M7 STEM WHITE PAPER: FINAL REPORT

Presentation
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Be Careful What You Say! You might get asked to put your actions where your mouth is!

How an idea gets started

1. MPS & Project Lead The Way Meeting, December 2006

2. Partnership between Marquette University and the Milwaukee Area Workforce Investment Board

3. Project Proposal

4. Project Team

How an idea gets started continued:

5. Project Deliverables
    a. Overview Inventory Report
    b. SWOT Analysis
    c. White Paper

10 Reasons Why This Paper Is Important to M7

1. There is significant lack of diversity in terms of who participates in STEM in the region.

2. There are very few African-American and Hispanic Scientists and Engineers in the region. The White Paper is a tool in our regional tool kit to do something about the dismal number of African-American and Hispanic math and science majors at our regional colleges and universities.

3. Connects the dots
   - regional
   - statewide
   - national
   - global

10 Reasons Why This Paper Is Important to M7 continued:

4. Blueprint for establishing M7 as an emerging scientific innovative regional player

5. The region's economic health is directly tied to how well it succeeds or fail in developing a competitive STEM culture

6. It's an example and reminder of the type of creative byproduct that can be produced when you assemble diverse talent and give them an assignment with inclusiveness as a dominant value

7. It is one of the "Access Road Maps" out of our regional storm

10 Reasons Why This Paper Is Important to M7 continued:

8. The White Paper answers 3 fundamental STEM questions
    A. Who are we as a region
    B. Where are we trying to go as a region
    C. How do we get there

9. The White Paper invites new conservation about STEM with new language, new ideas, new designs, new possibilities

10. The first regional document of its kind in the country/global competitive advantage

Basic Facts about the M7 Region, the State of Wisconsin, and America

1. The market demand for STEM professionals has been growing at nearly twice the rate of the production of math and science majors at American colleges and universities.

Basic Facts about the M7 Region, the State of Wisconsin, and America, continued:

2. According to the National Science Foundation, the nation is facing a severe shortage of engineers and individuals trained at the Ph.D. level in technology, especially native-born Americans.

   Over reliance on foreign nationals:

   - scientists and engineers
   - students in undergraduate and graduate Stem majors, especially at the Ph.D. level
   - patents and discoveries
   - firm creation, workforce development, economic development, wealth creation
   - education (professorial and instructional needs)

Basic Facts about the M7 Region, the State of Wisconsin, and America, continued:

3. According to a report published in 2000, Wisconsin ranked 23rd nationally regarding the number of Ph.D. scientists, and 26th nationally with regard to the number of Ph.D. engineers.

4. In terms of a STEM ecosystem, 85% of high-growth (high-tech) businesses created in the United States over the last two decades have been established by college-educated (meaning a 4 year degree) individuals.

Basic Facts about the M7 Region, the State of Wisconsin, and America, continued:

5. In the M7 region there is severe underrepresentation of racial and ethnic minorities in the STEM community.

M7 STEM Inventory
1062 STEM Educational Programs

Table 1: Number of Programs by Level Grouped

Level	Number of Programs
Adult Programming	783
Programming for Children	279

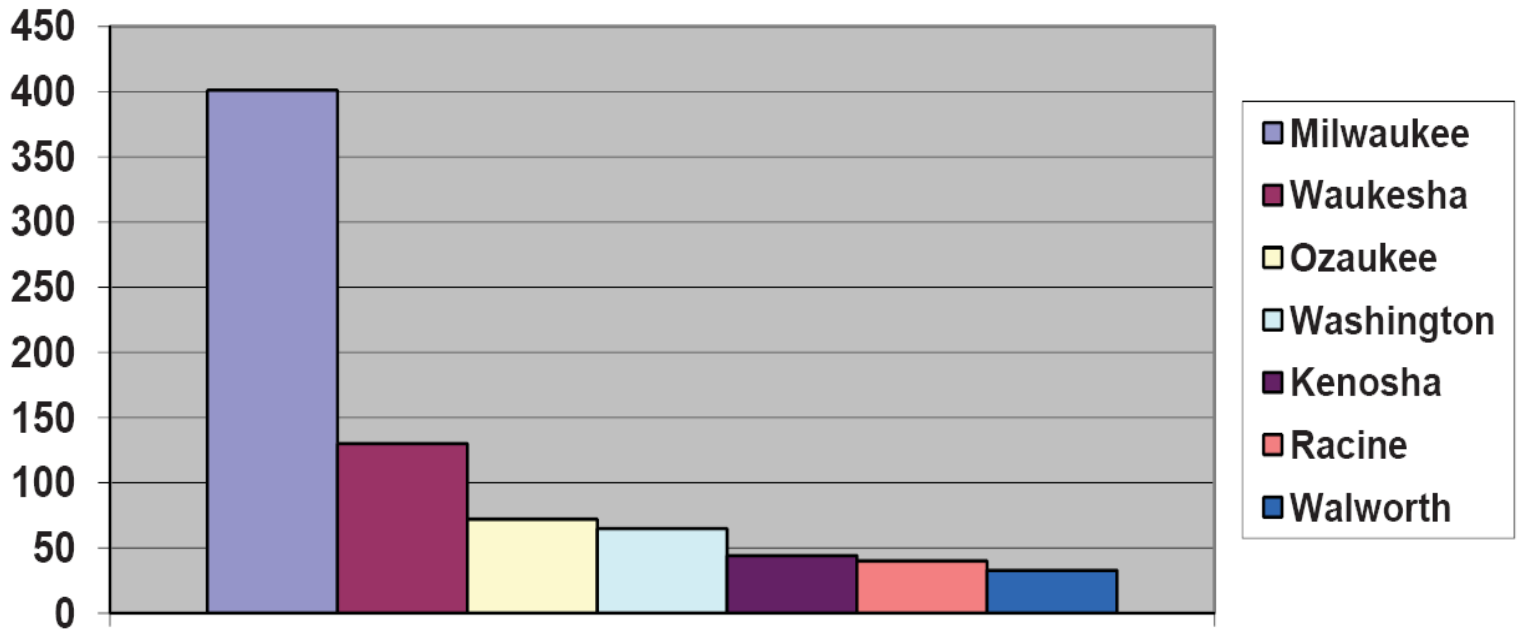
Adult Programs in the Region

Table 2: Number of Programs by County

County	Number Of Programs
Milwaukee	401
Waukesha	130
Ozaukee	72
Washington	65
Kenosha	44
Racine	40
Walworth	33

Adult Programs in the Region continued:

Figure 1: Number of Programs by County



Adult Programs in the Region continued:

Table 3: Number of Programs by STEM area by County

	Kenosha	Milwaukee	Ozaukee	Racine	Walworth	Washington	Waukesha
Science	19	183	29	3	4	47	76
Technology	17	155	11	28	19	6	28
Engineering	1	42	1	7	6	1	14
Math	7	48	28	4	7	11	20

Adult Programs in the Region continued:

Table 4: Number of Programs for Adults by Provider

Provider	Number of Programs
Milwaukee Area Technical College	224
Gateway Technical College	86
UW Waukesha	80
Marquette University	58
UW Washington County	57
UW Milwaukee	54
DeVry University	27
Milwaukee School of Engineering	24
Carroll College	21
UW Whitewater	19
WCTC	18
Cardinal Stritch University	16
Concordia University	14
UW Parkside	11
Mount Mary College	10
ITT Technical Institute	10
Alverno College	9
Carthage College	8

Table 4: Continued

Table 4: Number of Programs for Adults by Provider

Provider	Number of Programs
Moraine Park Technical College	8
Wisconsin Lutheran College	8
Milwaukee Career College	4
Upper Iowa University	3
Ottowa University	3
Medical College of Wisconsin	3
Project Lead the Way	2
University of Phoenix	2
Lakeland College	2
Goodwill Industries	2
Hands on Technology Transfer, INC.	1

Adult Programs in the Region continued:

Table 5: Number of Programs for Adults by Level

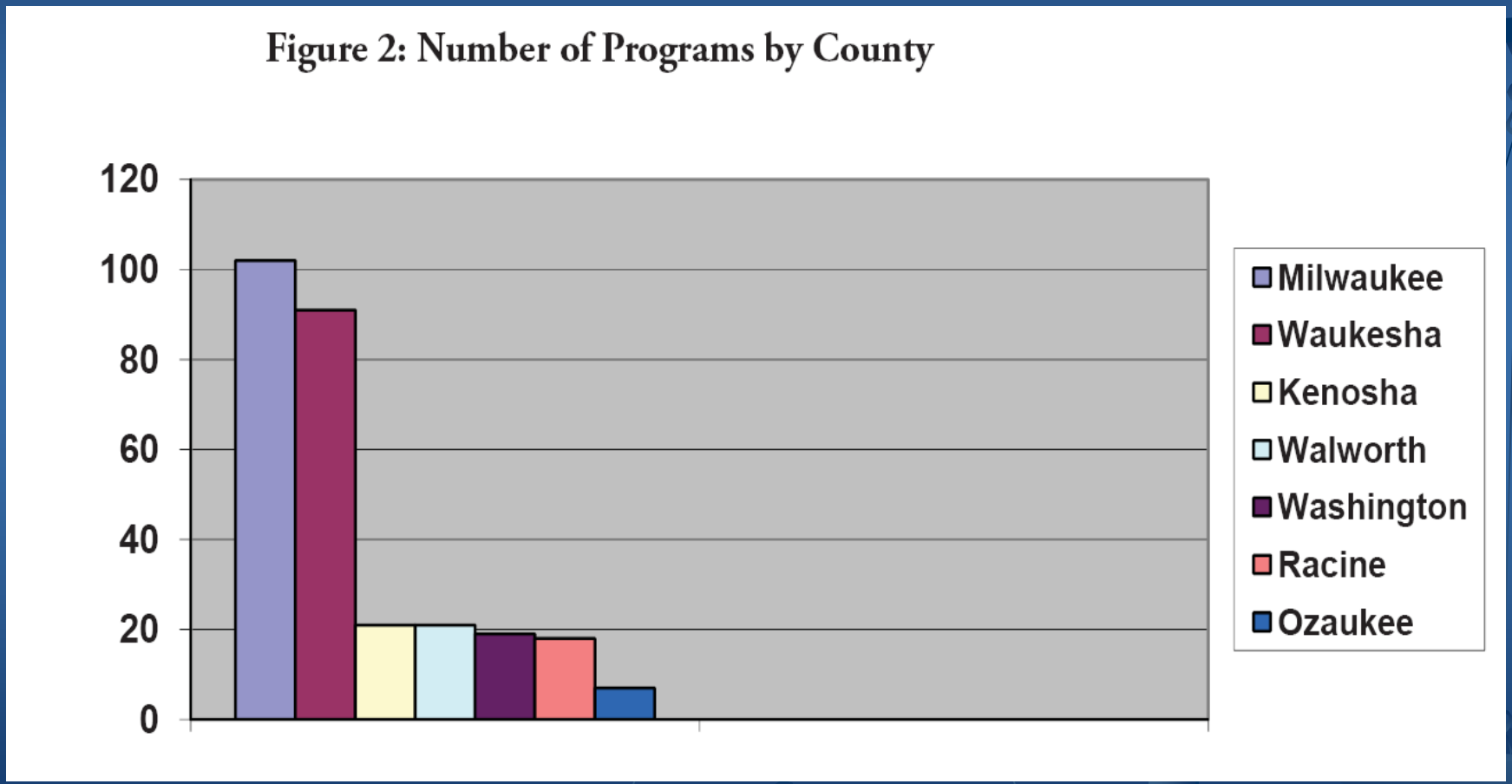
Level	Number of Programs
Graduate	78
Undergraduate	515
Postsecondary	188
Adult Education	3

Children Programs in the Region

Table 6: Number of Programs by County

County	Number Of Programs
Milwaukee	102
Waukesha	91
Kenosha	21
Walworth	21
Washington	19
Racine	18
Ozaukee	7

Children Programs in the Region continued:



Children Programs in the Region continued:

Table 7: Number of Programs by County and Level

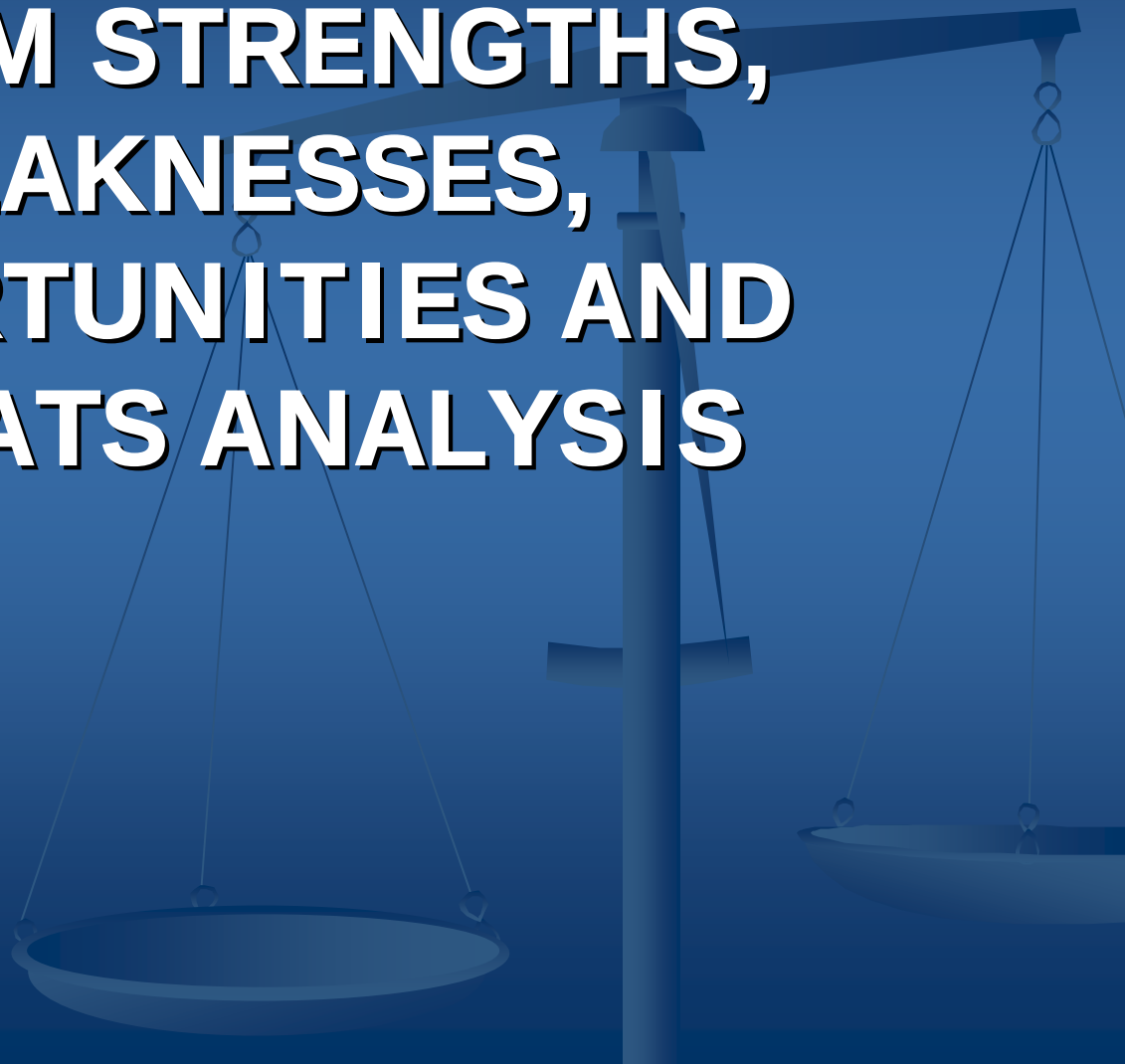
	Kenosha	Milwaukee	Ozaukee	Racine	Walworth	Washington	Waukesha
Elementary	3	27	2	3	2	6	31
Middle School	3	28	2	7	5	6	32
High School	15	46	3	7	14	8	28

Children Programs in the Region continued:

Table 8: Number of Programs for Children by Level

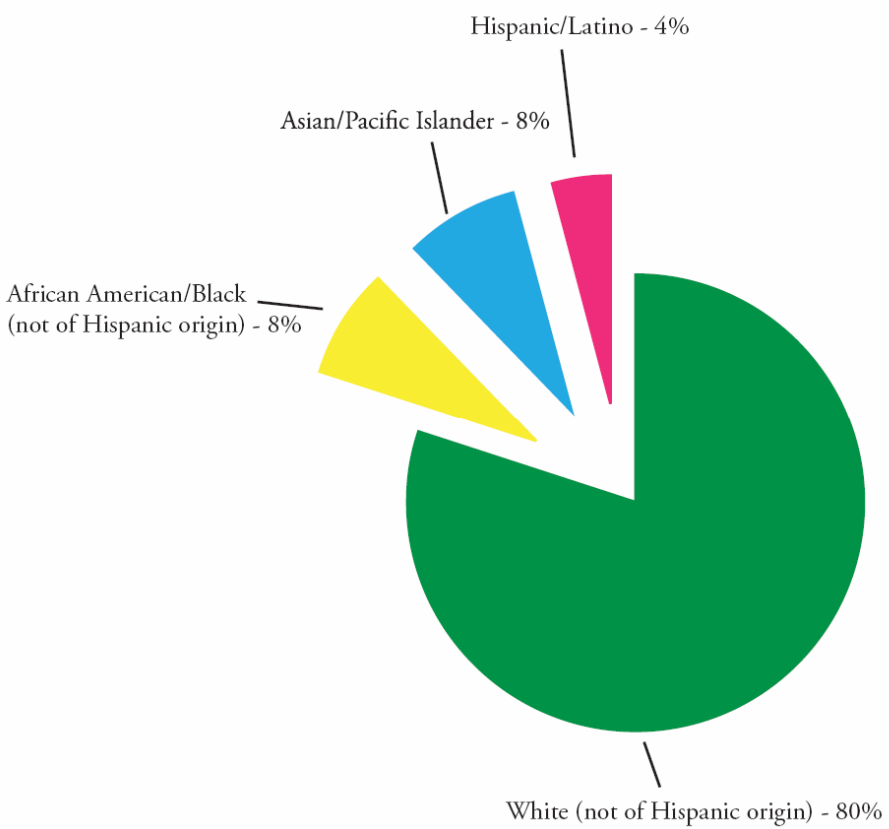
Level	Number of Programs
High School	121
Middle School	83
Elementary	74

