A Dialogue About Establishing Course Prerequisites

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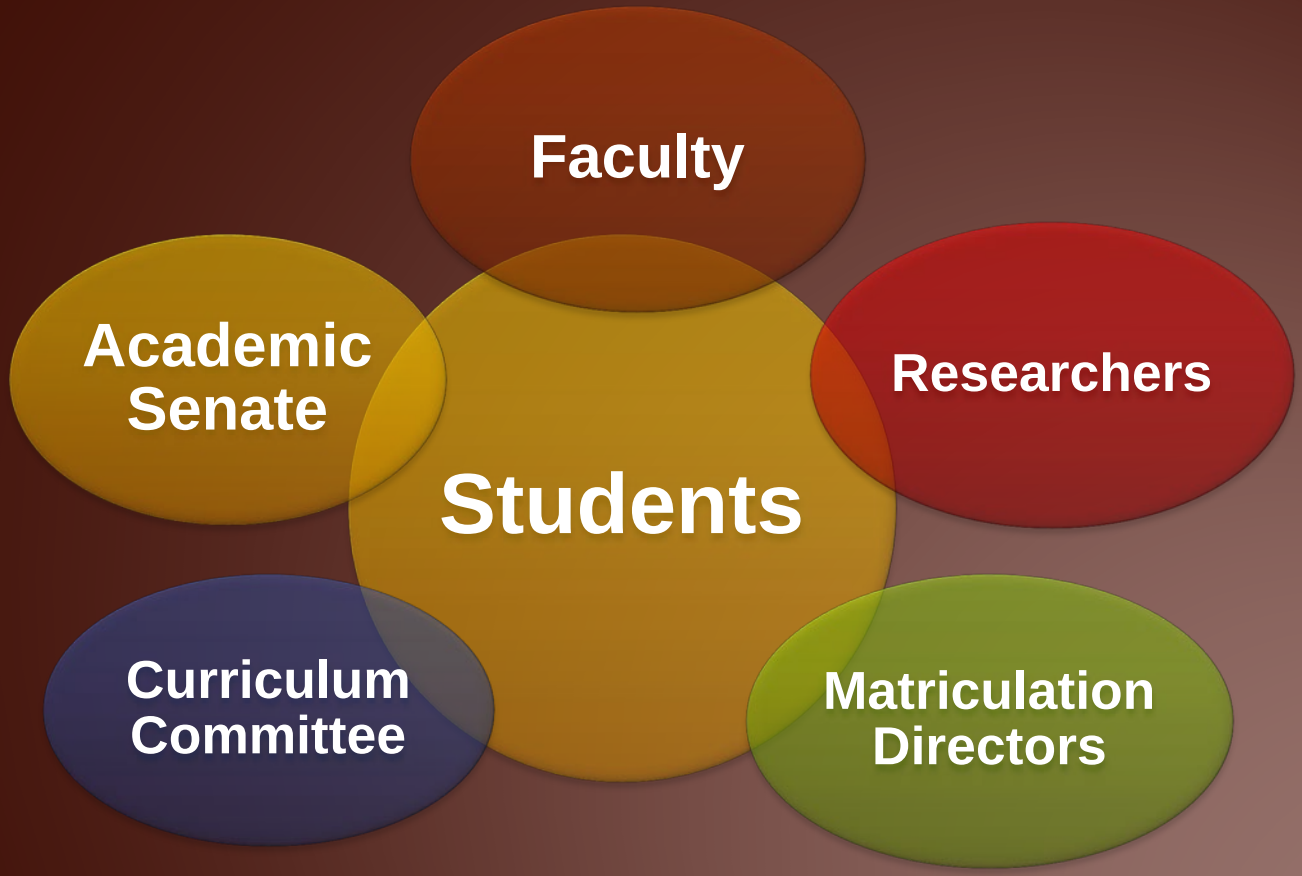
The Players


Faculty
Academic Senate
Researchers
Students
Curriculum Committee
Matriculation Directors

