

# Developing Human & Intellectual Capital for the Marine Industries



by:

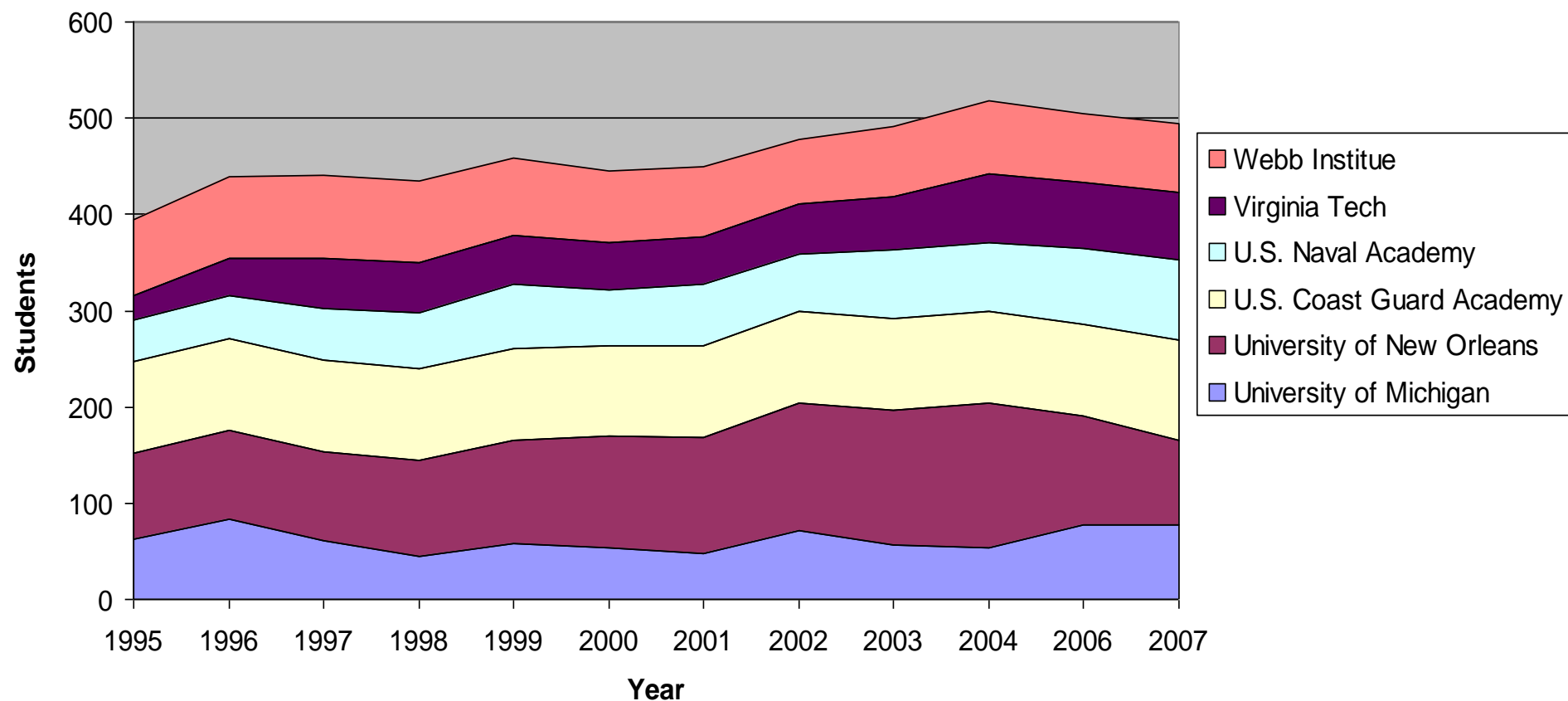
**R. Keith Michel**

President, Webb Institute

Past President, HEC

Past President, SNAME

# U.S. Naval Architecture Undergraduate Enrollment



Source: "Examining the Science and Technology Enterprise in Naval Engineering – Workforce and Education", by Ron Kiss

