

**STUDENT EXPERIENCE IN THE RESEARCH UNIVERSITY (SERU) PROJECT**

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**SERU PROJECT TECHNICAL REPORT\***

**A Common Factor Solution for UCUES 2006 Upper-Division Core Items**

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**ABSTRACT**

A significant amount of research based on prior University of California Undergraduate Experience Survey (UCUES) results used factor analysis to reduce student responses to a more manageable and more easily communicated set of factors (latent factors). Depending on the survey data used and decisions made in the solution process by the researcher, resulting principal component solutions were different but tended to be similar and typically included a factor labeled engagement. When researchers met at the Center for Studies in Higher Education on September 21<sup>st</sup> to share plans, it was clear that a similar process would soon unfold using the 2006 UCUES. While there are benefits to individually pursued inquiry, those in attendance saw clear advantages to a shared solution: reduced confusion about labels and terms, incorporation of factor scores into the centrally supported database, and shared judgment during the analysis phase. The process and resulting seven factor solution for the upper-division core items is described in this report.

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The first step in the process of deriving a shared factor solution was to schedule a work session with broad representation by experienced researchers. The session was scheduled at the Riverside campus and its goal was to produce a factor solution for the upper-division core that was acceptable to all present. The strategy was to perform analysis in real time, with results projected, so that all attendees could participate in the

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\* The SERU Project is a collaborative study based at the Center for Studies in Higher Education at UC Berkeley and focused on developing new types of data and innovative policy relevant scholarly analyses on the academic and civic experience of students at major research universities. One of the main products of the SERU Project has been the development and administration of the University of California Undergraduate Experience Survey (UCUES). For further information on the project, see <http://cshe.berkeley.edu/research/seru/>

process. The group met on the Riverside campus, Thursday, September 28, 2006. Attending the meeting were:

Drs. Steve Brint and Bob Hanneman (Riverside Sociology faculty),  
Dr. Linda Sax (UCLA faculty and former CIRP Director),  
Julian Fernald (UCSC Director of Institutional Research),  
Jeanette Gurrola (UCI Analyst with DUE-Research & Evaluation),  
Guadalupe Anaya (UCR Analyst with the Vice Chancellor for Student Affairs),  
Allison Cantwell (Graduate Research Assistant, Sociology at Riverside), and  
Steve Chatman (SERU/UCUES Program Director).

Other SERU/UCUES Work Group members were invited but could not attend on such short notice. The work session started at 9:30 AM and ended about 3 PM that afternoon. The first priority was to establish a content structure for the upper-division core for three reasons: (1) to validate the intended latent structure of the instrument, (2) to create a subset of summary measures for management information reporting, and (3) to identify item candidates for removal in order to reduce future instrument length. The Riverside meeting was very productive and the consensus was that we produced a much better product than any one of us would have produced working independently.

The meeting began with a discussion about alternative strategies: content or empirically driven. It concluded with the decision to follow empirical results first but to remain open to alternatives. The empirical strategy was to use varimax (orthogonal) rotation to determine principal components and then to subject each principal component to promax (oblique) fit. This conversation was soon followed by discussion about necessary variable recodes and derived variables. The most significant recode was degree aspiration: bachelors, masters, and terminal (doctoral or professional). The most significant derived variables were change as difference between skill ratings at time of entry and currently. After discussion, we decided to first try both current and change self-ratings as the dichotomy between performance level and improvement is pervasive in higher education accountability.

Our procedure for the initial orthogonal fit and the subsequent oblique fits was to rely on eigenvalues (the scree plot) to identify a limited number of possible solutions, to begin with a best guess estimate of number of substantive factors and to then vary number up or down as the loadings and variable clusters suggested. It was this part of the process that benefited most from the group-based strategy. In contrast to working alone, the analyses were run in real time before eight observers and every decision was discussed openly. All participants remarked that this process of interchange and exploration was surprisingly beneficial and recommend it highly.

The group elected to severely restrict discussion of possible factor names until a full draft solution was complete. Producing the first draft solution took the entire work session. It was decided that the group could probably manage the factor naming stage working remotely. Julian Fernald suggested the first labels and alternatives were offered by Gregg Thomson (UCB Director of the Office of Student Research) and Steve Chatman. Fortunately, a second opportunity for face-to-face solution occurred when the Office of the President called a SERU/UCUES Work Group meeting of the 17<sup>th</sup> of October in Oakland. The meeting had several objectives but included consideration of factor names. It was another very useful interchange resulting in a 2<sup>nd</sup> draft for factor structure and labels. Only minor changes were made after the meeting.

Here is the resulting seven factor structure reflecting a largely empirical basis but with a few content-based placements and distinctions.