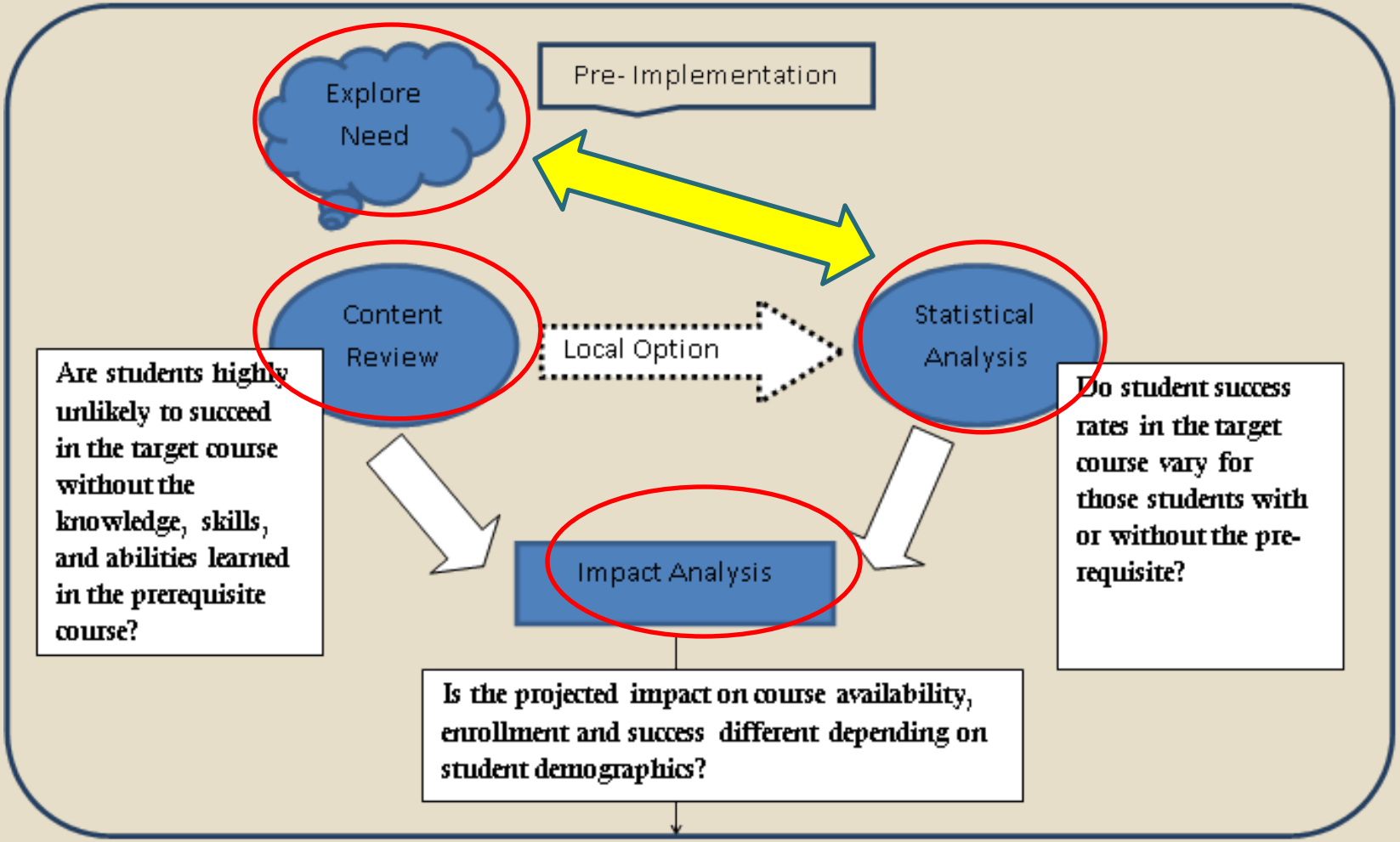
Overview of the RP Group's Prerequisite Validation Guidelines

