: * Estimates were calculated to impute values for missing data, to permit meaningful comparisons between years. Values that are missing are presumed to have the same distribution as is found in data that are known. Data were missing for 2% of students in FY06 and 1% in fY07. See Figure A40 in the appendix for details on missing data for the estimates of female graduates shown in this chart.*

*** The percentage point change is the difference between the percentage in one year and the percentage in the other year (e.g. 5% minus 4% = 1 percentage point difference). It is different from "percent increase" because it is not proportional to the size of the starting point. A one percentage point increase from 4% to 5% would be a 25 percent increase, whereas a one percentage point increase from 10% to 11% would be only a 20 percent increase. Percentage point changes may not equal the difference between the percents shown in the table, due to rounding.*

Graduates who are first-generation college students

The Minnesota definition of a first generation college student is one who does not have any parent who attended college. Overall, there is a decrease in the estimated number and proportion of first-generation college students receiving awards in 2007. This is mainly due to decreases at HealthForce and their high proportion of Certificate awards,

the graduation category which had the largest decrease (-22%) in numbers for the 2007 fiscal year. However, all the other Centers experience a decrease in proportion of awards given to first-generation colleges students, and all but 360° have a decrease in the estimated number of awards received by first-generation college students.

Along with the large decrease in Certificates received by first-generation college students, four-year degrees also drop by a considerable number (-23%). The estimated number of two-year degrees (grouped with diplomas) awarded to first-generation college students increased slightly. This is mainly due to the overall increase in two-year degrees so the actual proportion of first-generation college student receiving two-year degrees dropped by 5 percentage points. See figure 16.

16. Estimated* first-generation college students receiving degrees

	FY06		FY07		Estimated change		
	N	%	N	%	N*	%	% point**
360°	88	31%	90	24%	2	2%	(7% pt)
MNCEME	133	29%	120	28%	(13)	(10%)	(1% pt)
CSITS	58	44%	48	34%	(10)	(17%)	(10% pt)
HealthForce	874	40%	654	36%	(220)	(25%)	(5% pt)
Overall	**1,158**	**38%**	**918**	**33%**	**(240)**	**(21%)**	**(5% pt)**
Certificates	472	38%	332	34%	(140)	(30%)	(4% pt)
Diplomas/2-yr	578	41%	595	35%	18	3%	(5% pt)
Four-year	123	29%	95	24%	(28)	(23%)	(5% pt)
Graduate	24	31%	27	40%	3	11%	9% pt

Source: *Programs identified by the Centers, data from the Office of the Chancellor; calculations by Wilder Research.*

Notes: ** Estimates were calculated to impute values for missing data, to permit meaningful comparisons between years. Values that are missing are presumed to have the same distribution as is found in data that are known. Because data is more likely to be missing for first-generation college students, these students may be underrepresented as a result of these imputations, and any inaccuracy of estimation will be greater with higher levels of missing data. Amount of missing data varies considerably by Center, award level, and year. See Figure A40 in the appendix for details on the missing data for the estimates of first-generation college students receiving degrees shown in this chart.*

*** The percentage point change is the difference between the percentage in one year and the percentage in the other year (e.g. 5% minus 4% = 1 percentage point difference). It is different from "percent increase" because it is not proportional to the size of the starting point. A one percentage point increase from 4% to 5% would be a 25 percent increase, whereas a one percentage point increase from 10% to 11% would be only a 20 percent increase. Percentage point changes may not equal the difference between the percents shown in the table, due to rounding.*

Outcomes

Summary of results to date

Center directors as well as business representatives identified collaboration among academic institutions as one of the features that make Centers unique. As described in the section above on partnerships among academic institutions, these collaborations have already led to many new courses and programs as well as new ways of delivering courses and linking programs.

Business representatives who were surveyed strongly endorsed the value of these developments, and identified such changes in educational programs and practices as among the key strategies currently being pursued by the Centers.

Center directors generally believe that the new relationships among institutions will be sustained, even if the individuals in the specific positions currently change. This is felt to be likely because the relationships are based on shared, lasting purposes, and because institutional structures have begun to be developed to support and reinforce them.

Effects on programs and partners involved in the Centers

The new relationships, and those between the academic partners and business, have led to the following changes and innovations in education in the Minnesota State Colleges and Universities system:

- Enhanced equipment, laboratories, and other facilities, often purchased specifically to meet needs identified by employers in each institution's area
- Improved instruction in existing courses, and enhanced course content, because of the improved equipment and facilities
- New courses and new programs, focused particularly on fields and skills most in need by local industry
- Exchange of information about successful instructional practices among faculty of related programs across multiple institutions as a result of peer-to-peer faculty networking and review of courses and programs for articulation possibilities
- Increase in high-interest, memorable student experiences (such as competitions and simulations)

- Development of a collaborative Clinical Laboratory Science program that will allow more students to be served by enabling the needed clinical supervision to take place in a wider range of clinical settings

Some Center directors also report that faculty are reporting increased enrollments in certain core programs. This information cannot be verified from currently available system-level data, which are unable to pinpoint strategic program areas within an overall Center, and which do not include data for fall semester of 2007.

Ripple effects on other programs and institutions

Expectations for the Centers of Excellence included not only outcomes for the programs that directly participate, but also the diffusion of innovations to other associated programs and, ultimately, changes in how higher education works in the system as a whole.

At the close of this second year of operation, observers have pointed to certain kinds of broader effects that are beginning to be apparent:

- CSITS staff report that the Center's needs are being reflected in hiring decisions that are made by their college partners, in that deans are hiring more staff in order to free up more time for faculty who are involved in Center activities.

- HealthForce reports that work organized and funded by the Center is being incorporated back into participating academic institutions, such as through the availability of courses whose development the Center helped fund.

- 360° and MNCEME report that good practices identified at individual institutions within the Center are now being diffused and replicated at other institutions, as a result of informal networking or formal replication efforts.

- The equivalency tables developed by MNCEME to facilitate admission and transfer of credit into Minnesota State University, Mankato will be of use to many more students besides those in MNCEME-affiliated programs.

- There is now more awareness among colleges and universities that it is possible and beneficial to work in partnership with each other for certain kinds of purposes. More inter-institutional partnerships, with at a higher level of communication and coordination, are now expected by the Office of the Chancellor for some of the grants that they administer.

Other spillover effects on the larger educational system are likely with more time. Some that are specifically planned at this time include:

- CSITS and HealthForce expect to expand at least some of their activities (such as the CSITS web portal, or aspects of HealthForce's new approach to educating health care workers) to all students in the related programs across the Minnesota State Colleges and Universities system, not just those in the initial academic partners.
- 360° is discussing the possibility of expanding its current Seamless Career Pathways model to add additional closely related fields.
- CSITS in considering offering training for faculty across the state in Information Technology instruction.

Overview of expected outcomes and likely time frame for seeing them

Many different potential outcomes of the Centers of Excellence have been identified, by many different stakeholders. The initial authorizing legislation required the collection of information about the following outcomes:

- Program enrollment
- Student demographics
- Student admission data
- Endowment growth (which may also be interpreted as ability to raise additional funds to support the Center's work)
- Graduation rates
- Graduation outcomes
- Employer involvement
- Indicators of student or graduate employment success
- Other outcomes as determined by the MnSCU board
- Impact on the local economy (documentation not expected before 2009)

In its Request for Proposals, the Office of the Chancellor also required Centers to document their capacity to achieve the following:

- Progress toward multistate or regional recognition within five years
- Improvement of results in related programs
- Strong partnerships between 4-year and 2-year institutions
- Articulation of curriculum (consistent, appropriate, and useful progression in course work, including multiple levels of career development)
- Continued accountability and learning (process evaluation and its use)

Some of these outcomes may be expected as a direct result of Center operations, while others are several steps removed. Some may occur both as direct and indirect effects. For instance, increases in program enrollment could occur directly, as a result of marketing campaigns aimed at the general public, which could cause students or their parents to become aware of the programs associated with the Center and decide to apply for them. However, a large part of Centers' recruitment efforts are also based on expectations for more indirect chains of occurrences. One such indirect chain is illustrated by the Project Lead The Way effort, in which 360° and MNCEME work with schools to increase participation in PLTW, train teachers, and help acquire grants for equipment and other costs. The Center must then wait several years while the schools carry out their work, until the group of middle school and/or high school students graduate. From this larger pool of high school graduates, who will have higher skills and higher interest in technology, they expect to receive a larger number of applications.

A similar combination of direct and indirect causal pathways is involved in producing the highly desired outcome of graduates' employment success. Centers work directly with industry partners to collect information about workforce needs. They work directly with higher education partners to coordinate strategies for modifying academic courses and programs to incorporate the needed skills into the course of study available to students; however, the implementation of these strategies is done by the academic partners, not by the Centers. Academic programs have typically helped their students identify placement opportunities, but this is an area in which Centers may also be directly involved to help increase job matching options and services to students and employers.

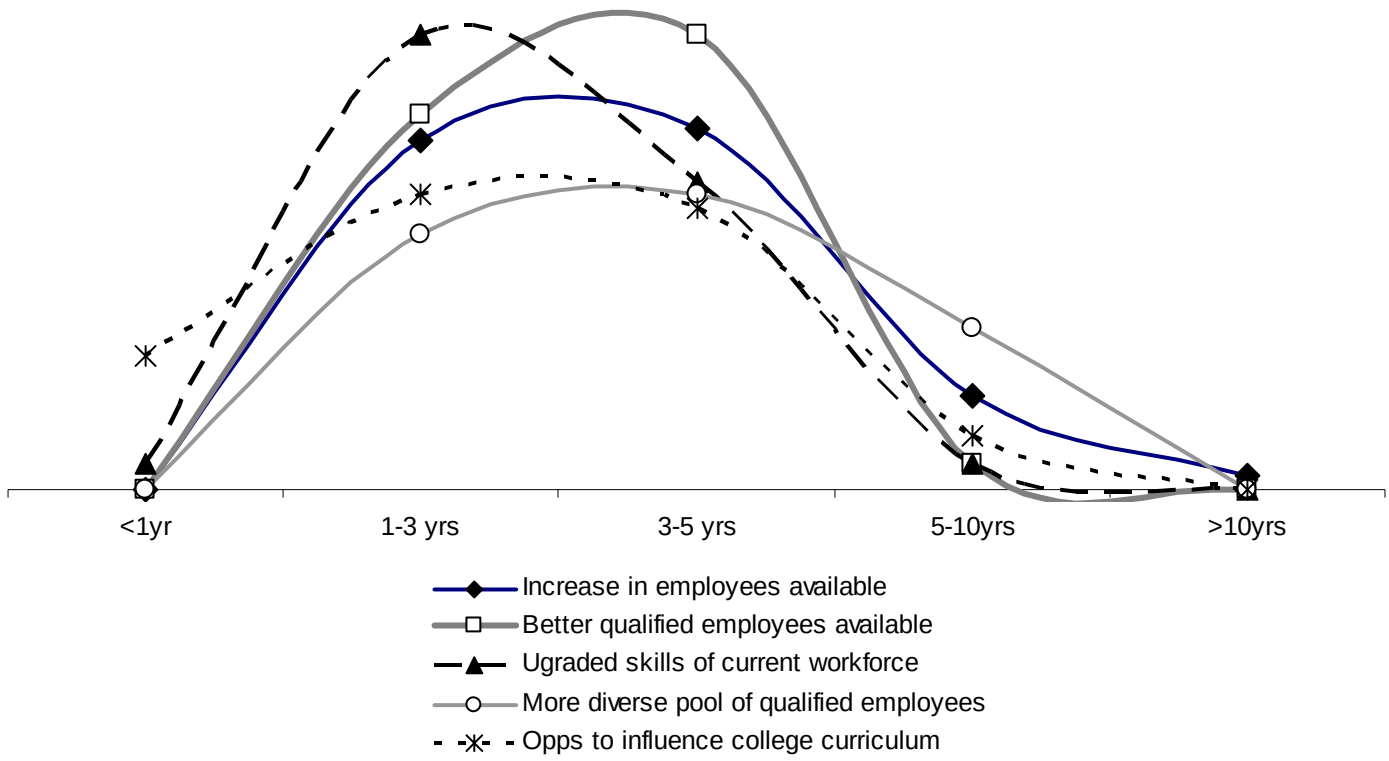
Some of these causal pathways may be very brief, while others can take years. Direct marketing can have immediate effects, but the development of key messages, and the new and updated programs to which students can be recruited, may take considerably longer to develop before the marketing can be carried out. Working with industry began almost immediately upon the creation of the Centers, but time was required to recruit the numbers and representative mix needed for input that could be acted upon. Taking industry input and developing academic programs based on it is the work of many months at the least, and sometimes years for more complicated or innovative needs.