M7 STEM STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS ANALYSIS



Demographics

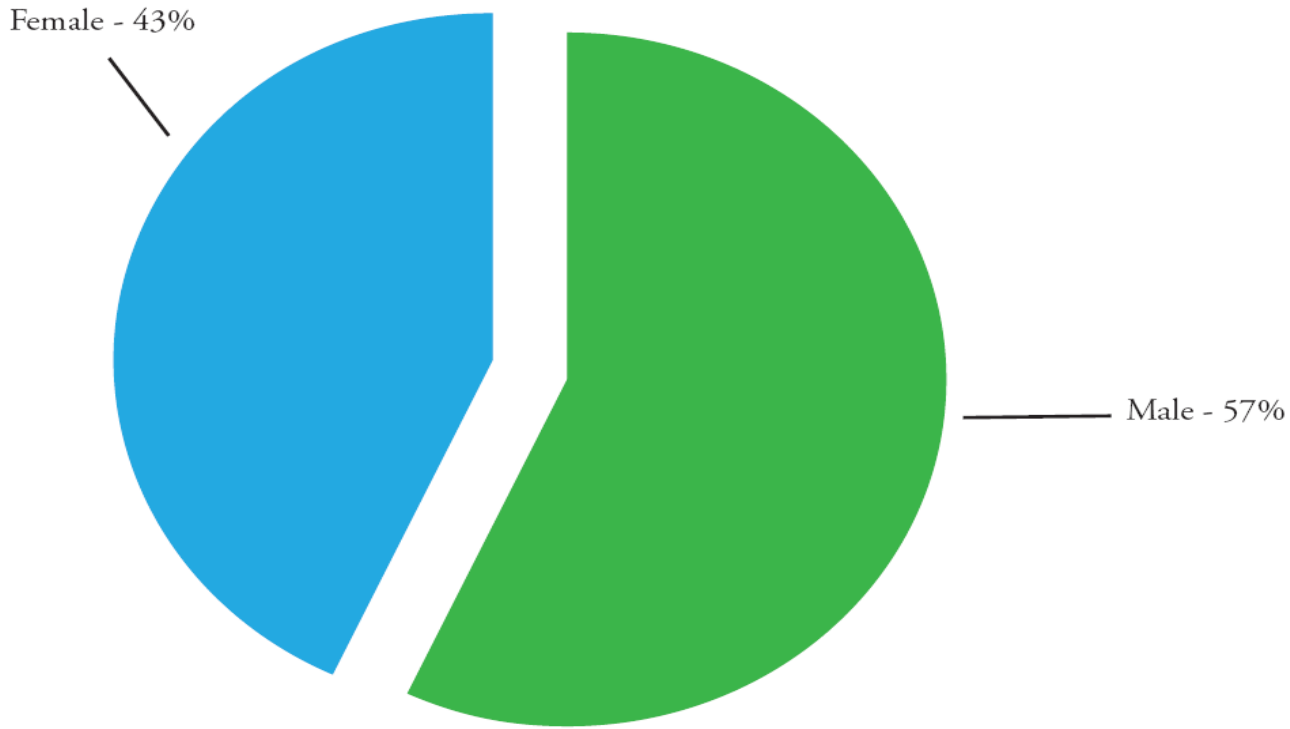
FIGURE 1
RACE/ETHNICITY OF RESPONDENTS



Source: Regional STEM Survey 2007

Demographics continued:

FIGURE 2
GENDER OF RESPONDENTS



Source: Regional STEM Survey 2007

Demographics continued:

TABLE 2
PERCENT RESPONDENTS BY COUNTY

County	Percentage
Kenosha	2%
Milwuakee	74%
Ozaukee	4%
Racine	6%
Walworth	1%
Washington	2%
Waukesha	7%
Other	4%

Source: Regional STEM Survey 2007

STRENGTHS

1. Programs in the region's educational pipeline
    a. Project Lead the Way
    b. Upward Bound
    c. INROADS/Wisconsin
    d. Minority Engineering Program at Marquette University and the University of Wisconsin-Milwaukee
    e. Society of Hispanic Engineering Professionals
    f. The National Society of Black Engineers
    g. Society of Women Engineers

Note:

Marquette University is ranked 9th in the nation in terms of awarding bachelor's degrees to women in Biomedical Engineering and ranked 16th in terms of awarding bachelor's degrees to women in Engineering (as a whole).