# SNAME Student Members

Institution	Members
Webb Institute	109
University of Michigan	93
Texas A&M - College Station	90
Memorial University of Newfoundland	83
Virginia Tech	72
National Technical University of Athens (NTUA)	71
SUNY Maritime	66
University of New Orleans	53
United States Coast Guard Academy	45
Piri Reis University	41
Stevens Institute of Technology	36
United States Naval Academy	35
University of British Columbia	31
Massachusetts Institute of Technology	30
Other U.S. Colleges & Universities	229
Othe International Colleges & Universities	207

1291

**Total Number of Colleges/Universities Represented: 101**

**No. of Students attending 2015 Annual Meeting: 251**

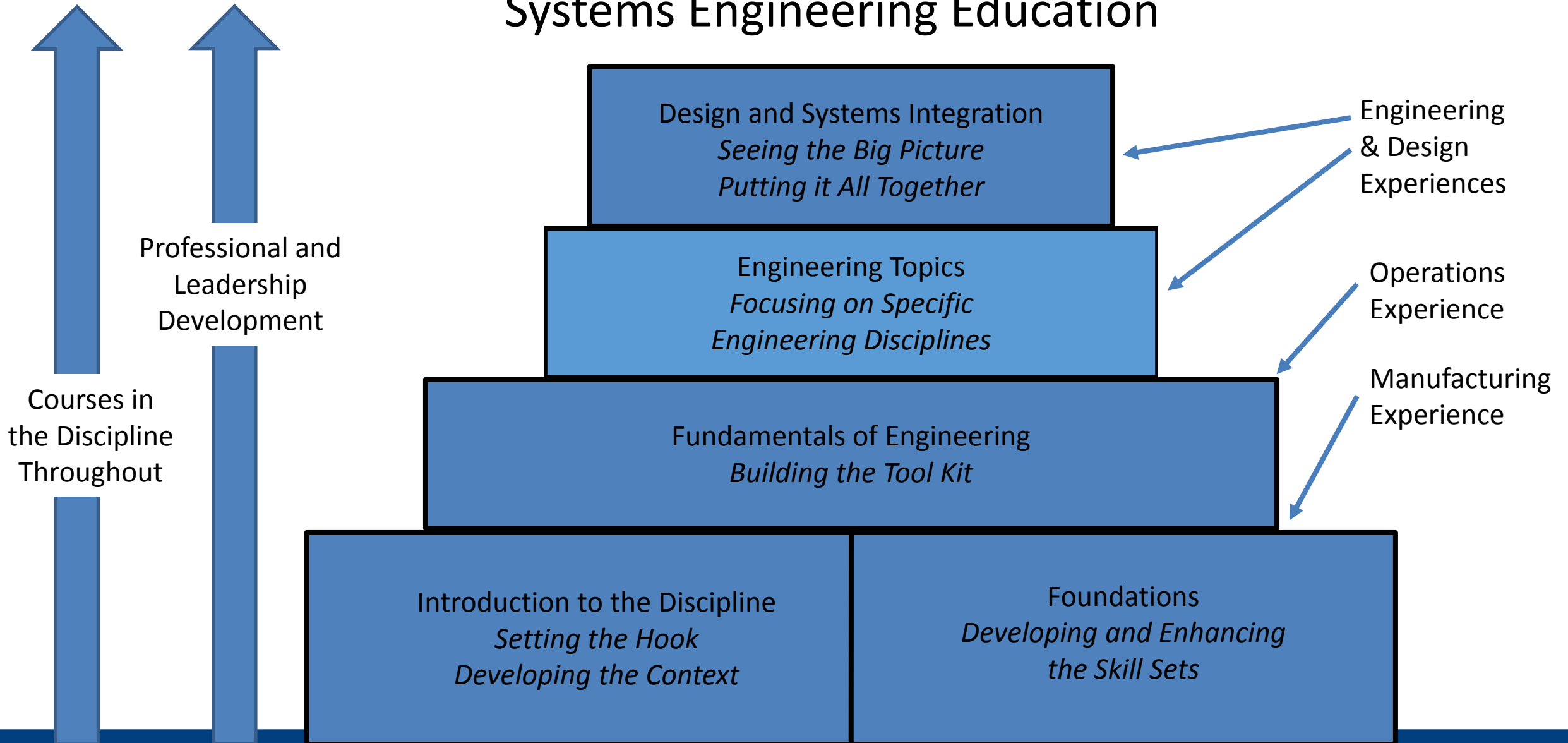
**Total U.S. Student Members: 857**



# Challenges Facing NA/ME/OE Programs

1. Attracting the right faculty.
2. Attracting well prepared students.
3. Staying abreast of technology.
4. Coverage of the diverse marine sectors.
5. Achieving high graduation rates.
6. Maintaining industry involvement.
7. Ensuring financial sustainability.