Business representatives who were surveyed recognized both the likely lag time to results and the different times required for different outcomes (see above, pages 14-16). Only one potential benefit of the Centers was expected by a plurality of business respondents within the first year – networking opportunities with industry peers – and almost as many thought that one to three years was the most reasonable time frame for expecting to see it.

Among the potential benefits of greatest interest to business, only one was expected within three years by a plurality of respondents: upgraded skills of the current workforce. For two of the other most important benefits (increase in number of potential employees available, and opportunities to influence the college curriculum), the most commonly expected time frame was almost equally split between one to three years and three to five years. For the other two most important benefits (more diverse pool of qualified employees , and better qualified employees available), the most commonly-expected time frame was three to five years.

Figure 17 below represents the proportion of business respondents citing each of the possible time frames for each of these five outcomes.

17. Business representatives' expected time frames for five key outcomes



Source: *Wilder Research, telephone survey of 66 business representatives, fall 2007.*

It should be noted that although all of the surveyed business stakeholder were involved in the Center in one or more ways, not all are familiar with the academic processes involved in developing and implementing new or modified programs. Many recognize that their expectations for timeliness are different from those of academics, and take pride in delivering their message of urgency. However, greater involvement may increase understanding of the complexity of academic change. One stakeholder who has been most deeply involved commented, during a site visit, of his growing appreciation of the value of the lengthier process used by academics to ensure that changes are grounded in research and meet high standards. On the other hand, Center directors express interest in finding ways to accomplish this quality control while also speeding up the process of innovation, so that Centers can meet expectations of helping the colleges and universities become more flexible and responsive.

Some of these five critical outcomes can be achieved by increasing the amount of effort and resources devoted to current educational activities – for example, increasing the numbers of potential employees can theoretically result from graduating more students through programs that already exist, and upgrading the skills of the current workforce could come from delivering more of the existing customized training courses. However, it is likely that numbers will not increase for current offerings unless there are new reasons for more people to enroll in them. The academic changes required to produce such new reasons introduce another step, and more time, into the process. In addition, additional numbers of graduates can only come after additional numbers of entering students have had time to progress all the way through a program.

Reflecting the time required for each step, and the way in which many of them build on earlier steps, the following table (Figure 18) presents our preliminary estimates of the likely time frames for seeing change on the various measures of interest:

18. Estimated sequence and time horizon for key Center outcomes

Year of Center's existence	Outcome of interest	Comments
1	2-year/4-year partnerships	Strong partnerships were evident in the first year and continue to mature during 2007. Tensions result from attempts to institutionalize innovation, and partnerships may be tested in the third and fourth year until new patterns become more established and are supported by explicitly agreed-upon sharing of efforts and benefits.
1	Employer involvement	Substantial levels of involvement were evident in the first year, and have continued through the second.
1	Accountability and learning	Centers have each done this in their own way to date, in ways that supplement the external evaluation. Part of the evaluation work plan for 2008 is to discuss how each will use external evaluation findings and continue what is of greatest use following the end of the external evaluation.
1, 4-6	Growth in Center funding	After an initial burst when the Centers were founded, it is possible that fewer major grants will be received until Centers have built a documented track record of success and can be considered reasonably permanent. Exceptions are likely to be donations and sponsorships for specific events and activities (such as camps or marketing). Consistency of revenue will also depend on Centers' having legal status allowing them to solicit, receive, and manage their own funds.
2-4 (adoption) 4-8 (evidence of student success)	Articulation of curriculum	Many early articulations have been made. More are under development, but more difficult articulations will take longer to be agreed upon and implemented. Evidence of articulation effectiveness will come after there has been time to track students' progress from one program to the other and observe successful completion of the second program.

Table continued on next page

18. Estimated sequence and time horizon for key Center outcomes (continued)

Year of Center's existence	Outcome of interest	Comments
3-6	Student admissions and program enrollment	There may be a slight early boost from already-enrolled students who change into Center-affiliated programs, and another slight boost slightly afterwards from graduating high school students who are influenced by general marketing. However, the main growth is likely to come after current junior high school students have been exposed to high school opportunities that are now being expanded.
4-7	Student demographics	Early growth in enrollments is most likely to come from students who are most like current students. Growth in diversity will take more time and is more likely to result from more intensive recruitment and support efforts that take longer to implement.
4-7	Graduation rates	Given the time needed for students to complete program requirements, graduation numbers are not likely to change until 1 or 2 years after enrollment numbers begin to change. In selected short-term certificate and diploma programs results could be evident sooner.
5-10	Regional recognition	Evaluators will consult with Center and Office of the Chancellor staff on appropriate measures during 2008. We plan to look for expansion in the geographic spread of home addresses for new students. However, since a large part of the program emphasis is on serving working students, it is unlikely that many will come from far away. Other measures may include geographic spread of graduates, speaking invitations at regional and national meetings or conferences, national grants or accreditations, or requests for course/program replication.
6-9	Graduation outcomes such as employment success	Data on job placements and wages are collected from graduate surveys done in the year following receipt of a degree. We will begin to have *baseline* data, for FY06 graduates, in the fall of 2008. Changes will likely occur shortly after graduation numbers change, and data will be available approximately two years after that.
6-10	Economic impact	While large-scale economic impact, including job placement rates and income changes, are unlikely by the required 2009 report, a variety of intermediate measures can be used to gauge potential longer-term impact (such as customized training contracts, program enrollments, or awards of shorter-term credentials).
6-12	Improvement of results in related programs	Some related programs are beginning to adopt some of the innovative practices of Center programs, and more are expected in 2008 and beyond. Changes in program results will take more time than changes in results for Center programs, because of the less intensive effort.

The small number of these outcomes that can realistically be measured within the first few years of the Centers is cause for some concern, especially if performance on these is planned as the basis for determining further support for the Centers. Evaluators have held several discussions with Center stakeholders to identify additional short-term measures that are meaningful and can provide earlier, leading indicators of likely longer-term change. Where available, these have been included throughout this report as findings have been presented, and include development of new courses and programs, and business stakeholders' perceptions of progress.

However, two other concerns remain. First, most of the required measures apply to traditional educational activities that continue to be carried out by the academic partners. These do not adequately describe the kinds of innovations for which the Centers were created, such as quality and sustainability of partnerships, or ability to foresee and/or respond rapidly to changing industry conditions. Second, the strategies best designed to show early change on traditional measures are not necessarily those that will best position the Center for longer-term success.

Finally, it is important to recognize that four different Centers that succeed in being responsive to their respective industries are likely to follow four different sets of priorities that will lead to different kinds of impacts. Even the two applied engineering and manufacturing Centers, with their different emphases, have been encouraged by their industry stakeholders to emphasize different goals and strategies. While both are working on producing higher numbers of students in order to graduate more future technicians and engineers, MNCEME also has a strong focus on emerging technology and its impact on how the workplace will be organized in the future. The resulting changes to academic programs, students, and work places will likely take longer to produce, be more difficult to document, and have somewhat different kinds of impacts on the industry. Different outcomes for different Centers thus should not be interpreted as showing more or less success, but may rather reflect different kinds of success.

Discussion and issues to consider

Key challenges to Center development and growth

Centers have already made significant progress in organizing outreach activities to interest and recruit students to the field, and to strengthen and coordinate academic offerings at partner institutions. One measure of the extent to which they have genuinely innovated is the extent to which they have challenged the system to do things in new ways, which can cause stress both to the Centers and to the rest of the system. In this discussion section we describe some of the challenges involved in accomplishing the Centers' work so far, and considerations for ways that the Centers' progress can be sustained in the longer term.

Evaluation data document certain common themes about challenges the four Centers face in implementing and maintaining their missions. These include tension between different expectations of different partners. Other challenges are seen in certain kinds of operational friction between the Centers' missions and their organizational settings.

Differences in expectations

The Centers balance the needs and expectations of a variety of stakeholders, including students, K-12 partners, business and industry, and higher education faculty and administration. Given the variety of constituencies the Centers are intended to reach, these expectations do not always coincide. In particular, different groups do not always have the same views on the most important kinds of activities and outcomes, or what time frames for actions and outcomes are reasonable. Furthermore, various academic partners within a Center may also have differing priorities among goals and strategies. For example, evaluation data suggest that applied research activities are of greatest interest to four-year institutions, and of less interest to industry and two-year institutions; and that some business representatives expect actions and outcomes more quickly than do academic representatives.

Stresses related to innovation

In addition to differences in focus and priority, a handful of more operational "stress points" have also become apparent. Most of these appear to arise from the fact that the Centers were set up to be a different kind of entity than had previously existed within the Minnesota State Colleges and Universities system. They operate next to, but outside of, the standard departmental framework.

While many of the new Center activities are cross-campus in purpose and design, their implementation is carried out by the traditional programs, departments, and colleges. To the extent that new practices have been obliged to fit into, or work around, the system's regular campus-based operating structures and policies, some have been made harder or slower. For example, when hiring for Center staff positions, it is hard to find existing job descriptions that adequately match the responsibilities of Center staff who must balance the interests of multiple stakeholders. In general, Directors do not report that the system has created significant barriers to innovation. However, because of the Centers' dependence of on the institutions, their long-term viability will require some degree of accommodation between their novel mission and structure and existing missions and institutional practices.

The resolution of such stress points will likely involve addressing some larger structural considerations, and this in turn is likely to help identify promising ways in which Centers can achieve long-term viability and continuing effectiveness. More broadly, any work to resolve systemic issues faced by the Centers of Excellence initiative will likely inform the Board of Trustees' Strategic Direction to "Innovate to meet current and future educational needs efficiently."

We illustrate these operational issues with three of the stress points that evaluators have heard since the Centers' inception:

Centers are restricted in their ability to seek, receive, or control funds.

Unlike a department or college, a Center has no standing as a formal entity, and is not allowed to receive funds directly, either as a donation or as a share of tuition revenue from enrollments it helps to generate. Each Center has a governance structure that includes all academic partners, but Directors report to the administration of the host four-year institutions, which are also ultimately accountable for Center funds. One result of this arrangement is that the university administration has the power, if they choose, to determine the amount of authority the Centers' governing bodies can exercise over those funds.

When Centers were initially proposed, it was commonly assumed that business would provide significant funding over the long term. The survey of industry stakeholders found that businesses express a willingness to contribute personnel time, in-kind resources and some amount of cash investment where they anticipate specific, relatively immediate value in return. However, current stakeholders, including business partners, do not consider it likely that industry will play a main role in the ongoing financial support of the Centers.

Implications for continued viability: Stable, ongoing operations are key to effective service to industry as well as students, and require stable, ongoing sources of revenue. All four Centers have been exploring business models for long-term financial sustainability, but none has identified sources of income that will replace the state appropriation in its entirety in the near term.

Differences in institutional missions and priorities can impede curriculum articulation.

Four-year institutions and each kind of two-year institution have different missions. Given these differences, partner institutions often have good reasons for different understandings of academic standards for course content and depth. Similarly, selection of courses to meet the purposes of a two-year technical degree may not match what is expected in the first two years of a four-year degree. Development of articulation agreements for seamless academic progression requires a thorough review of curriculum, which is a time-consuming task. Centers must either ask faculty to volunteer their time for such purposes or find funds to pay for release time.

Implications for continued viability: Centers' development of a truly coordinated curriculum is expected to include multiple "career pathways," across partner institutions, including a variety of possible entry points and also allowing for re-entry without loss of prior credits. This is under development now in each of the Centers, but its accomplishment requires direct acknowledgement of the programs' different purposes, as well as sensitive negotiation about the strategies for reconciling the differences. The process is harder in Centers with more varied academic partners.

Innovation is mainly initiated through new <u>individual</u> relationships, but is more likely to be maintained if it is embedded in new <u>structural</u> relationships.

Competition among academic partners naturally arises from varied missions and institutional strengths, as well as institutional needs to maximize revenues from tuition, grants, and contracts. The Centers have made significant strides toward reconciling many of the initial turf issues, by focusing on cooperative activities that increase resources for all the partners as well as form the basis for continued cooperation and trust. The evidence so far suggests that relationships have been developed through early partnership negotiations that tend to make subsequent negotiations easier. The more layers of the organization that are involved in such relationship building (such as campus administration, department administration, and individual faculty members), the stronger the basis for continued cooperation and trust. However, busy academic schedules and difficulties in arranging for release time tend to limit such broad participation.

Implications for continued viability: Significant Center resources have been used to promote and coordinate cooperative and collaborative educational approaches. Yet, these approaches do not have a built-in source of support from existing accountability structures or funding incentives. Encouragement from industry stakeholders and the support of the Office of the Chancellor are helpful. However, in the absence of continued funding for Center staffing and purchase of release time, or the development of new structural arrangements that directly promote and reward cooperative cross-institutional activities, this encouragement may not be sufficient in the long term, given the relatively small scale of the Centers within the overall system.