Did you know?

1. Rensselaer Polytechnic Institute (#1) Biomedical Engineering
2. University of Southern California (#9) Biomedical Engineering
3. Brown University (#9) Biomedical Engineering
4. Michigan Technological University (#7) Biomedical Engineering
5. University of Miami (#19) Biomedical Engineering
6. University of California, Berkeley (#20) Biomedical Engineering
7. Tennessee State University (#1) Engineering Degrees to Women
8. University of Puerto Rico, Mayaguez (#2) Engineering Degrees to Women
9. Alabama A&M University (#4) Engineering Degrees to Women
10. Tuskegee University (#5) Engineering Degrees to Women
11. Morgan State University (#20) Engineering Degrees to Women

What people are saying in the Region

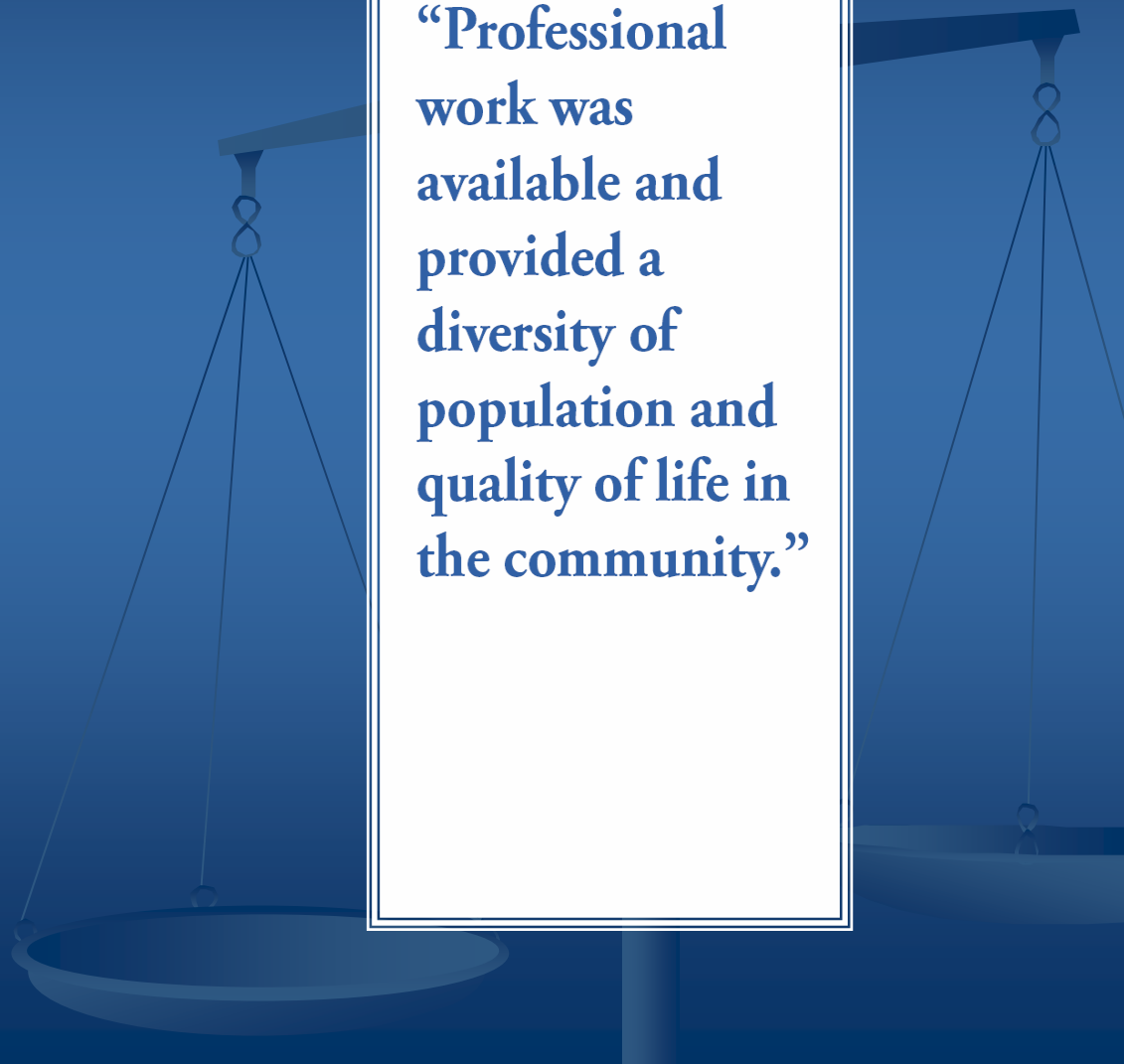
"I was attracted to the Milwaukee area in general because of its progressive history, overall quality of life, and educational opportunities."