- Intended to help researchers
  - Execute the statistical analyses
  - Support faculty
- Developed by the RP Group with input from the field
- Input provided by various groups: matriculation, faculty, researchers
- Incorporated information from Academic Senate and Chancellor's office guidelines

Title 5 Regulations

- Title 5 regulations state:
  5 CCR § 55003 (d) (2) the prerequisite will assure, consistent with section 55002, that a student has the skills, concepts, and/or information that is presupposed in terms of the course or program for which it is being established, such that a student who has not met the prerequisite **is highly unlikely** to receive a satisfactory grade in the course (or at least one course within the program) for which the prerequisite is being established;

The Game Plan: Pre-Implementation



Content Review: Sample Rating Template

Skill: Ability to…	Rater					Mean Rating
	#1	#2	#3	#4	#5	
Skill 1: Solve radical, quadratic equations.	4	3	4	4	4	3.8
Skill 2: Solve logarithmic equations.	4	4	5	4	5	4.4
Skill 3: Solv equations.						0
Skill 4: Solv problems by applying the definitions, postulates and theorems of plane geometry.	5	4	4	3	5	4.2
Skill 5: Graph linear, quadratic, simple polynomial, exponential logarithmic functions and conic sections.	5	4	5	4	4	4.4

Number of skills with a mean rating of ≥ 4.0: 4

Percent of skills with a mean rating of ≥ 4.0: 80%

Sample Statistical Options for Researchers

Tests	Questions Answered with Prerequisite Validation
Chi-Square	Is there a statistically significant difference between success in the target course and completion of the prerequisite course? The difference may not be substantial.
T-tests	Is their a statistically significant difference between the average grade points in the prerequisite and target courses? The difference may not be substantial.
Pearson Correlation	Is there a significant relationship between grade points in the prerequisite and target courses?

Sample Statistical Options for Researchers

Tests	Questions Answered with Prerequisite Validation
Effect Size	What is the strength of the relationship between successfully completing the prerequisite course and successfully completing the target course?
Odds Ratio	How likely is it that students who meet the prerequisite will succeed in the target course compared to those who do not meet the prerequisite?
2:1 Ratio	Do students not meeting the prerequisite succeed at a rate that is half that for students meeting the prerequisite?
Average Percent Gain	What is the average percent gain in success in the target course of students who met the prerequisite over those who did not meet the prerequisite?

Chaffey College–Impact of Reading Prereq on HIST-1, HIST-2 and HIST-7

Three-Pronged Approach

1. Comparison of Performance in the Target Course of Students Who Did and Did Not Meet the Prerequisite
2. Effect Size (accounts for influence of sample size) and Average Percent Gain
3. Restricted Bivariate Correlation Coefficient and Corrections for Restriction of Range
   - Pearson's *r* (Rule of Thumb: $r \geq .35$, *assuming* $p < .05$)
   - Chaffey also recalculates to correct for restriction of range

http://www.chaffey.edu/research/IR_PDF_Files/Research_Reports/Academic_Success/1011-History%201,%202,%20and%207%20Reading%20Prerequisite%20Validation.pdf

Chaffey College - Signals for Implementing or Not Implementing

- **Green** – Sufficient evidence exists to enforce prerequisite (at least two out of three measures are supported)
- **Yellow** – Although evidence exists, only one out of three measures supports enforcement of the prerequisite. Further discussion should occur within the department and the Curriculum Committee before the prerequisite is enforced
- **Red** – Data does not exist to support enforcement of the prerequisite. None of the measures explored meet pre-established criteria
- Insufficient Data – While evidence may point to the efficacy of the prerequisite, the sample size is too small to render a reliable decision

Chaffey College Prerequisite Data Table

The Target Course Includes the Following Semesters: Fall 2005 Through Spring 2010
The Prerequisite Course Completions and Placement Recommendations Include the Following Semesters: Fall 2001 Through Fall 2009