Potential paths for Centers' evolving structural development

The formation of the Centers of Excellence in 2005 focused on creating collaborative relationships among many MnSCU institutions, industry and K-12 representatives, and other stakeholders. The common ground for these diverse stakeholders was a specific industry and occupational focus (manufacturing, health care, or information technology). This basis for organization does not align with the Minnesota State College and University system's organizational structure, which is organized first by geography, then by institutional type (2 year vs. 4 year), then by function (academic, non-credit, customized training, etc.) and then, perhaps – and probably mostly informally – by content areas. Consequently, the Centers have blazed new trails in the system in the relationships they have formed, and in so doing they have created stress points in the system with regard to some of their business operations (hiring, raising money, etc.).

We offer a few perspectives to consider when thinking through the evolution of the Centers in the coming years. Clearly, their long-term sustainability is a goal shared by the Centers, system leadership, and other stakeholders. In order for that be realized, there will likely need to be some structural shifts in the Centers themselves and perhaps in the institutions which comprise them.

In the coming years, Centers could evolve in at least one and possibly more of the following ways:

1. Embedded in institution – status quo

Centers would remain essentially as they are now, with the same governance model and business operations.

2. Embedded in institution with direct report to system office

Centers would remain embedded in a host institution (currently the lead 4-year institution), but with a direct reporting relationship from the Center director to the Office of the Chancellor. Business operations within the Center might still be handled through

the host institution. Such a reporting relationship would enable the OOC to hear directly from Centers and understand local operating issues, while Centers would more readily get a system-wide perspective. Having the direct line might also be beneficial to the Centers and the Office of the Chancellor in identifying and addressing operational barriers within host institutions and/or among partners.

3. Embedded in system office

This would take the direct report option above and add the opportunity for one or more Center business functions to be handled by a single, shared Center of Excellence office at the system level. In this scenario, some business functions (hiring, for example) might continue to be handled by the host institution while others (perhaps fundraising) would be handled through the shared system level office. In this model, the Office of the Chancellor could be more aware of opportunities for system-wide adoption of some of the innovations being piloted by the Centers, and might have more capacity to help with their replication. The arrangement could pave the way for Centers to eventually be moved out of their host institutions. However, such a move raises the possibility that Centers would then feel more detached from the institutions of which it is composed.

4. Embedded with Joint Powers governance

Centers would remain hosted by a 4-year institution for their business functions, but governance would shift from a direct report of the director to the 4-year dean or president to a Joint Powers Board comprising representatives from each of the participating campuses. It is also possible that the Joint Powers Board might have a seat for an Office of the Chancellor representative and/or someone representing industry stakeholders. The purpose of this option would be to move to a more collaborative management structure in which the Center is truly responsive to – and accountable to – the institutions that it comprises, rather than only one of those institutions. A complication in this approach is that although the Joint Powers Board would have governing authority, the 4-year institution representative would still have informal authority as the host institution with respect to Center business operations.

5. Spin off

Centers could spin off entirely into their own free-standing organizations. These would likely be nonprofit 501(c)3 or 501(c)6 entities connected to colleges, but with their own independent business functions and governance structures. Such a move obviously gives Centers the greatest latitude. On the other hand, two likely disadvantages would be a weakened relationship with the colleges that make up the Center, and a much lower likelihood that Centers would enjoy continued public support from the State Legislature.

Further, the Minnesota State Colleges and Universities system's own history with the Targeted Industry Partnerships would likely advise against going down this path again.

These alternatives differ with respect to at least three basic elements: the hosting of business functions, fundraising, and governance. The differences are summarized in the following table (Figure 19).

19. Possible structures for Center operation and governance

	Business functions	Fundraising	Reporting
1. Embedded in institution – status quo	4-year institution	4-year institution	4-year institution
2. Embedded in institution with direct report to system office	4-year institution	4-year institution	Office of Chancellor
3. Embedded in system office	4-year institution	System CoE office, Office of Chancellor	System CoE office, Office of Chancellor
4. Embedded with Joint Powers governance	4-year institution	Joint Powers Board	Joint Powers Board
5. Spin off	Independent Board	Independent Board	Independent Board

If desired, as part of its 2008 work plan Wilder Research would undertake to work with Center staff, institution representatives, Office of the Chancellor staff, and other stakeholders to further define each of these possible models and identify likely advantages and disadvantages for the sustained development of effective Centers.

Economic impact

The legislation that established the Centers of Excellence mandates that the January 2009 evaluation report will include an analysis of "the program's [Center's] impact on the local economy." Two things have been clear from the beginning of the ongoing evaluation of the Centers:

First, while 2009 is the final year of the required evaluation, it is still very early to expect signs of substantial and measurable economic effects. Over time, it is hoped that the Centers will enhance the growth and profitability of certain sectors of the Minnesota economy. If the Centers are to have the salutary economic impacts that were envisioned when they were established, those economic effects will take place over a long stretch of time and there may be very little indication of the ultimate size of those effects in 2009. The first class of four-year degree students who attended college during the life of the

Centers will not graduate until June 2010 and will not have impact in Minnesota firms until after they begin working.

In addition, applied research or consulting done by the Centers for or with area companies will also take several years to be commissioned, concluded, and acted upon. Moreover, it may be that the Centers will foster the growth of entrepreneurship that will result in the creation of new companies that contribute to Minnesota's economic vitality. But clearly any such effects of new companies will take even longer to have measurable economic impacts. Finally, it should also be noted that the Centers themselves will be evolving over the two and a half years of operation before the 2009 report – so their early operations may have smaller-scale effects compared to those of their more mature programs as they will be operating in 2009.

Second, the effects of the Centers are more likely to be felt statewide rather than only in a certain geographic region. The final configuration of the Centers and the geographic spread of the colleges included in each make it likely that the principal effects of a given Center are most likely to be felt in a certain sector or subsector of the Minnesota economy. Moreover, the Centers all have the capability to affect their chosen sectors on a statewide basis, through training students who can work at firms anywhere in the state and by offering services to companies regardless of their geographic location. In addition, it should be noted that the Centers may redefine their area of specialization or focus in line with their experience and the evolution of market forces in coming years.

Therefore, a top-down evaluation that merely looked at data on the growth and profitability of firms in the segments of the Minnesota economy that are targeted by the four Centers would be likely to show little or no effects, even if the Centers are on track to produce significant results. Moreover, even if the chosen sectors showed unusually high growth relative to similar companies in other states, there are a myriad factors other than the Centers that could generate such a result.

Accordingly, our economic impact evaluation in 2009 will include a number of intermediate measures chosen to indicate whether or not it is likely that the Centers are making progress of the type that is likely to produce the longer-term effects on the profitability and growth of Minnesota companies. To produce such measures, we must delineate both the channels of expected economic influence and the time frames over which the Centers might be expected to produce measurable results in each of those channels.

Channels of influence

While the ultimate goal of the Centers is to improve the vitality and competitiveness of certain sectors of the Minnesota economy, there are a number of potential channels

through which the Centers could promote the profitability and growth of businesses in the state. The businesses we surveyed stated clearly that they expected the greatest contribution to come from improvements in the available workforce, but there are other channels of potential influence as well.. Here are the main ones:

Training existing workers

The constant enhancement and upgrading of the skills of the existing workforce is of concrete and immediate benefit to Minnesota companies as they cope with competitive pressures and technological change. Minnesota State Colleges and Universities already have numerous contracts to do customized training for Minnesota companies. The Centers could expand the training of existing workers in their economic sectors in at least two ways. They could:

- Encourage additional customized training through industry contacts and coordination among institutions, and/or
- Add new course offerings that workers would register for in order to build important jobs skills.

These activities would benefit Minnesota companies in a number of ways. They would raise the productivity of the existing workforce, reduce the need for companies' internal training, and reduce companies' labor turnover. Recent research has shown a connection between customized training and labor turnover at Minnesota companies. Lower turnover translates in lower costs of recruiting, hiring, and training new workers, dollars that immediately improve the bottom line of Minnesota companies.

Upgrading the skills of existing workers should be one of the first concrete signs of the impact of the Centers and the businesses surveyed for this evaluation indicated they expected change within one to three years of the beginning of operation of the Centers. Accordingly, measures of incumbent worker training will be included in the measures of economic impact in this report.

Producing more and better trained graduates

A second channel of influence is the production of more highly-trained graduates whose skills are more in line with the needs of Minnesota employers in key economic sectors. The advantages for Minnesota companies are obvious. These graduates can be more productive and require less training, and hiring costs should be lower as companies work with the Centers and come to rely on them more heavily as sources of trained workers.

The graduates produced by Minnesota State Colleges and Universities could cover the whole spectrum from certificate programs, through two-year and four-year degrees and even, in some cases, to graduate degrees. Coordination between the Centers and business partners could also mean that more internship and part-time employment opportunities are developed so that graduates would have significant real-world experience that would make them more valuable to Minnesota employers.

In order to produce more and better qualified graduates, recruitment of future students is also critically important. Therefore, activities that build the pipeline of future enrollees in the Centers' programs are an important element in the overall plans of the Centers. These activities might include summer institutes or camps, specialized in-school programs (such as Project Lead the Way in engineering), outreach to schools and teachers, stronger connections between businesses and K-12 schools, and even mass media advertising to build interest in particular careers.

Most business survey respondents expected change in the number and quality of graduates to start to become apparent within 3 to 5 years. Therefore, the measures that will be reported in this area will include some information on two-year degree recipients and other measures that give intermediate indications that the quality and quantity of graduates will improve.

Consulting with existing businesses

The Centers could facilitate consulting contracts between college and university faculty and Minnesota companies in their chosen sectors. In particular, it would be possible that collaborations could spring up over the course of years that would provide ongoing beneficial information to Minnesota businesses, enabling them to compete even more effectively in national and international markets.

Most of the surveyed businesses thought that this channel of impact was "somewhat likely" rather than "very likely" and put the horizon for seeing change at from three to five years. So, the measures included in the 2008 report will include not only data on actual consulting activities but also the growth of connections between the colleges and businesses that may lead to more work in the future,

Applied research

Beyond consulting, which would involve the sharing of existing knowledge, it is hoped that the Centers would facilitate the production of new knowledge focused on the needs of Minnesota companies. Such research might grow out of a consulting relationship or result from a company approaching a Center with a question or problem.

It is envisioned that, over time, the faculty allied with Centers would develop expertise that would give them a comparative advantage at providing research relevant to the economic sectors that the Centers serve. This expertise and a possible research partnership with private industry could shorten the time for technology transfer to take place.

Like consulting activities, this channel of influence was deemed less certain and slower to produce results than the workforce training activities described above. Given the long time horizons involved, the 2008 study will focus on measures that may lead to greater applied research in the future in addition to any data on actual research undertaken.

Entrepreneurship, innovation, and the formation of new enterprises

Finally, over time, it is conceivable that the ultimate effect of the Centers would be to foster the formation of new companies in their areas of industry focus. For this to occur, there would have to be a critical mass of companies and workers in given sectors. Moreover, it would take some time for the graduates from the institutions to work in industry and potentially contribute to expansions and startups in Center-related industries.

If the centers lead to greater sectoral entrepreneurship and an increase in business formation, such an impact would be seen only after a substantial period of time, mostly likely more than five years. The 2008 report is, thus, unlikely to include any measures that focus solely on new business formation. However, intermediate measures that give indication of growing industry momentum also raise the likelihood of increased business formation in the longer term.

Intermediate measures of progress

As stated above, the evaluation of the Centers economic impact in 2009 needs to focus on intermediate measures of progress because the evaluation occurs so early in the life cycle of the Centers. Here are some of the potential measures that we expect to include in our report:

- The number of related customized training programs
- Enrollment in customized training programs
- Enrollment of incumbent workers in for-credit courses
- Information on labor turnover rates and hiring costs at sector firms (possibly)
- Number of and enrollment in special camps and workshops for prospective students
- Participation in school-based sector programs (e.g. Project Lead The Way)

- Other K-12 outreach activities for students and teachers
- Enrollment in programs allied with the Centers
- Graduation data on programs allied with the Centers
- Placement data for two-year and certificate graduates (and, possibly, four-year graduates in future reports)
- Growth in curriculum consultation with business
- Growth in sponsorship of the Centers by businesses
- Growth of internship programs
- Number and dollar volume of consulting contracts in areas allied with the Center
- Number and dollar volume of applied research contracts

This list does not necessarily include the full panoply of measures that may be developed as the analysis proceeds during the upcoming year. Even within this list, not all intermediate measures may be appropriate for all of the four Centers. Industry sectors differ and the Centers are taking different strategic paths to their goals. So assessment of progress toward economic impact will be done based on appropriate, and perhaps slightly differing, measures for each Center.