"I think UW-Milwaukee is an excellent university, and my family has made a wonderful home in the Milwaukee area."

What people are saying in the Region continued:

"There was a potential for research growth with the proximity of world-class research and development firms (i.e., GE, Rockwell, and Eaton)."

"Professional work was available and provided a diversity of population and quality of life in the community."



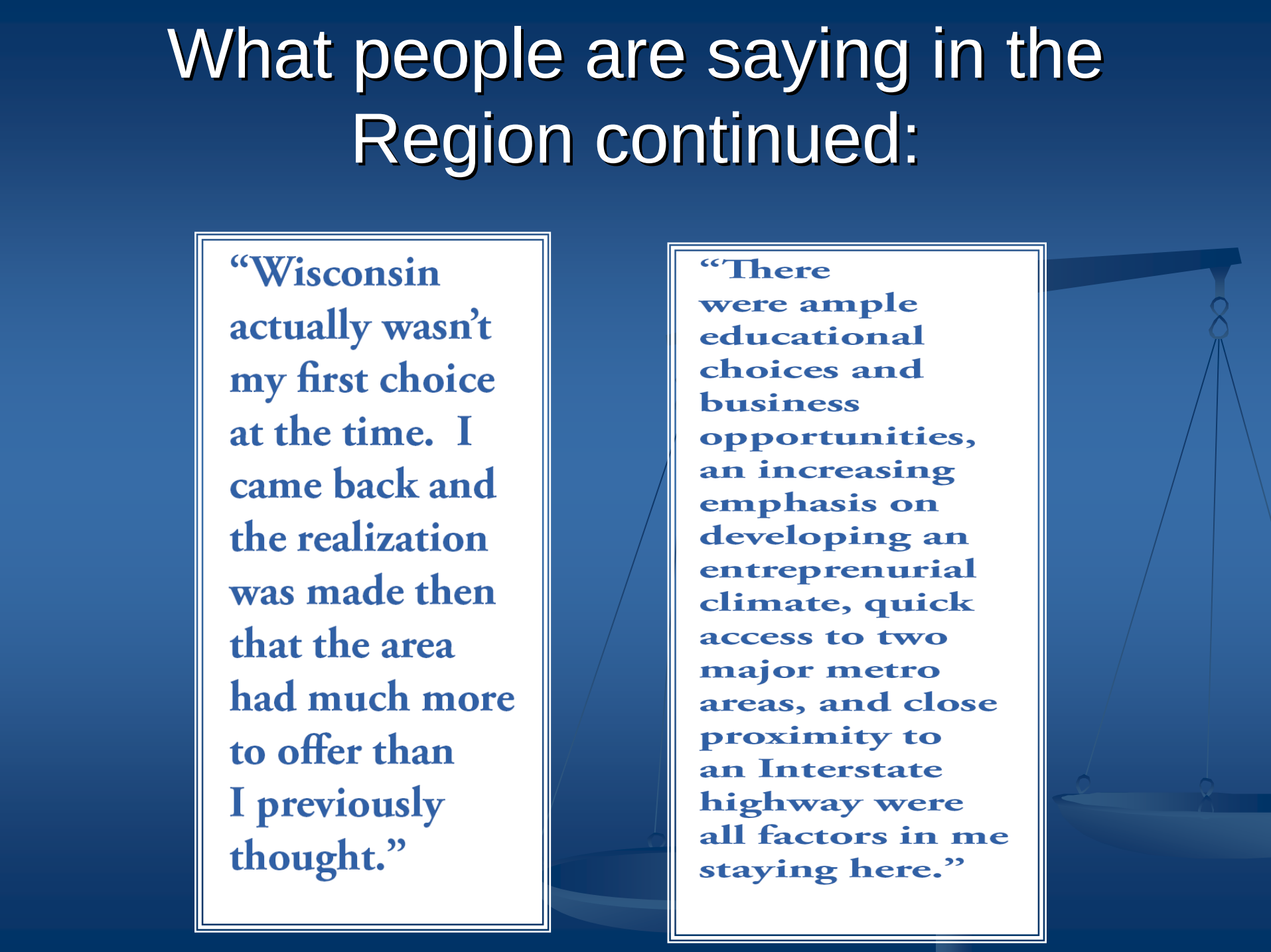
What people are saying in the Region continued:

"There are great job opportunities and a strong business sector."