Selected Students Who Made Their First Attempt in Target Course Where a GOR Was Earned				Proposed Prerequisite Courses and Selected Students' Methods for Meeting Eligibility		Success Rate in Target Course of Students Who **Met** the Prerequisite			% of Target Course GOR Earners Who Met Prereq	Success Rate in Target Course of Students Who **Did Not Meet** the Prerequisite			Difference Between the Success Rates in the Target Course of Students Who Did and Did Not Meet the Prerequisite			Restricted Bivariate Correlation Coefficient					
Course	Successful	GOR	%	Prerequisite Course	Method of Eligibility	Successful	GOR	%		Successful	GOR	%	P-Value	Effect Size	Average % Gain	Value	N	P-Value	Correlation Corrected for Restricted Range	Meets Threshold	Disproportionate Impact
				READ-1																	
HIST-1	530	949	55.8%		READ-550 or Higher	8	17	47.1%	1.8%	478	858	55.7%	0.462	0.18	7%	0.29	14	0.310	0.49	Correlation Only	No
HIST-1	530	949	55.8%		Reading Proficient	8	14	57.1%	1.5%				0.922	0.03	1%	0.04	12	0.894	0.09	No	No
HIST-1	530	949	55.8%		READ-1 Placed	36	60	60.0%	6.3%				0.504	0.09	4%	0.04	55	0.777	0.10	No	No
HIST-1	530	949	55.8%		All Methods Combined	52	91	57.1%	9.6%				0.794	0.03	1%					No	No
				READ-450																	
HIST-1	1,815	3,196	56.8%		READ-550 or Higher	70	93	75.3%	2.9%	1,191	2,230	53.4%	0.000	0.38	15%	0.43	83	0.000	0.46	All 3	Yes
HIST-1	1,815	3,196	56.8%		Reading Proficient	130	194	67.0%	6.1%				0.003	0.22	9%	0.17	169	0.027	0.46	All 3	Yes
HIST-1	1,815	3,196	56.8%		READ-450 Placed	424	679	62.4%	21.2%				0.001	0.15	6%	0.12	573	0.004	0.28	P-Value Only	Yes
HIST-1	1,815	3,196	56.8%		All Methods Combined	624	966	64.6%	30.2%				0.000	0.23	9%					2 of 2	Yes
				READ-550																	
HIST-1	2,345	4,145	56.6%		READ-530 or Higher	120	169	71.0%	4.1%	1,072	2,139	50.1%	0.000	0.30	12%	0.41	144	0.000	0.61	All 3	Yes
HIST-1	2,345	4,145	56.6%		Reading Proficient	172	252	68.3%	6.1%				0.000	0.25	10%	0.10	220	0.147	0.28	2 of 3	Yes
HIST-1	2,345	4,145	56.6%		READ-550 Placed	981	1,585	61.9%	38.2%				0.000	0.17	7%	0.10	1,367	0.000	0.17	P-Value Only	Yes
HIST-1	2,345	4,145	56.6%		All Methods Combined	1,273	2,006	63.5%	48.4%				0.000	0.27	11%					2 of 2	Yes
				READ-530																	
HIST-1	2,345	4,145	56.6%		READ-520 or Higher	129	199	64.8%	4.8%	799	1,593	50.2%	0.016	0.17	7%	0.36	165	0.000	0.56	2 of 3	Yes
HIST-1	2,345	4,145	56.6%		Reading Proficient	172	252	68.3%	6.1%				0.000	0.25	10%	0.10	220	0.147	0.28	2 of 3	Yes
HIST-1	2,345	4,145	56.6%		READ-530 Placed	1,245	2,101	59.3%	50.7%				0.000	0.11	4%	0.17	1,802	0.000	0.20	P-Value Only	Yes

http://www.chaffey.edu/research/IR_PDF_Files/Research_Reports/Academic_Success/1011-History%201,%202,%20and%207%20Reading%20Prerequisite%20Validation.pdf