Appendix

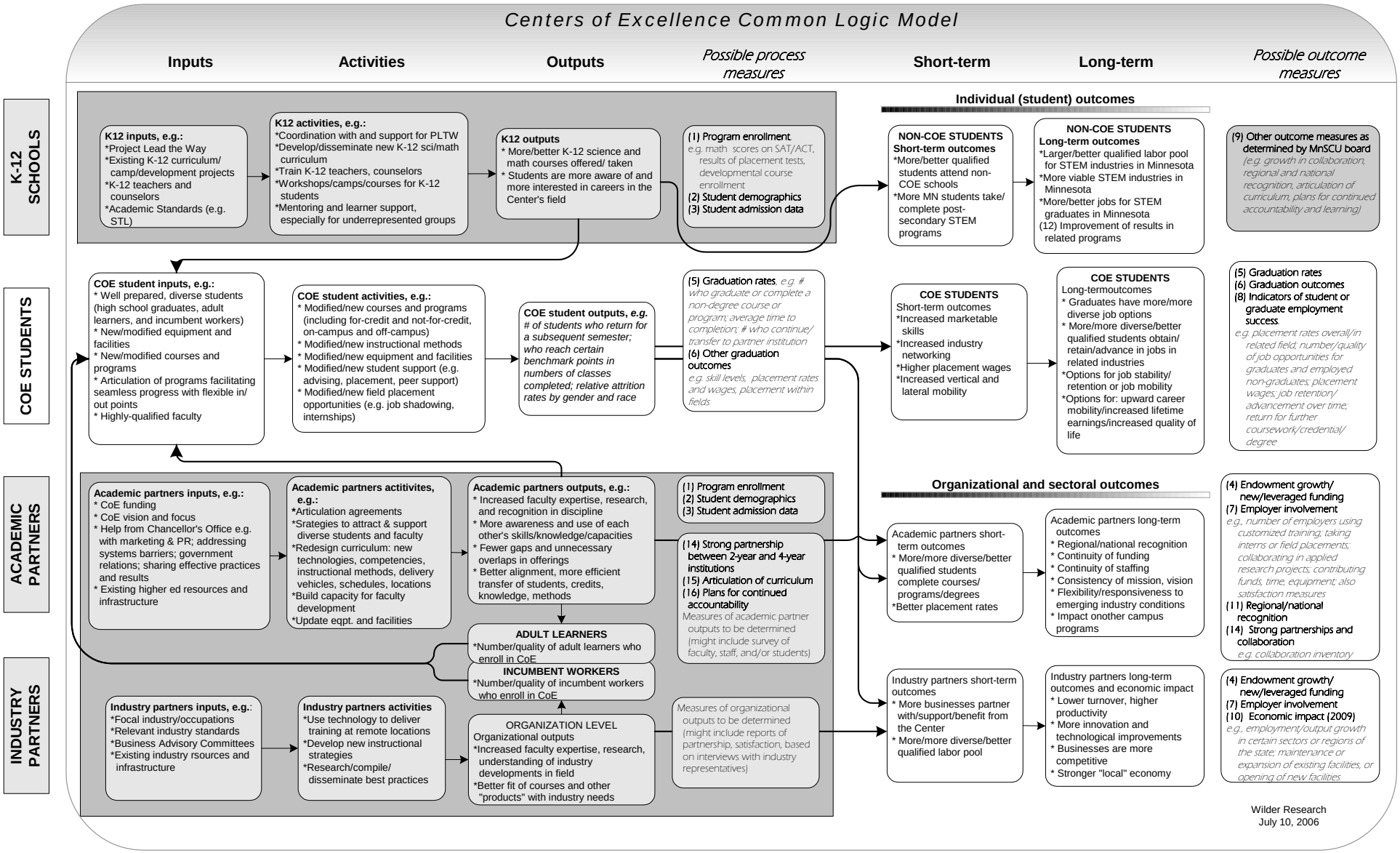
Logic model

Detail tables: Responses to business survey

Detail tables: Numbers and characteristics of students most likely to be affected by Center activities

Detail tables: Numbers and characteristics of graduates and awards of Center-affiliated programs

Logic model


Centers of Excellence Common Logic Model
Inputs
Activities
Outputs
Possible process measures
Short-term
Long-term
Possible outcome measures
K-12 SCHOOLS
COE STUDENTS
ACADEMIC PARTNERS
INDUSTRY PARTNERS
Individual (student) outcomes
Organizational and sectoral outcomes
K12 inputs, e.g.:
*Project Lead the Way
*Existing K-12 curriculum/ camp/development projects
*K-12 teachers and counselors
*Academic Standards (e.g. STL)
K12 activities, e.g.:
*Coordination with and support for PLTW
*Develop/disseminate new K-12 sci/math curriculum
*Train K-12 teachers, counselors
*Workshops/camps/courses for K-12 students
*Mentoring and learner support, especially for underrepresented groups
K12 outputs
* More/better K-12 science and math courses offered/ taken
* Students are more aware of and more interested in careers in the Center's field
(1) Program enrollment
e.g. math scores on SAT/ACT, results of placement tests, developmental course enrollment
(2) Student demographics
(3) Student admission data
NON-COE STUDENTS
Short-term outcomes
*More/better qualified students attend non-COE schools
*More MN students take/ complete post-secondary STEM programs
NON-COE STUDENTS
Long-term outcomes
*Larger/better qualified labor pool for STEM industries in Minnesota
*More viable STEM industries in Minnesota
*More/better jobs for STEM graduates in Minnesota
(12) Improvement of results in related programs
(9) Other outcome measures as determined by MnSCU board
(e.g. growth in collaboration, regional and national recognition, articulation of curriculum, plans for continued accountability and learning)
COE student inputs, e.g.:
* Well prepared, diverse students (high school graduates, adult learners, and incumbent workers)
* New/modified equipment and facilities
* New/modified courses and programs
* Articulation of programs facilitating seamless progress with flexible in/ out points
* Highly-qualified faculty
COE student activities, e.g.:
* Modified/new courses and programs (including for-credit and not-for-credit, on-campus and off-campus)
* Modified/new instructional methods
* Modified/new equipment and facilities
* Modified/new student support (e.g. advising, placement, peer support)
* Modified/new field placement opportunities (e.g. job shadowing, internships)
COE student outputs, e.g. # of students who return for a subsequent semester; who reach certain benchmark points in numbers of classes completed; relative attrition rates by gender and race
(5) Graduation rates. e.g. # who graduate or complete a non-degree course or program; average time to completion; # who continue/ transfer to partner institution
(6) Other graduation outcomes
e.g. skill levels, placement rates and wages, placement within fields
COE STUDENTS
Short-term outcomes
*Increased marketable skills
*Increased industry networking
*Higher placement wages
*Increased vertical and lateral mobility
COE STUDENTS
Long-termoutcomes
* Graduates have more/more diverse job options
* More/more diverse/better qualified students obtain/ retain/advance in jobs in related industries
*Options for job stability/ retention or job mobility
*Options for: upward career mobility/increased lifetime earnings/increased quality of life
(5) Graduation rates
(6) Graduation outcomes
(8) Indicators of student or graduate employment success.
e.g. placement rates overall/in related field; number/quality of job opportunities for graduates and employed non-graduates; placement wages; job retention/ advancement over time; return for further coursework/credential/ degree
Academic partners inputs, e.g.:
* CoE funding
* CoE vision and focus
* Help from Chancellor's Office e.g. with marketing & PR; addressing systems barriers; government relations; sharing effective practices and results
* Existing higher ed resources and infrastructure
Academic partners actitivites, e.g.:
*Articulation agreements
*Srategies to attract & support diverse students and faculty
*Redesign curriculum: new technologies, competencies, instructional methods, delivery vehicles, schedules, locations
*Build capacity for faculty development
*Update eqpt. and facilities
Academic partners outputs, e.g.:
* Increased faculty expertise, research, and recognition in discipline
* More awareness and use of each other's skills/knowledge/capacities
* Fewer gaps and unnecessary overlaps in offerings
* Better alignment, more efficient transfer of students, credits, knowledge, methods
(1) Program enrollment
(2) Student demographics
(3) Student admission data
(14) Strong partnership between 2-year and 4-year institutions
(15) Articulation of curriculum
(16) Plans for continued accountability
Measures of academic partner outputs to be determined (might include survey of faculty, staff, and/or students)
ADULT LEARNERS
*Number/quality of adult learners who enroll in CoE
INCUMBENT WORKERS
*Number/quality of incumbent workers who enroll in CoE
Academic partners short-term outcomes
* More/more diverse/better qualified students complete courses/ programs/degrees
*Better placement rates
Academic partners long-term outcomes
* Regional/national recognition
* Continuity of funding
* Continuity of staffing
* Consistency of mission, vision
* Flexibility/responsiveness to emerging industry conditions
* Impact onother campus programs
(4) Endowment growth/ new/leveraged funding
(7) Employer involvement
e.g., number of employers using customized training; taking interns or field placements; collaborating in applied research projects; contributing funds, time, equipment; also satisfaction measures
(11) Regional/national recognition
(14) Strong partnerships and collaboration
e.g. collaboration inventory
Industry partners inputs, e.g.:
*Focal industry/occupations
*Relevant industry standards
*Business Advisory Committees
*Existing industry rsources and infrastructure
Industry partners activities
*Use technology to deliver training at remote locations
*Develop new instructional strategies
*Research/compile/ disseminate best practices
ORGANIZATION LEVEL
Organizational outputs
*Increased faculty expertise, research, understanding of industry developments in field
*Better fit of courses and other "products" with industry needs
Measures of organizational outputs to be determined (might include reports of partnership, satisfaction, based on interviews with industry representatives)
Industry partners short-term outcomes
* More businesses partner with/support/benefit from the Center
* More/more diverse/better qualified labor pool
Industry partners long-term outcomes and economic impact
* Lower turnover, higher productivity
* More innovation and technological improvements
* Businesses are more competitive
* Stronger "local" economy
(4) Endowment growth/ new/leveraged funding
(7) Employer involvement
(10) Economic impact (2009)
e.g., employment/output growth in certain sectors or regions of the state; maintenance or expansion of existing facilities, or opening of new facilities
Wilder Research
July 10, 2006

Detail tables: Responses to business survey

In October and November, Wilder Research interviewed 66 business and industry representatives by telephone. The Centers provided Wilder Research with lists of stakeholders who had been involved in any way with the work of the Centers, and Wilder completed the interviews with at least 15 and up to 18 respondents per Center. The interview included a mixture of closed-ended and open-ended questions, and lasted on average about one-half hour.

A1. How many people are employed in your organization?

	360°		MNCEME		CSITS		HealthForce		Total	
	N	%	N	%	N	%	N	%	N	%
Less than 10 employees	2	13%	2	13%	4	22%	1	6%	9	14%
11 – 50 employees	2	13%	4	27%	4	22%	2	11%	12	18%
51 – 500 employees	7	47%	5	33%	3	17%	4	22%	19	29%
501 – 1000 employees	-	-	-	-	1	6%	3	17%	4	6%
More than 1000 employees	4	27%	4	27%	6	33%	8	44%	22	33%
Total	**15**	**100%**	**15**	**100%**	**18**	**100%**	**18**	**100%**	**66**	**100%**
Median number of people employed in organization	104 people		110 people		228 people		1000 people		200 people	
Median number of positions that require credentials or certification	30 positions		10 positions		15 positions		450 positions		68 positions	

A2. What proportion of employees in your organization require credentials or certification?

	360°		MNCEME		CSITS		HealthForce		Total	
	N	%	N	%	N	%	N	%	N	%
Less than 25 percent	7	54%	7	54%	4	29%	2	12%	20	35%
25 percent -49 percent	1	8%	3	23%	2	14%	3	18%	9	16%
50 percent -74 percent	-	-	3	23%	3	21%	7	41%	13	23%
75 percent or more	5	39%	-	-	5	38%	5	29%	15	26%
Total	**13**	**100%**	**13**	**100%**	**14**	**100%**	**17**	**100%**	**57**	**100%**

A3. Do you expect the number of people you employ or that the number requiring credentials or certification will change in the next five years?