# Webb Institute's Approach to a Systems Engineering Education



# Webb Institute's Academic Program

<i>FRESHMEN</i>		<i>SOPHOMORE</i>		<i>JUNIOR</i>		<i>SENIOR</i>	
FALL	SPRING	FALL	SPRING	FALL	SPRING	FALL	SPRING
<b>Math I Calculus I</b>  4-0-4	<b>Math II Calculus II</b>  4-0-4	<b>Math III Differential Equations</b>  3-0-3	<b>Math IV Adv Engrg Math</b>  4-0-4	<b>Probability/ Statistics</b>  4-0-4	<b>Thesis</b>  0-1-½	<b>Thesis</b>  0-5-2½	<b>Thesis</b>  0-6-3
<b>Technical Communication</b>  2-0-2	<b>Political Philosophy</b>  3-0-3	<b>Western Culture I</b>  3-0-3	<b>Western Culture II</b>  2-0-2	<b>Humanities/ Social Science Elective</b> 3-0-3	<b>Development of American Government</b> 2-0-2	<b>Professional Ethics</b>  3-0-3	<b>Professional Presentation</b>  2-0-2
<b>Chemistry</b>  3-1-3½	<b>Material Science</b> 3-0-3	<b>Strength of Materials</b> 3-0-3	<b>Dynamics</b>  3-0-3	<b>Vibrations</b>  3-0-3	<b>Hydrodynamics</b> 3-0-3		<b>Special Topics</b>  3-0-3
<b>Physics I</b>  3-0-3	<b>Physics II</b>  2-0-2	<b>CAD</b>  0-2-1	<b>Physics III</b>  2-2-3	<b>Electrical Engineering I</b> 2-2-3	<b>Electrical Engineering II</b> 2-2-3	<b>Engineering Economics</b> 1-0-1	<b>Senior Seminar</b>  2-0-0
<b>Programming &amp; Applications</b> 2-1-2½	<b>Statics</b>  3-0-3	<b>Thermo- dynamics</b> 3-0-3	<b>Fluid Mechanics</b> 3-0-3		<b>Ship Design I</b>  1-4-3	<b>Ship Design II</b>  2-4-4	<b>Ship Design III</b>  1-4-3
<b>Introduction to Naval Architecture</b> 2-2-3	<b>Science Lab</b>  0-2-1	<b>Ship Statics</b>  2-2-3		<b>Ship Resistance &amp; Propulsion</b> 2-2-3	<b>Ship Structures</b>  2-2-3	<b>Ship Dynamics</b>  3-0-3	<b>Propulsor Design &amp; CFD</b>  3-0-3
	<b>Intro to Mar Engineering Systems</b> 2-0-2	<b>Mar Eng System Components</b> 2-2-3	<b>Mar Eng Machinery Design</b> 3-0-3	<b>Mar Eng Applied Thermo</b> 3-0-3	<b>Ship Auxiliary Systems</b>  3-0-4	<b>Ship Propulsion Systems</b> 4-2-5	<b>Marine Transportation</b>  3-0-3
20/18	19/18	23/19	19/18	21/19	24/18½	24/18½	24/17