Statistical vs. Practical Significance

- Statistical Significance=Yes (p<.05)
- Discussion about what is “good enough”

	ENGR-123		
Group	# Successful	Total Enrolled (N)	% Successful
Successfully Completed Transfer-Level Math Prior to Enrolling in ENGR-123	76	103	74%
Not Co-Enrolled or Did Not Successfully Complete Transfer-Level Math Prior To ENGR-123	809	1,215	67%

23 sections

There’s statistical significance but 2/3 without prereq are successful

More conversation starters

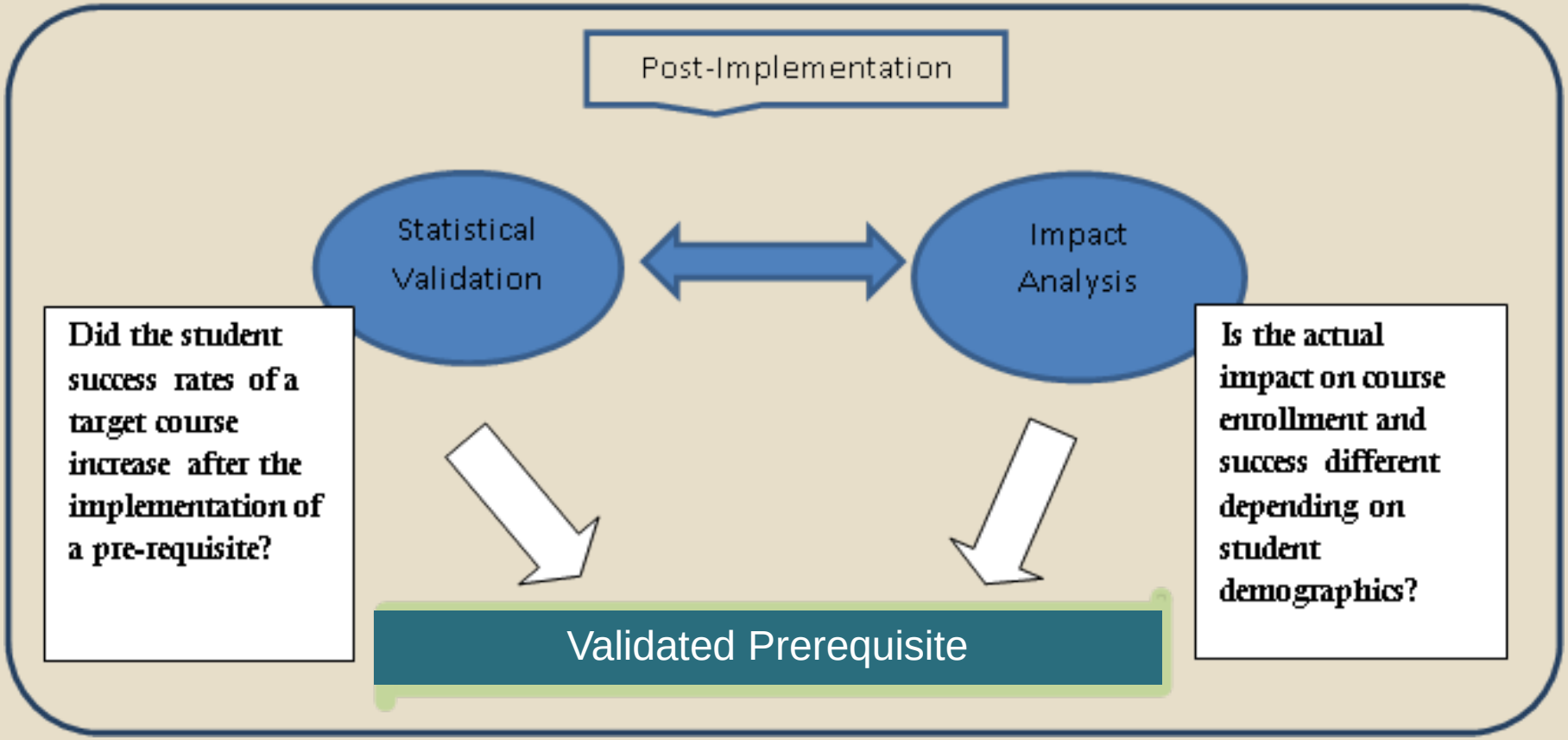
- Statistical Significance=Yes ($p<.05$)
- Discussion about what is “good enough”