	360°		MNCEME		CSITS		HealthForce		Total	
	N	%	N	%	N	%	N	%	N	%
Yes	10	71%	14	93%	13	77%	11	61%	48	75%
No	4	29%	1	7%	4	24%	7	39%	16	25%
Total	**14**	**100%**	**15**	**100%**	**17**	**100%**	**18**	**100%**	**64**	**100%**

A4. For those expecting a change in the number of people requiring credentials or certifications change, how will that change occur? (Coded responses to open-ended question)

	360° (N=10)		MNCEME (N=14)		CSITS (N=13)		HealthForce (N=11)		Total (N=48)	
	N	%	N	%	N	%	N	%	N	%
Increase in proportion of employees needing credentials or the overall number of employees	8	80%	14	100%	12	92%	10	91%	44	92%
Decrease in proportion of employees needing credentials or the overall number of employees	1	10%	-	-	-	-	-	-	1	2%
Other	1	10%	-	-	1	8%	1	9%	3	6%

A5. What type of work does your organization do? (Coded responses to open-ended question)

	360° (N=15)		MNCEME (N=15)		CSITS (N=18)		HealthForce (N=18)		Total (N=66)	
	N	%	N	%	N	%	N	%	N	%
Manufacturing	12	80%	7	47%	-	-	-	-	19	29%
Health care provider	-	-	-	-	-	-	12	67%	12	18%
Workforce development	-	-	1	7%	3	17%	4	22%	8	12%
Consulting	1	7%	4	27%	3	17%	-	-	8	12%
Advocacy/policy	2	13%	2	13%	1	6%	2	11%	7	11%
Sales/marketing	-	-	2	13%	3	17%	1	6%	6	9%
Research and development	-	-	1	7%	4	22%	-	-	5	8%
Other	1	7%	-	-	7	39%	1	6%	9	14%

A6. Was your organization involved with any of the Center's academic partners before the Center was formed?

	360°		MNCEME		CSITS		HealthForce		Total	
	N	%	N	%	N	%	N	%	N	%
Yes	12	80%	10	67%	2	11%	14	78%	38	58%
No	2	13%	5	33%	13	72%	3	17%	23	35%
Don't know	1	7%	-	-	3	17%	1	6%	5	8%
Total	**14**	**100%**	**15**	**100%**	**15**	**100%**	**17**	**100%**	**61**	**100%**

A7. When did your organization first become involved in the Center or its development?

	360°		MNCEME		CSITS		HealthForce		Total	
	N	%	N	%	N	%	N	%	N	%
During the proposal stage (Before 11/05)	4	27%	7	47%	-	-	7	38%	18	27%
During the first six months (11/05-4/06)	2	13%	4	27%	9	50%	4	22%	19	29%
During the second six months (5/06-10/06)	4	27%	1	7%	4	22%	5	28%	14	21%
During the second year (After 11/06)	5	33%	2	13%	5	28%	1	6%	13	20%
Don't know (month or year)	-	-	1	7%	-	-	1	6%	2	3%
Total	**15**	**100%**	**15**		**18**	**100%**	**18**	**100%**	**66**	**100%**

**Note: Respondents who only did not know the month but knew that it was 2005 were included in "first six months." Those only knowing it was 2006 were included in "second six months."*

A8. Which of these potential benefits that the Centers of Excellence might produce would you rate as critical?

	360° (N=15)		MNCEME (N=15)		CSITS (N=18)		HealthForce (N=18)		Total (N=66)	
	N	%	N	%	N	%	N	%	N	%
An increase in the number of employees available to employers	13	87%	10	67%	7	39%	14	78%	44	67%
A better qualified or educated pool of employees available to employers	9	60%	11	73%	7	39%	9	50%	36	55%
A more diverse pool of qualified employees	7	47%	4	27%	7	39%	6	33%	24	36%
Opportunity for industry to influence college curriculum	7	47%	5	33%	3	17%	7	39%	22	33%
Upgraded skills of the workers who are currently in the industry	6	40%	3	20%	4	22%	4	22%	17	26%
Opportunities for industry to interact or become familiar with the work of K-12 schools	7	47%	4	27%	1	6%	1	6%	13	20%
Better information to make projections and preparations for future business strategies	3	21%	2	13%	1	6%	4	22%	10	15%
Applied research to advance the field and provide new industry practice	-	-	5	33%	4	22%	1	6%	10	15%
Networking opportunities with industry peers	2	13%	1	7%	4	22%	2	11%	9	14%

A9. Which of these potential benefits that the Centers of Excellence might produce would you rate as critical or very important?

	360° (N=15)		MNCEME (N=15)		CSITS (N=18)		HealthForce (N=18)		Total (N=66)	
	N	%	N	%	N	%	N	%	N	%
A better qualified or educated pool of employees available to employers	15	100%	15	100%	15	72%	18	100%	61	92%
An increase in the number of employees available to employers	14	93%	15	100%	12	67%	17	95%	58	88%
Opportunity for industry to influence college curriculum	14	93%	14	93%	11	61%	17	94%	56	85%
Upgraded skills of the workers who are currently in the industry	11	73%	12	80%	14	78%	15	83%	52	79%
A more diverse pool of qualified employees	12	80%	10	67%	12	67%	14	78%	48	73%
Opportunities for industry to interact or become familiar with the work of K-12 schools	12	80%	8	53%	6	33%	13	72	39	59%
Applied research to advance the field and provide new industry practice	7	47%	11	73%	8	44%	8	44%	34	52%
Networking opportunities with industry peers	8	53%	4	27%	12	67%	9	50%	33	50%
Better information to make projections and preparations for future business strategies	8	53%	8	53%	8	44%	8	44%	32	49%

A10. For those organizations for which a more diverse pool of qualified was critical or very important, what types of diversity are you interested in? (Coded responses to open-ended question)

Types of diversity listed below are based on open-ended responses.	360° (N=12)		MNCEME (N=10)		CSITS (N=12)		HealthForce (N=14)		Total (N=48)	
	N	%	N	%	N	%	N	%	N	%
Racial, Ethnic, or Cultural	3	25%	6	60%	4	33%	13	93%	26	54%
Gender	1	8%	3	30%	4	33%	3	21%	11	23%
Representative of population served	-	-	-	-	-	-	3	21%	3	6%
Age	-	-	-	-	-	-	2	14%	2	4%
Socio-economic	-	-	-	-	-	-	1	7%	1	2%
Workers with disabilities	-	-	-	-	-	-	1	7%	1	2%
Other or unspecified	5	42%	2	20%	1	8%	-	-	8	17%
Diverse backgrounds, experiences, skills, or education	7	58%	3	30%	8	67%	6	43%	24	50%
Respondent explains the value of a diverse workforce	3	25%	1	10%	1	8%	2	14%	7	15%

A11. Are you or anyone else in your organization involved with any groups or committees as part of your involvement with the Centers of Excellence?

	360°		MNCEME		CSITS		HealthForce		Total	
	N	%	N	%	N	%	N	%	N	%
Yes	13	87%	10	67%	12	67%	14	78%	49	74%
No	2	13%	5	33%	6	33%	4	22%	17	26%
Total	**15**	**100%**	**15**	**100%**	**18**	**100%**	**18**	**100%**	**66**	**100%**

A12. For those who have been involved in groups or committees, during the last year, how many hours per month would you say that you have spent on Center activities?

	360°		MNCEME		CSITS		HealthForce		Total	
	N	%	N	%	N	%	N	%	N	%
Zero hours	3	20%	5	33%	6	33%	5	28%	19	29%
1 - 9 hours	12	80%	8	53%	10	56%	11	61%	41	62%
10 -19 hours	-	-	1	7%	2	11%	-	-	3	5%
20 or more hours	-	-	1	7%	-	-	2	11%	3	5%
Total	**15**	**100%**	**15**	**100%**	**18**	**100%**	**18**	**100**	**66**	**100%**
Average number of hours spent per month on Center activities	**2.7 hours**		**7.5 hours**		**4.3 hours**		**13.8 hours**		**7.2 hours**	
Median number of hours spent per month on Center activities	**2.0 hours**		**3.0 hours**		**3.0 hours**		**3.0 hours**		**2.0 hours**	

A13. Are there any ways other than groups or committees in which your organization is involved with the Centers of Excellence?

	360°		MNCEME		CSITS		HealthForce		Total	
	N	%	N	%	N	%	N	%	N	%
Yes	5	33%	6	40%	5	28%	13	72%	29	44%
No	10	67%	9	60%	13	72%	5	28%	37	56%
Total	**15**	**100%**	**15**	**100%**	**18**	**100%**	**18**	**100%**	**66**	**100%**

A14. For those who are involved with the Centers, in other ways have you been involved? (Coded responses to open-ended question)

	360° (N=5)		MNCEME (N=6)		CSITS (N=5)		HealthForce (N=13)		Total (N=29)	
	N	%	N	%	N	%	N	%	N	%
Specific one-time event(s)	2	40%	2	33%	2	40%	2	15%	8	28%
Promoting the Center or industry	3	60%	2	33%	1	20%	1	8%	7	24%
Higher education activities	1	20%	1	17%	2	40%	1	8%	5	17%
General advisory role	1	20%	-	-	2	40%	2	15%	5	17%
HealthForce grant project	-	-	-	-	-	-	5	38%	5	17%
Specific initiative(s)	-	-	-	-	1	20%	2	15%	3	10%
Networking	-	-	2	33%	-	-	1	8%	3	10%
K12 activities (including PLTW and STEM)	-	-	2	33%	-	-	-	-	2	7%
Other	1	20%	-	-	-	-	3	23%	4	14%

A15. Respondents who <u>agree or strongly agree</u> with the following statements about the Center

	360° (N=8-15)		MNCEME (N=12-15)		CSITS (N=13-18)		HealthForce (N=12-18)		Total (N=47-66)	
	N	%	N	%	N	%	N	%	N	%
The new ideas and connections you make at the meetings are worth the extra time the meetings take.	12	80%	11	73%	15	88%	15	88%	53	83%
Information about the Center's activities is adequately shared with the business partners.	9	60%	9	60%	14	82%	13	81%	45	71%
Information is collected to identify successful innovations and is reported back to participants elsewhere in the Center.	9	64%	8	67%	10	71%	12	75%	39	70%
The benefits your organization gets out of its involvement with the Center are equitable considering what its puts into the Center.	11	73%	8	53%	14	78%	11	61%	34	68%
Resources are fairly shared among the Center's partners and activities.	5	73%	8	62%	8	62%	8	62%	29	62%
There are policies and standard practices in place that limit the Center's ability to innovate.	5	45%	6	44%	1	8%	8	67%	20	40%

A16. Respondents who strongly agree with the following statements about the Center.

	360° (N=15)		MNCEME (N=15)		CSITS (N-18)		HealthForce (N=18)		Total (N=66)	
	N	%	N	%	N	%	N	%	N	%
The benefits your organization gets out of its involvement with the Center are equitable considering what its puts into the Center.	4	27%	1	7%	7	41%	3	17%	15	23%
The new ideas and connections you make at the meetings are worth the extra time the meetings take.	5	33%	-	-	6	35%	3	18%	14	22%
Information about the Center's activities is adequately shared with the business partners.	2	13%	2	13%	3	18%	2	13%	9	14%
Information is collected to identify successful innovations and is reported back to participants elsewhere in the Center.	3	21%	-	-	2	14%	3	19%	8	14%
There are policies and standard practices in place that limit the Center's ability to innovate.	1	9%	-	-	-	-	4	33%	5	10%
Resources are fairly shared among the Center's partners and activities.	1	13%	1	8%	-	-	1	8%	3	6%

A17. What one thing most makes you feel that it's worth your time and effort to participate in the Center? (Coded responses to open-ended question)

	360° (N=15)		MNCEME (N=15)		CSITS (N-18)		HealthForce (N=18)		Total (N=66)	
	N	%	N	%	N	%	N	%	N	%
Networking with or meeting others	-	-	3	20%	6	33%	4	22%	13	20%
An improved or potential to improve the workforce	4	27%	4	27%	1	6%	3	17%	12	18%
Opportunity for industry to influence or get involved in education	3	20%	2	13%	5	28%	1	6%	11	17%
Opportunities offered by the Center (not specified)	2	13%	2	13%	1	6%	4	22%	9	14%
Improving awareness or public relations for the field or industry	4	27%	1	7%	2	11%	1	6%	8	12%
Improved or new collaboration and partnership (i.e. the group dynamics)	1	7%	2	13%	2	11%	2	11%	7	11%
The overall concept, mission, vision or focus of the Center	2	13%	-	-	3	17%	2	11%	7	11%
The innovated nature of the Center (i.e. being part of something unique)	-	-	1	7%	1	6%	3	17%	5	8%
Improved or potential for improving K-12 education	1	7%	2	13%	-	-	1	6%	4	6%
Improved or potential for improving higher education	2	13%	-	-	-	-	1	6%	3	5%
Information that comes out of the Center	-	-	-	-	-	-	1	6%	1	2%
Other	1	7%	2	13%	2	17%	1	6%	7	11%
Respondent questions the value of the center or not sure if it is worth the effort	1	7%	1	7%	-	-	1	6%	3	5%

A18. For each potential benefit of the Center, proportion of respondents who regard it as likely; most commonly expected time frame for seeing change; and percent of respondents who expect change within the first three years