Shipyard Trades  
Internship

Shipboard Cadet

Engineering  
Internship

Engineering  
Internship



# The K-12 Challenge

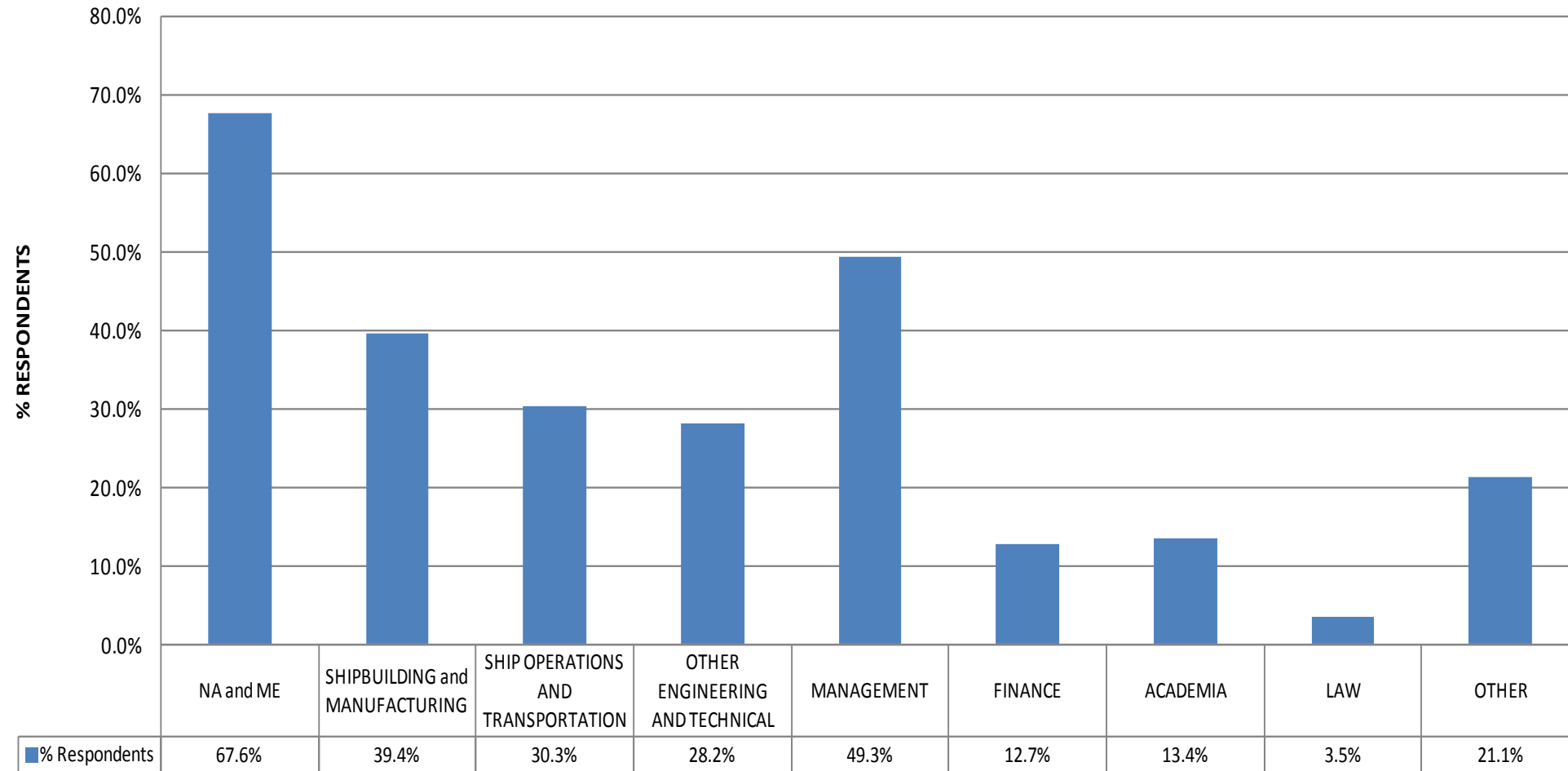
Most students are not sufficiently prepared for college.

We need to get the word out regarding NA/ME/OE, so we can attract the best and brightest to our industry.