Highest English Level Completed	Philosophy-101 (Fall 2010, Spring 2011, Fall 2011, Spring 2012)		
	Success (N)	Success (%)	Total (N)
Below ENGL-Level 3	6	27%	22
ENGL-Level 3	32	46%	69
ENGL-Level 2	105	49%	216
ENGL-Level 1	176	64%	273
Degree/Transfer-ENGL	526	74%	712

Discussions with Prereq Planning Team – An Example

- More discussion needs to be had with the Academic Senate to establish a standard by which departments can justify further exploration into the establishment of a prerequisite.
- This should include discussions about what level of success is acceptable (or adequate) and how much of a gap in success rates would warrant establishment of a prerequisite.
- Options for consideration when developing a standard include:
  - Option 1: Conduct inferential statistical analyses, which are necessary but not sufficient.
  - Option 2: Use a 2:1 ratio to determine how much more likely it is that students at or above the prerequisite are to succeed compared to those below it. Spicer (1989) further recommends that at least two-thirds of the students at or above the prerequisite level should pass the target course versus one-third or fewer below the prerequisite level.
  - Option 3: Establish a rule that there must be at least a 20 or 30 percent gap between students meeting the desired prerequisite and those who do not.
  - Option 4: Use a Phi Coefficient to measure the relationship between the success rates for students meeting the desired prerequisite and those who do not.

Post-Implementation



Group Activity

- Break into small groups
- Draw the prerequisite validation process at your college (who are the players, what's the flow of activity, what's the role of I.R.)
- Then…
  - Share your illustrations at your table
  - What similarities exist?
  - What are some differences?
  - What new ideas did you get for improving your college's process?

Statewide Resources

- ASCCC Website www.asccc.org
  - Adopted papers on prerequisite implementation
  - Rostrum articles
  - Resource teams to visit your campus
- RP Group Website
  - Prerequisite Validation Guide for Researchers available under the Resources section.
- CCCCO Website (www.cccco.edu)
  - Monitoring Disproportionate Impact publication will be available soon under the Student Success and Support Program (SSSP-formerly Matriculation) division

Resources: College Examples

- Cabrillo College
  - Cabrillo College. (2002). *Validation of English 1A as a prerequisite for Psychology 1A*. Aptos, CA: Borden, R. C.
- Chaffey College
  - Chaffey College. (2011). *Prerequisite Validation Studies: Impact of a Reading* Prerequisite *on HIST-1, HIST-2, and HIST-7.* Rancho Cucamonga, CA: Institutional Research
  - Chaffey College. (2010). *Philosophy 76 Prerequisite Validation Study: English 1A Prerequisite*. Rancho Cucamonga, CA: Institutional Research.
- Sacramento City College
  - Danenberg, A. (2011). *Methodological and Data Considerations for a Communication or Computation Prerequisite Implementation Study.* Sacramento City College: Planning, Research, & Institutional Effectiveness.
- Crafton Hills
  - Wurtz, K. A., & Riggs, M. (2010). *Prerequisite Validation Study: Examination of Reading as a Prerequisite to EMS-020 (Emergency Medication Technician-I / EMT – Basic)*. Retrieved November 16, 2012 from http://www.craftonhills.edu/~/media/Files/SBCCD/CHC/About%20CHC/Research%20and%20Planning/Research%20Reports/0910_EMS_Read_PrerequisiteStudy.ashx

Questions / Comments

depositphotos.com