Potential benefit of the Center	360° (N=15)				MNCEME (N=15)				CSITS (N=18)				HealthForce (N=18)				Total (N=66)			
	Very likely	Somewhat or very likely	Time frame in years	Percent within first three years	Very likely	Somewhat or very likely	Time frame in years	Percent within first three years	Very likely	Somewhat or very likely	Time frame in years	Percent within first three years	Very likely	Somewhat or very likely	Time frame in years	Percent within first three years	Very likely	Somewhat or very likely	Time frame in years	Percent within first three years
Better qualified or educated pool of employees available to employers	73%	100%	3-5	20%	53%	100%	1-3	53%	72%	100%	1-3	65%	28%	94%	3-5	35%	56%	99%	3-5	44%
Increase in the number of employees available to employers	60%	100%	3-5	27%	40%	93%	1-3	50%	61%	100%	1-3	65%	17%	83%	3-5	27%	44%	94%	3-5	43%
Opportunities for industry to influence college curriculum	47%	80%	1-3	67%	67%	93%	3-5	50%	50%	100%	3-5	59%	17%	78%	1-3	50%	44%	88%	1-3	56%
Upgrade skills of workers currently in the industry	47%	80%	1-3	58%	33%	100%	1-3	53%	39%	95%	1-3	63%	29%	94%	1-3	69%	37%	92%	1-3	61%
A more diverse pool of qualified employees	33%	93%	3-5	14%	23%	85%	1-3	55%	47%	88%	3-5	43%	11%	78%	5-10	36%	29%	87%	3-5	36%
Better information to make projections and preparations for future business strategies	14%	79%	1-3	46%	25%	83%	1-3	60%	24%	88%	1-3	50%	12%	63%	1-3	55%	18%	78%	1-3	52%
Applied research to advance the field and provide new industry practice	21%	93%	3-5	31%	33%	80%	1-3	58%	33%	83%	1-3	43%	24%	88%	3-5	7%	28%	86%	3-5	34%
Networking opportunities with industry peers	60%	100%	<1	93%	57%	78%	<1	100%	72%	100%	<1	100%	61%	94%	1-3	100%	63%	94%	<1	50%
Opportunities for industry to interact or become familiar with the work of K-12 schools	43%	100%	1-3	50%	21%	86%	3-5	50%	8%	68%	1-3	78%	33%	89%	1-3	81%	26%	85%	1-3	67%

A19. In general, do you feel that the Center has made adequate progress up to this point?

	360°		MNCEME		CSITS		HealthForce		Total	
	N	%	N	%	N	%	N	%	N	%
Yes	11	73%	7	47%	14	78%	12	67%	44	67%
No	3	20%	7	47%	1	6%	5	28%	16	24%
Don't know	1	7%	1	7%	3	17%	1	6%	6	9%
Totals	**15**	**100%**	**15**	**100%**	**18**	**100%**	**18**	**100%**	**66**	**100%**

A20. Do you feel that there is anything else the Center needs to do beyond its current initiatives or strategies to help it achieve sustained success?

	360°		MNCEME		CSITS		HealthForce		Total	
	N	%	N	%	N	%	N	%	N	%
Yes	9	60%	11	79%	7	50%	10	63%	37	63%
No	6	40%	3	21%	7	50%	6	38%	22	37%
Total	**15**	**100%**	**14**	**100%**	**14**	**100%**	**16**	**100%**	**59**	**100%**

A21. What activities, initiatives, or strategies that are currently <u>not being pursued</u> by the Center do you think are important to implement if the Center is going to succeed? (Top 5 categories coded from open-ended responses.)

	360° (N=9)		MNCEME (N=11)		CSITS (N=7)		HealthForce (N=10)		Total (N=37)	
	N	%	N	%	N	%	N	%	N	%
Increase efficiency of education or overcome MnSCU red-tape	1	11%	-	-	1	14%	2	20%	4	11%
Focus on funding or sustainability	3	33%	-	-	-	-	-	-	3	8%
Increase marketing, advertising, or public relations	1	11%	2	18%	2	29%	2	20%	7	19%
More focused strategy. (i.e. Take an idea and run with it)	1	11%	-	-	1	14%	1	10%	3	8%
Bring together or reach out more to industry	-	-	4	36%	2	29%	1	10%	7	19%

A22. To what extent do you agree or strongly agree with these statements about the Center.

	360° (N=12-15)		MNCEME (N=13-15)		CSITS (N=13-18)		HealthForce (N=11-18)		Total (N=51-66)	
	N	%	N	%	N	%	N	%	N	%
There is a stable list of businesses that participate in the Center.	12	80%	12	86%	15	100%	10	67%	49	83%
The Center has facilitated new partnerships, programming, and service.	11	78%	10	77%	13	87%	15	83%	49	82%
The Center serves as a model for future higher education and industry collaboration.	11	73%	10	67%	15	88%	13	72%	49	75%
Our organization is committed to the sustainability of the Center partnership through financial and other resources.	12	80%	12	86%	10	59%	10	63%	44	71%
The academic, industry, and K-12 partners all agree on a clear and consistent mission for the Center.	8	67%	7	50%	11	79%	5	46%	31	61%
You are well aware of what other participating organizations bring to and need from the Center.	5	39%	10	67%	8	47%	8	44%	31	49%
The Center is well-known among programs and businesses that do not directly participate in it.	2	15%	2	14%	1	8%	1	6%	6	11%

A23. What one thing most makes the Center uniquely different from any other entity? (Coded responses to open-ended question)

	360° (N=15)		MNCEME (N=15)		CSITS (N=18)		HealthForce (N=18)		Total (N=66)	
	N	%	N	%	N	%	N	%	N	%
Collaboration between education and industry	2	13%	4	27%	4	22%	6	33%	16	24%
General collaboration and partnership	3	20%	1	7%	1	6%	6	33%	11	17%
Its ability to work outside of the norm or without the usual restrictions	2	13%	1	7%	5	28%	2	11%	10	15%
Collaboration between educational institutions	5	33%	1	7%	2	11%	1	6%	9	14%
Its focus on the industry or field	1	7%	1	7%	1	6%	-	-	3	5%
Other	4	27%	2	13%	3	17%	2	11%	11	17%
Nothing or don't know	2	13%	5	33%	2	11%	2	11%	11	17%

A24. Do you feel that the overall Minnesota State College and University (MnSCU) system has a role to play in helping the Centers achieve sustained success?

	360°		MNCEME		CSITS		HealthForce		Total	
	N	%	N	%	N	%	N	%	N	%
Yes	14	93%	15	100%	17	100%	16	100%	62	98%
No	1	7%	-	-	-	-	-	-	1	2%
Don't know					1		2			
Total	**15**	**100%**	**15**	**100%**	**17**	**100%**	**16**	**100%**	**63**	**100%**

A25. What do you see as the Role of the MnSCU system to help the Center achieve or sustain success? (Top 5 categories coded from open-ended responses)

	360° (N=14)		MNCEME (N=15)		CSITS (N=17)		HealthForce (N=16)		Total (N=62)	
	N	%	N	%	N	%	N	%	N	%
Funding or providing financial support	6	43%	5	33%	8	47%	7	44%	26	42%
Reducing restrictions, barriers, or red tap (i.e. Get out of the way)	2	14%	2	13%	2	12%	6	38%	12	19%
Marketing, advertising, public relations, getting the word out	2	14%	3	20%	4	24%	1	6%	10	16%
Philosophical or ceremonial support (i.e. Legitimizing the effort.)	2	14%	5	33%	-	-	3	19%	10	16%
Advising or providing direction and vision	2	14%	2	13%	3	18%	2	13%	9	15%

A26. Do you feel that the Center's industry partners or sector has a role to play in helping the Centers achieve sustained success?

	360°		MNCEME		CSITS		HealthForce		Total	
	N	%	N	%	N	%	N	%	N	%
Yes	15	100%	15	100%	18	100%	17	94%	65	98%
No	-	-	-	-	-	-	1	6%	1	2%
Total	**15**	**100%**	**15**	**100%**	**18**	**100%**	**18**	**100%**	**66**	**100%**

A27. What do you see as the role of industry to help the Center achieve sustained success? (Top 5 categories coded from open-ended responses)

	360° (N=15)		MNCEME (N=15)		CSITS (N=18)		HealthForce (N=17)		Total (N=65)	
	N	%	N	%	N	%	N	%	N	%
Advising and providing guidance or information to help the Center make general strategic decisions	8	53%	7	47%`	6	33%	6	35%	27	42%
Funding or providing financial support or investment	8	53%	4	27%	2	11%	3	18%	17	26%
Advise specifically on higher education curriculum or customized training needs	3	20%	6	40%	1	6%	6	35%	16	25%
Provide opportunities for real-life experiences or training for students or educators	2	13%	2	13%	2	11%	1	6%	7	11%
Promotion of the Center or the industry	2	13%	0	0%	2	11%	1	6%	5	8%

A28. To what extent do you agree or strongly agree with these statements about the Center?

	360° (N=10-15)		MNCEME (N=11-15)		CSITS (N=12-17)		HealthForce (N=12-18)		Total (N=46-64)	
	N	%	N	%	N	%	N	%	N	%
Meetings typically generate lively discussion with a variety of viewpoints expressed.	12	86%	11	92%	14	88%	14	88%	51	88%
Participating industries and academic programs have a variety of needs and capacities.	15	100%	14	100%	17	100%	17	94%	63	98%
In the sector that the Center focuses on, there is a big gap between the number of qualified entry-level workers today and the projected need three years from now.	14	93%	16	93%	15	88%	16	94%	59	92%
The different schools, departments, and partners who are involved in the Center each have the latitude to scan and respond to their environments in their own way.	8	73%	10	83%	8	67%	12	71%	38	73%
The Center has identified at least one place where innovation is already occurring, that is wants to replicate, and expand on.	4	40%	7	64%	11	85%	12	100%	34	74%

Detail tables: Number and characteristics of students and graduates

The Centers of Excellence do not enroll students. To identify students most likely to be affected by Center activities, Wilder Research had the help of Center staff, associated programs, and Office of the Chancellor staff in a two-stage process. First we developed lists of programs most closely associated with each Center. Based on these lists, we then identified lists of courses that each Center considers most likely to include students in Center-affiliated programs, while not being of such general applicability as to also enroll a high percentage of other students.

Students identified by this method provide the best estimation of students likely to be affected by Center activities. However, these data should not be thought of as representing an exact count, or exact identification of "Center students." The method will unavoidably include some students who are not very closely associated with the Centers but who happen to be enrolled in one of the courses, and omit others who are closely involved in Center-associated programs, but are not taking any of the list's core courses during the year. In addition, identification of programs, courses, and students is more difficult for HealthForce, where because of their competitive, project-based selection of activities it is sometimes difficult to know in advance what programs or courses are most likely to be involved in the Center in any given year.

The tables below were prepared by Wilder Research using student data maintained and selected by staff in the Office of the Chancellor.