What people are saying in the Region continued:

"Wisconsin actually wasn't my first choice at the time. I came back and the realization was made then that the area had much more to offer than I previously thought."

"There were ample educational choices and business opportunities, an increasing emphasis on developing an entreprenurial climate, quick access to two major metro areas, and close proximity to an Interstate highway were all factors in me staying here."



What people are saying in the Region continued:

"Career opportunities were present as well as the opportunity to grow and enhance my work skills."

"There were also opportunities to contribute to a worthy mission, a good working environment, and a good community of support."

OTHER STRENGTHS

1. Cooperative relationships within the STEM ecosystem

   - Milwaukee Public School System
   - Wisconsin Technical College System
   - Industry Affiliates
   - Strong STEM Network

WEAKNESSES

1. Communication is often non-existent within and among the M7 STEM organizations. Therefore, weak communication equates to weak collaboration. This is viewed as a serious fatal flaw in the M7 STEM infrastructure.

2. Transparency within the M7 STEM ecosystem in terms of what organizations are doing.

3. Weak STEM coordination.

4. Size and scope of STEM programs within the region are major weaknesses.

5. Lack of racial and ethnic diversity.

6. Lack of diversity regarding STEM jobs. This is viewed as a “Death Zone” for STEM students and professionals within the region.

7. STEM salaries compared to east and west coast markets.

8. Taxes within the region.

9. There is not a vibrant community of young STEM professionals of color.

10. Regional “brain drain” in the region.

OPPORTUNITIES

1. Housing and educational opportunities in the region.

2. Job opportunities for STEM professionals.

3. Increase the research potential at the University of Wisconsin Milwaukee and Marquette University. Both institutions could become world-class research centers.

4. Use UWM and Marquette to attract high profile technology and development firms to the region.

Opportunities continued:

5. Capitalize on M7's (Milwaukee) geographic location.
   - proximity to other large metropolitan areas
   - Lake Michigan region

6. Identify key financial opportunities for investment and entrepreneurial growth as it relates to STEM. Reframe portfolios.

7. Market the M7 region as an urban hub for young professionals (especially professionals of color).

Opportunities continued:

8. Take advantage of increasing STEM students and professionals of color being a national priority and a critical competitiveness issue by:
    - aggressively going after state and federal dollars
    - Working with political leadership to receive federal earmarked funds.

9. Reframe the STEM pipeline and create a STEM “Superhighway.”

Opportunities continued:

10. Expose regional children to STEM disciplines at an early age. Tap into their natural curiosity.
11. Use STEM to retain regional talent.
12. Use the saying “my family is here” to retain and attract talent to the region.
13. Help revitalize the M7 business community.
14. Develop a successful STEM economy in the region.
15. Develop the region as a STEM corridor.

THREATS

1. Milwaukee County failing to be the epicenter for STEM action in the M7 region.

2. Failure to involve parents in developing the region as a STEM Corridor and knowledge society.

3. Failure to increase the numbers of STEM students and professionals of color in an aggressive manner.

4. Failure to build on – ramp partnerships with Historically Black Colleges and Universities (HBCU's) and Hispanic serving institutions.

THREATS continued:

5. Failure to expose children in the Region to STEM disciplines and careers at an early age.

6. Region failing to keep pace with the State's intentions to become a knowledge – driven economy.

7. Failure to expand the size and scope of STEM programs in the region.

THREATS continued:

8. Failure to bring new programs on–line.

9. Failure to get corporations to make sizeable investments in STEM.

10. Failure as a Region to act on the recommendations in the White Paper.

White Paper Recommendations

FOUNDATIONAL EFFORTS

Recommendation One:

Need to Increase the Number of Underrepresented Groups in the STEM Workforce in the M7

Recommendation Two:

M7 needs to Retain more of its STEM Graduates

White Paper Recommendations continued:

Foundational Efforts

Recommendation Three:

Recruitment from Outside the M7 is Needed

Recommendation Four:

STEM Education Needs to Start as Early as Possible: K-1

White Paper Recommendations

UNIQUE OPPORTUNITIES

Recommendation One:

Need to Strengthen the Relationship between STEM Organizations

White Paper Recommendations continued:

UNIQUE OPPORTUNITIES

Recommendation Two:

Need to Market STEM programs in M7

White Paper Recommendations continued:

UNIQUE OPPORTUNITIES

Recommendation Three:

STEM Education Needs to Be A Priority

White Paper Recommendations continued:

UNIQUE OPPORTUNITIES

Recommendation Four:

Create a Research Institute for the Theory and Practice of STEM Entrepreneurial Wealth Creation