Some of Webb's K-12 Initiatives:

- Engineering Day for 5<sup>th</sup> through 7<sup>th</sup> grade students
- Tutoring and mentoring programs for high school students
- High school boat competition
- Lectures on NA/ME at high schools
- Developing video on the marine industry with NNS
- Webb summer program

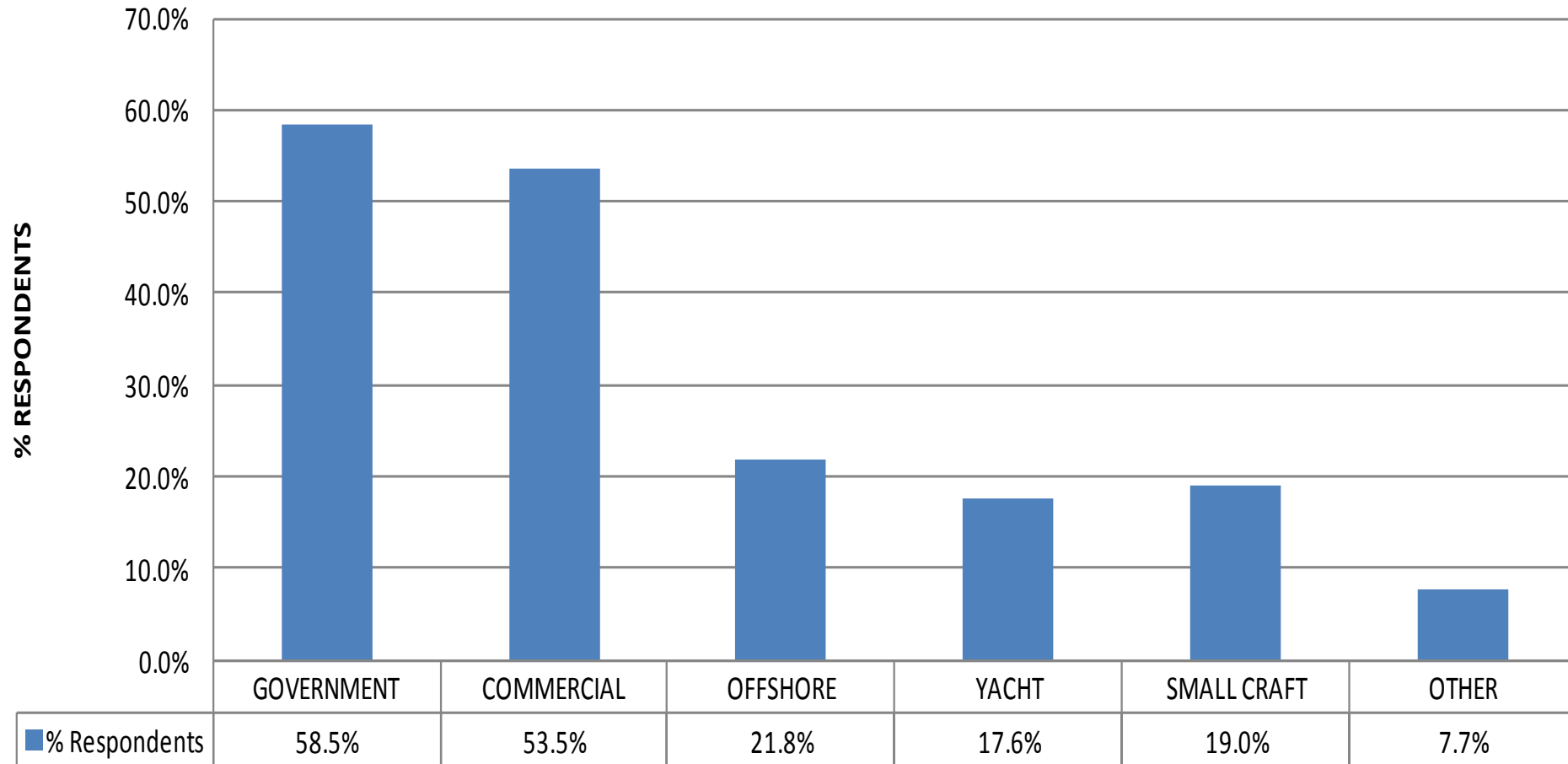
# Webb Graduates – Affiliation within the Marine Field



Source: Survey of Webb Graduates in 2012



# Webb Graduates – Involvement by Marine Sector



Source: Survey of Webb Graduates in 2012

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## QUESTIONS?