A29a. For-credit students and their course loads, by associated Center and institution

	FY 2006				FY 2007			
	Students	Credits	CoE Credits	% CoE	Students	Credits	CoE Credits	% CoE
360	**2,286**	**39,429**	**23,303**	**59%**	**2,445**	**40,247**	**24,397**	**61%**
Bemidji State University	754	14,394	6,847	48%	767	14,352	6,896	48%
Pine Tech. College	41	989	354	36%	55	1,024	441	43%
Saint Paul College	824	11,667	7,913	68%	888	11,521	7,983	69%
Saint Cloud Tech. College	236	4,810	2,977	62%	312	4,820	3,386	70%
Northwest Tech. – Bemidji	44	595	427	72%	39	458	331	72%
Central Lakes College	158	4,199	2,596	62%	161	4,557	2,947	65%
Minneapolis Com./Tech.	33	629	500	79%	47	872	733	84%
Northland Com./Tech.	196	2,146	1,689	79%	176	2,643	1,680	64%
MnCEME	**3,264**	**71,927**	**39,208**	**55%**	**3,536**	**78,170**	**42,331**	**54%**
MSU Mankato	898	24,691	9,116	37%	1,005	27,819	10,528	38%
Itasca Com. College	185	5,365	1,230	23%	178	5,335	1,172	22%
Vermillion Com. College	0	0	0	-	0	0	0	-
Normandale Com. College	78	1,486	344	23%	116	2,389	515	22%
Anoka Tech. College	335	5,954	4,080	69%	278	4,904	3,727	76%
Alexandria Tech. College	222	5,876	4,538	77%	213	6,006	4,733	79%
Hennepin Tech. College	1,051	15,749	10,936	69%	1,192	17,725	11,868	67%
South Central College	280	6,513	4,052	62%	293	6,363	4,171	66%
Hibbing Com. College	87	2,498	1,730	69%	89	2,466	1,755	71%
Mesabi Range Com./Tech	128	3,795	3,182	84%	172	5,163	3,862	75%
CSITS	**1,404**	**26,396**	**8,719**	**33%**	**1,464**	**27,895**	**9,023**	**32%**
Metro State University	1,051	20,825	5,683	27%	1,048	21,317	5,491	26%
Inver Hills Com. College	189	2,716	1,200	44%	234	3,555	1,748	49%
Minneapolis Com./Tech.	164	2,855	1,836	64%	182	3,023	1,784	59%
CIHSEP	**8,274**	**160,499**	**69,228**	**43%**	**8,668**	**166,955**	**72,365**	**43%**
Winona State University	1,708	43,763	16,992	39%	1,778	44,986	17,884	40%
Normandale Com. College	1,315	26,334	8,966	34%	1,389	26,880	8,662	32%
Pine Tech. College	290	4,974	3,459	70%	428	5,837	4,137	71%
MN State College – SE Tech.	651	11,683	7,318	63%	532	11,238	7,281	65%
Minneapolis Com./Tech.	1,423	21,660	12,596	58%	1,551	23,781	13,628	57%
Rochester Com./Tech.	1,332	26,317	9,996	38%	1,365	26,965	10,235	38%
Riverland Com. College	517	7,284	4,759	65%	524	7,240	4,604	64%
Ridgewater College	1,038	18,484	5,142	28%	1,101	20,028	5,934	30%

A29b. Non-credit students and their course loads, by associated Center and institution

	FY 2006				FY 2007			
	Students	Hours	CoE Hours	% CoE	Students	Hours	CoE Hours	% CoE
360	**733**	**20,775**	**17,807**	**86%**	**511**	**18,473**	**13,214**	**72%**
Bemidji State University	0	0	0	-	0	0	0	-
Pine Tech. College	54	1,401	987	70%	0	0	0	-
Saint Paul College	76	3,542	2,424	68%	50	2,685	2,112	79%
Saint Cloud Tech. College	194	2,727	2,397	88%	190	7,273	4,783	66%
Northwest Tech. – Bemidji	0	0	0	-	0	0	0	-
Central Lakes College	41	1,038	984	95%	20	286	144	50%
Minneapolis Com./Tech.	32	950	840	88%	14	514	336	65%
Northland Com./Tech.	336	11,118	10,176	92%	237	7,715	5,839	76%
MnCEME	**275**	**3,230**	**2,681**	**83%**	**411**	**5,300**	**5,007**	**94%**
MSU Mankato	0	0	0	-	0	0	0	-
Itasca Com. College	0	0	0	-	0	0	0	-
Vermillion Com. College	32	164	96	59%	23	87	71	82%
Normandale Com. College	0	0	0	-	0	0	0	-
Anoka Tech. College	0	0	0	-	0	0	0	-
Alexandria Tech. College	200	2,782	2,316	83%	268	4,408	4,194	95%
Hennepin Tech. College	0	0	0	-	0	0	0	-
South Central College	0	0	0	-	0	0	0	-
Hibbing Com. College	0	0	0	-	0	0	0	-
Mesabi Range Com./Tech	43	284	269	95%	120	805	742	92%
CSITS	**0**	**0**	**0**	**-**	**0**	**0**	**0**	**-**
Metro State University	0	0	0	-	0	0	0	-
Inver Hills Com. College	0	0	0	-	0	0	0	-
Minneapolis Com./Tech.	0	0	0	-	0	0	0	-
CIHSEP	**3,258**	**39,770**	**36,946**	**93%**	**3,526**	**74,285**	**62,246**	**84%**
Winona State University	0	0	0	-	0	0	0	-
Normandale Com. College	0	0	0	-	0	0	0	-
Pine Tech. College	177	3,115	2,873	92%	141	2,969	2,419	81%
MN State College – SE Tech.	735	6,817	5,248	77%	663	28,579	17,872	63%
Minneapolis Com./Tech.	1,515	19,768	19,327	98%	2,278	33,344	32,849	99%
Rochester Com./Tech.	155	2,119	2,095	99%	22	1,664	1,644	99%
Riverland Com. College	113	2,579	2,529	98%	116	2,744	2,622	96%
Ridgewater College	563	5,373	4,876	91%	306	4,986	4,840	97%

A30. Number of students and proportion of for-credit and non-credit students, by year, associated Center, and institution

	FY 2006				FY 2007			
	N	Credit only	Non-credit only	both	N	Credit only	Non-credit only	both
360°	**3,017**	**74%**	**24%**	**2%**	**2,953**	**80%**	**17%**	**2%**
Bemidji State University	754	100%	0%	0%	767	99%	0%	1%
Pine Tech. College	95	43%	57%	0%	55	98%	0%	2%
Saint Paul College	899	88%	8%	4%	938	91%	5%	4%
Saint Cloud Tech. College	429	54%	45%	2%	500	60%	38%	2%
Northwest Tech. – Bemidji	44	100%	0%	0%	39	100%	0%	0%
Central Lakes College	199	77%	21%	2%	180	87%	10%	3%
Minneapolis Com./Tech.	65	48%	49%	3%	61	75%	23%	2%
Northland Com./Tech.	532	35%	63%	2%	413	40%	57%	2%
MNCEME	**3,537**	**89%**	**8%**	**4%**	**3,941**	**86%**	**10%**	**4%**
MSU Mankato	898	100%	0%	0%	1,005	100%	0%	0%
Itasca Com. College	185	94%	0%	6%	178	98%	0%	2%
Vermillion Com. College	32	0%	100%	0%	23	0%	100%	0%
Normandale Com. College	78	99%	0%	1%	116	100%	0%	0%
Anoka Tech. College	335	99%	0%	1%	278	99%	0%	1%
Alexandria Tech. College	420	50%	46%	4%	475	37%	53%	10%
Hennepin Tech. College	1,051	99%	0%	1%	1,192	98%	0%	2%
South Central College	280	80%	0%	20%	293	81%	0%	19%
Hibbing Com. College	87	71%	0%	29%	89	94%	0%	6%
Mesabi Range Com./Tech	171	73%	25%	2%	292	54%	41%	4%
CSITS	**1,404**	**99%**	**0%**	**1%**	**1,464**	**100%**	**0%**	**0%**
Metro State University	1,051	100%	0%	0%	1,048	100%	0%	0%
Inver Hills Com. College	189	100%	0%	0%	234	100%	0%	0%
Minneapolis Com./Tech.	164	93%	0%	7%	182	98%	0%	2%
HealthForce	**10,682**	**66%**	**21%**	**13%**	**11,456**	**65%**	**23%**	**12%**
Winona State University	1,708	99%	0%	1%	1,778	100%	0%	0%
Normandale Com. College	1,315	96%	0%	4%	1,389	97%	0%	3%
Pine Tech. College	403	53%	28%	19%	471	67%	9%	24%
MN State College – SE Tech.	1,167	37%	41%	22%	1,153	41%	48%	11%
Minneapolis Com./Tech.	2,574	41%	41%	18%	3,397	33%	51%	16%
Rochester Com./Tech.	1,485	86%	10%	4%	1,387	96%	2%	3%
Riverland Com. College	627	81%	17%	2%	636	81%	16%	3%
Ridgewater College	1,403	45%	24%	32%	1,245	51%	11%	38%

A31. Graduates and awards, by Center and year

	FY06		FY07		Change		
	N	%	N	%	N	%	% pt
Overall Total Grads	**3,037**		**2,771**		**(266)**	**(9%)**	**-**
Certificate awarded	1,259	40%	998	32%	(261)	(21%)	(8%)
Diplomas awarded	687	22%	788	25%	101	15%	3%
2-year degrees	742	23%	923	29%	181	24%	6%
4-year degrees	421	13%	392	12%	(29)	(7%)	(1%)
Graduate awards	78	2%	67	2%	(11)	(14%)	0%
Total awards	3,187	100%	3,168	100%	(19)	(1%)	-
360° Total Grads	**283**		**375**		**92**	**33%**	**-**
Certificates awarded	55	19%	90	23%	35	64%	4%
Diplomas awarded	127	44%	172	43%	45	35%	(1%)
2-year degrees	33	11%	66	17%	33	100%	6%
4-year degrees	71	25%	71	18%	0	0%	(7%)
Graduate awards	**		**				
Total awards	287	100%	400	100%	113	39%	-
MNCEME Total Grads	**458**		**426**		**(32)**	**(7%)**	**-**
Certificates awarded	61	12%	47	9%	(14)	(23%)	(3%)
Diplomas awarded	128	26%	190	38%	62	48%	12%
2-year degrees	160	32%	167	34%	7	4%	2%
4-year degrees	133	27%	74	15%	(59)	(44%)	(12%)
Graduate awards	16	3%	20	4%	4	25%	1%
Total awards	498	100%	498	100%	0	0%	
CSITS Total Grads	**132**		**141**		**9**	**7%**	**-**
Certificates awarded	31	19%	41	23%	10	32%	4%
Diplomas awarded	**		**				
2-year degrees	20	12%	26	14%	6	30%	2%
4-year degrees	83	51%	94	52%	11	13%	1%
Graduate awards	24	15%	18	10%	(6)	(25%)	(5%)
Total awards	163	100%	182	100%	19	12%	
HealthForce Total Grads	**2,164**		**1,829**		**(335)**	**(15%)**	**-**
Certificates awarded	1,112	50%	820	39%	(292)	(26%)	(11%)
Diplomas awarded	427	19%	423	20%	(4)	(1%)	1%
2-year degrees	529	24%	664	32%	135	26%	8%
4-year degrees	134	6%	153	7%	19	14%	1%
Graduate awards	37	2%	28	1%	(9)	(24%)	(1%)
Total awards	2,239	100%	2,088	100%	(151)	(7%)	-

** *Small but non-zero number; data suppressed to preserve confidentiality.*

A32. Total number of for-credit and non-credit students, by Center and institution

	For-credit students				Non-credit students			
	Students		Change		Students		Change	
	FY06	FY07	N	%	FY06	FY07	N	%
360°	2,286	2,445	159	7%	**733**	**511**	**(222)**	**(30%)**
Bemidji State University	754	767	13	2%	0	0	-	-
Pine Tech. College	41	55	14	34%	54	0	(54)	(100%)
Saint Paul College	824	888	64	8%	76	50	(26)	(34%)
Saint Cloud Tech. College	236	312	76	32%	194	190	(4)	(2%
Northwest TC – Bemidji	44	39	(5)	(11%)	0	0	-	-
Central Lakes College	158	161	3	2%	41	20	(21)	(51%)
Minneapolis Com./Tech.	33	47	14	42%	32	14	(18)	(56%)
Northland Com./Tech.	196	176	(20)	(10%)	336	237	(99)	(29%)
MNCEME	3,264	3,536	272	8%	**275**	**411**	**136**	**49%**
MSU, Mankato	898	1,005	107	12%	0	0	-	-
Itasca Com. College	185	178	(7)	(4%)	0	0	-	-
Vermillion Com. College	0	0	-	-	32	23	(9)	(28%)
Normandale Com. College	78	116	38	49%	0	0	-	-
Anoka Tech. College	335	278	(57)	(17%)	0	0	-	-
Alexandria Tech. College	222	213	(9)	(4%)	200	268	68	34%
Hennepin Tech. College	1,051	1,192	141	13%	0	0	-	-
South Central College	280	293	13	5%	0	0	-	-
Hibbing Com. College	87	89	2	2%	0	0	-	-
Mesabi Range Com./Tech	128	172	44	34%	43	120	77	179%
CSITS	1,404	1,464	60	4%	**0**	**0**	**-**	**-**
Metro State University	1,051	1,048	(3)	0%	0	0	-	-
Inver Hills Com. College	189	234	45	24%	0	0	-	-
Minneapolis Com./Tech.	164	182	18	11%	0	0	-	-
HealthForce	8,274	8,668	394	5%	**3,258**	**3,526**	**268**	**8%**
Winona State University	1,708	1,778	70	4%	0	0	-	-
Normandale Com. College	1,315	1,389	74	6%	0	0	-	-
Pine Tech. College	290	428	138	48%	177	141	(36)	(20%)
MN State College–SE Tech.	651	532	(119)	(18%)	735	663	(72)	(10%)
Minneapolis Com./Tech.	1,423	1,551	128	9%	1,515	2,278	763	50%
Rochester Com./Tech.	1,332	1,365	33	2%	155	22	(133)	(86%)
Riverland Com College	517	524	7	1%	113	116	3	3%
Ridgewater College	1,038	1,101	63	6%	563	306	(257)	(46%)

A33. Total number of for-credit and non-credit students, by Center and year

	For-credit students				Non-credit students			
	Students		Change		Students		Change	
	FY06	FY07	N	%	FY06	FY07	N	%
360°	2,286	2,445	159	7%	733	511	(222)	(30%)
MNCEME	3,264	3,536	272	8%	275	411	136	49%
CSITS	1,404	1,464	60	4%	0	0	-	-
HealthForce	8,274	8,668	394	5%	3,258	3,526	268	8%
OVERALL	**15,228**	**16,113**	**885**	**6%**	**4,266**	**4,448**	**182**	**4%**

A34. For-credit students' total credits and credits in Center-related courses, by Center and year

	For-credit students				For-credit students			
	Total credits		Change		Credits in Center-related courses		Change	
	FY06	FY07	N	%	FY06	FY07	N	%
360°	39,429	40,247	818	2%	23,303	24,397	1,094	5%
MNCEME	71,927	78,170	6,243	9%	39,208	42,331	3,123	8%
CSITS	26,396	27,895	1,499	6%	8,719	9,023	304	3%
HealthForce	160,499	166,955	6,456	4%	69,228	72,365	3,137	5%
OVERALL	**298,251**	**313,267**	**15,016**	**5%**	**140,458**	**148,116**	**7,658**	**5%**

A35. Non-credit students' total hours and hours in Center-related courses, by Center and year

	Non Credit students				Non Credit Students			
	Total hours		Change		Hours in Center-related courses		Change	
	FY06	FY07	N	%	FY06	FY07	N	%
360°	20,775	18,473	(2,303)	(11%)	17,807	13,214	(4,593)	(26%)
MNCEME	3,230	5,300	2,070	64%	2,681	5,007	2,326	87%
CSITS	0	0	-	-	0	0	-	-
HealthForce	39,770	74,285	34,515	87%	36,946	62,246	25,300	68%
OVERALL	**63,775**	**98,058**	**34,283**	**54%**	**57,434**	**80,467**	**23,033**	**40%**

A36. For-credit students' total credits and credits in Center-related courses, by Center, institution, and year

	For-credit students				For credit students			
	Total hours		Change		CoE hours		Change	
	FY06	FY07	N	%	FY06	FY07	N	%
360°	**39,429**	**40,247**	**818**	**2%**	**23,303**	**24,397**	**1,094**	**5%**
Bemidji State University	14,394	14,352	(42)	0%	6,847	6,896	49	1%
Pine Tech. College	989	1,024	35	4%	354	441	87	25%
Saint Paul College	11,667	11,521	(146)	(1%)	7,913	7,983	70	1%
Saint Cloud Tech. College	4,810	4,820	10	0%	2,977	3,386	409	14%
Northwest TC – Bemidji	595	458	(137)	(23%)	427	331	(96)	(22%)
Central Lakes College	4,199	4,557	358	9%	2,596	2,947	351	14%
Minneapolis Com./Tech.	629	872	243	39%	500	733	233	47%
Northland Com./Tech.	2,146	2,643	497	23%	1,689	1,680	(9)	(1%)
MNCEME	**71,927**	**78,170**	**6,243**	**9%**	**39,208**	**42,331**	**3,123**	**8%**
MSU, Mankato	24,691	27,819	3,128	13%	9,116	10,528	1,412	15%
Itasca Com. College	5,365	5,335	(30)	(1%)	1,230	1,172	(58)	(5%)
Vermillion Com. College	0	0	--	--	0	0	--	--
Normandale Com. College	1,486	2,389	903	61%	344	515	171	50%
Anoka Tech. College	5,954	4,904	(1,050)	(18%)	4,080	3,727	(353)	(9%)
Alexandria Tech. College	5,876	6,006	130	2%	4,538	4,733	195	4%
Hennepin Tech. College	15,749	17,725	1,976	13%	10,936	11,868	932	9%
South Central College	6,513	6,363	(150)	(2%)	4,052	4,171	119	3%
Hibbing Com. College	2,498	2,466	(32)	(1%)	1,730	1,755	25	1%
Mesabi Range Com./Tech	3,795	5,163	1,368	36%	3,182	3,862	680	21%
CSITS	**26,396**	**27,895**	**1,499**	**6%**	**8,719**	**9,023**	**304**	**3%**
Metro State University	20,825	21,317	492	2%	5,683	5,491	(192)	(3%)
Inver Hills Com. College	2,716	3,555	839	31%	1,200	1,748	548	46%
Minneapolis Com./Tech.	2,855	3,023	168	6%	1,836	1,784	(52)	(3%)
HealthForce	**160,499**	**166,955**	**6,456**	**4%**	**69,228**	**72,365**	**3,137**	**5%**
Winona State University	43,763	44,986	1,223	3%	16,992	17,884	892	5%
Normandale Com. College	26,334	26,880	546	2%	8,966	8,662	(304)	(3%)
Pine Tech. College	4,974	5,837	863	17%	3,459	4,137	678	20%
MN State College–SE Tech.	11,683	11,238	(445)	(4%)	7,318	7,281	(37)	(1%)
Minneapolis Com./Tech.	21,660	23,781	2,121	10%	12,596	13,628	1,032	8%
Rochester Com./Tech.	26,317	26,965	648	2%	9,996	10,235	239	2%
Riverland Com College	7,284	7,240	(44)	(1%)	4,759	4,604	(155)	(3%)
Ridgewater College	18,484	20,028	1,544	8%	5,142	5,934	792	15%

A37. Non-credit students' total hours and hours in Center-related courses, by Center, institution, and year

	Non credit students				Non credit students			
	Total hours		Change		CoE hours		Change	
	FY06	FY07	N	%	FY06	FY07	N	%
360°	**20,775**	**18,473**	**(2,303)**	**-11%**	17,807	13,214	(4,593)	(26%)
Bemidji State University	0	0	-	-	0	0	-	-
Pine Tech. College	1,401	0	(1,401)	(100%)	987	0	(987)	(100%)
Saint Paul College	3,542	2,685	(857)	(24%)	2,424	2,112	(312)	(13%)
Saint Cloud Tech. College	2,727	7,273	4,546	167%	2,397	4,783	2,386	100%
Northwest TC – Bemidji	0	0	-	-	0	0	-	-
Central Lakes College	1,038	286	(752)	(72%)	984	144	(840)	(85%)
Minneapolis Com./Tech.	950	514	(436)	(46%)	840	336	(504)	(60%)
Northland Com./Tech.	11,118	7,715	(3,403)	(31%)	10,176	5,839	(4,337)	(43%)
MNCEME	**3,230**	**5,300**	**2,070**	**64%**	2,681	5,007	2,326	87%
MSU, Mankato	0	0	-	-	0	0	-	-
Itasca Com. College	0	0	-	-	0	0	-	-
Vermillion Com. College	164	87	(77)	(47%)	96	71	(25)	(26%)
Normandale Com. College	0	0	-	-	0	0	-	-
Anoka Tech. College	0	0	-	-	0	0	-	-
Alexandria Tech. College	2,782	4,408	1,626	58%	2,316	4,194	1,878	81%
Hennepin Tech. College	0	0	-	-	0	0	-	-
South Central College	0	0	-	-	0	0	-	-
Hibbing Com. College	0	0	-	-	0	0	-	-
Mesabi Range Com./Tech	284	805	521	183%	269	742	473	176%
CSITS	**0**	**0**	-	-	0	0	-	-
Metro State University	0	0	-	-	0	0	-	-
Inver Hills Com. College	0	0	-	-	0	0	-	-
Minneapolis Com./Tech.	0	0	-	-	0	0	-	-
HealthForce	**39,770**	**74,285**	**34,515**	**87%**	36,946	62,246	25,300	68%
Winona State University	0	0	-	-	0	0	-	-
Normandale Com. College	0	0	-	-	0	0	-	-
Pine Tech. College	3,115	2,969	(146)	-5%)	2,873	2,419	(454)	(16%)
MN State College–SE Tech.	6,817	28,579	21,762	319%	5,248	17,872	12,625	241%
Minneapolis Com./Tech.	19,768	33,344	13,576	69%	19,327	32,849	13,523	70%
Rochester Com./Tech.	2,119	1,664	(455)	(21%)	2,095	1,644	(451)	(22%)
Riverland Com College	2,579	2,744	166	6%	2,529	2,622	94	4%
Ridgewater College	5,374	4,986	(388)	(7%)	4,876	4,840	(36)	(1%)

A38. Average and median age of students, by Center, institution, and year

	2006		2007		Change	
	Ave	Med	Ave	Med	Ave	Med
360°	**30**	**25**	**28**	**24**	**(2)**	**(1)**
Bemidji State University	28	23	28	23	0	0
Pine Tech. College	34	30	24	20	(10)	(10)
Saint Paul College	29	26	28	26	(1)	0
Saint Cloud Tech. College	28	23	26	20	(2)	(3)
Northwest Tech. – Bemidji	23	21	23	21	0	0
Central Lakes College	27	20	23	20	(4)	0
Minneapolis Com./Tech.	33	33	34	32	1	(1)
Northland Com./Tech.	36	36	35	34	(1)	(2)
MNCEME	**27**	**22**	**27**	**22**	**0**	**0**
MSU Mankato	22	21	22	21	0	0
Itasca Com. College	20	19	20	19	(1)	0
Vermillion Com. College	47	50	47	45	0	(5)
Normandale Com. College	24	23	25	23	1	1
Anoka Tech. College	24	20	24	19	(1)	(1)
Alexandria Tech. College	31	26	31	25	0	(1)
Hennepin Tech. College	32	31	32	29	0	(2)
South Central College	25	21	24	21	0	0
Hibbing Com. College	21	20	22	20	1	0
Mesabi Range Com./Tech	28	23	32	27	5	4
CSITS	**30**	**28**	**30**	**28**	**0**	**0**
Metro State University	30	28	30	28	0	0
Inver Hills Com. College	28	24	29	26	1	2
Minneapolis Com./Tech.	31	29	29	28	(1)	(1)
HealthForce	**28**	**23**	**27**	**23**	**(1)**	**0**
Winona State University	23	20	23	20	0	0
Normandale Com. College	26	23	26	23	0	0
Pine Tech. College	30	26	26	22	(3)	(4)
MN State College – SE Tech.	29	24	28	24	(1)	0
Minneapolis Com./Tech.	33	29	31	28	(1)	(1)
Rochester Com./Tech.	27	23	26	23	(1)	0
Riverland Com. College	30	26	30	26	(1)	0
Ridgewater College	28	23	26	22	(2)	(1)

A39. Missing data for estimates of student demographics

		FY06		FY07	
		N	%	N	%
Students of color (chart 9, page 52)	360°	208	9%	188	8%
	MnCEME	233	7%	257	7%
	CSITS	270	19%	214	15%
	HealthForce	473	6%	484	6%
	Overall	**1,184**	**8%**	**1,143**	**7%**
Female students (chart 10, page 53)	360°	26	1%	3	<1%
	MnCEME	11	<1%	24	1%
	CSITS	174	12%	150	10%
	HealthForce	89	1%	105	1%
	Overall	**300**	**2%**	**282**	**2%**
First-generation college students (chart 11, page 54)	360°	908	40%	1,030	42%
	MnCEME	807	25%	746	21%
	CSITS	416	30%	346	24%
	HealthForce	1,416	17%	1,335	15%
	Overall	**3,547**	**23%**	**3,457**	**21%**
Non Credit students (chart 12, page 55)	U.S. Students of Color	1,657	39%	2,121	48%
	Female students	719	17%	1,500	34%
	1st generation college students	2,839	67%	3,224	72%
	Students 35-44	1,233	29%	1,744	39%
	Students 45+	1,233	29%	1,744	39%
For-Credit students (chart 12, page 55)	Students 35-44	477	3%	536	3%
	Students 45+	477	3%	536	3%

A40. Missing data for estimates of graduate demographics

		FY06		FY07	
		N	%	N	%
Graduates of color (chart 14, page 57)	Certificates awarded	137	11%	71	7%
	Diplomas/2-year degrees	57	4%	131	8%
	4-year degrees	102	24%	81	21%
	Graduate degrees	15	19%	14	21%
	Unduplicated graduates	**303**	**10%**	**205**	**7%**
Female graduates (chart 15, page 53)	360°	3	1%	1	<1%
	MnCEME	14	3%	2	<1%
	CSITS	28	21%	17	12%
	HealthForce	18	1%	20	1%
	Overall graduates	**63**	**2%**	**40**	**1%**
First-generation college students receiving degrees (chart 16, page 59)	360°	97	34%	105	28%
	MnCEME	97	21%	79	19%
	CSITS	53	40%	45	32%
	HealthForce	392	18%	311	17%
	Overall graduates	639	21%	540	19%
	Certificates awarded	285	23%	180	19%
	Dimplomas/2-yr degrees	169	12%	306	18%
	Four-year degrees	150	36%	119	31%
	Graduate degrees	45	58%	37	55%