**Factor 1: Satisfaction with Educational Experience**

**Subfactor 1a\_i: Quality of Instruction and Courses in the Major**

**Subfactor 1a\_ii: Satisfaction with Access and Availability of Courses in the Major**

**Subfactor 1b: Sense of Belonging and Satisfaction**

**Subfactor 1c: Satisfaction with Advising**

**Subfactor 1d: Clarity of Program Requirements, Policies & Practices**

**Subfactor 1e: Satisfaction with Library Support**

**Factor 2: Current Skills Self-Assessment (Nonquantitative)**

**Subfactor 2a: Critical Thinking and Communication**

**Subfactor 2b: Cultural Appreciation and Social Awareness**

**Factor 3: Gains in Self-Assessment of Skills (Nonquantitative)**

**Subfactor 3a: Gains in Critical Thinking and Communication**

**Subfactor 3b: Gains in Cultural Appreciation and Social Awareness**

**Factor 4: Development of Scholarship**

**Subfactor 4a: Critical Reasoning and Assessment Experiences**

**Subfactor 4b: Curricular Foundations for Reasoning**

**Subfactor 4c: Elevated Academic Effort**

**Factor 5: Understanding Other Perspectives**

**Subfactor 5a: Gains from Interactions with Students from Different Backgrounds**

**Subfactor 5b: Gains from Interactions with Students with Different Views and Orientations**

**Factor 6: Research Experiences**

**Factor 7: Quantitative Professions**

**Subfactor 7a: Collaborative Learning**

**Subfactor 7b: Career Orientation**

**Subfactor 7c: Quantitative Skills**

**Factor T: Use of Time**

**Subfactor Ta: Time Employed**

**Subfactor Tb: Academic Time**

**Factor X: Residual Elements (Not routinely computed)**

**Subfactor Xa: Foreign Language**

**Subfactor Xb: Library Use**

**Subfactor Xc: Choice of Major -- Non-Demanding**

**Subfactor Xd: Choice of Major - Intrinsic and International Opportunities**

UCUES 2006 shares many characteristics with other undergraduate questionnaires but is notable for including research experiences and quantitative professions as principal components. These are areas that may receive short shrift from other questionnaires that are shaped by a liberal arts and social sciences bias that does not well reflect the mission of public doctoral extensive research universities.

The remainder of this report will examine each component and then illustrate campus and disciplinary field of study differences and similarities. UCUES was designed to support scholarly and practical administrative uses and these factors address both purposes. UCUES must be administered to all students in order to provide information at the level of an academic major but the data will show that there are dramatic differences in factor profiles by discipline that would be lost if UCUES were administered to only a sample of students.

Table 1 follows the questionnaire's structure (use of time, diversity, proficiency ratings, service learning, degree aspirations, etc.) and displays factor loadings for the principal components solution with varimax (orthogonal) rotation. As anticipated, the factor structure tends to follow the organizational structure designed into the questionnaire but there are important exceptions. The self-ratings section is a good example in that the large majority of items do fall together but there are some skills that either fit better elsewhere, quantitative skills, or nowhere, foreign language. The work group decided to use two measures from the self-ratings items. The original items asked students to rate current skills and skills at entry. From these two values, a gain can be computed. The work group's deliberations showed support for both current ratings and gain scores as important outcomes. The fact that the two were identified with separate factors shows that there was an empirical base for the distinction and both current ratings and gain were included. One of the more surprising results was that planning to do any of several types of research was not clearly associated with any factor. Having done or being currently engaged in research was. The use of time items were set aside to be treated independently. The following tables show the result of oblique solution (promax) for items within each principal component.



**Table 1: (Continued)**

	Assignment	Factors						
		F1	F2	F3	F4	F5	F6	F7
Ability to speak clearly and effectively in English	2		0.674					
Understanding international perspectives (economic political, social, cultural etc.)	2		0.576					
Leadership skills	2		0.604					
Computer skills	2		0.542					0.310
Internet skills	2		0.582					
Library research skills	2		0.528					
Other research skills	2		0.588				0.310	
Ability to prepare and make a presentation	2		0.629					
Interpersonal (social) skills	2		0.586					
Change between self-reported current skill level and skill level at entry								
Analytical and critical thinking skills	3			0.622				
Ability to be clear and effective when writing	3			0.587				
Ability to read and comprehend academic material	3			0.609				
Foreign language skills	8							
Understanding of a specific field of study	3			0.539				
Quantitative (mathematical and statistical) skills	7			0.314				0.399
Ability to speak clearly and effectively in English	3			0.568				
Understanding international perspectives (economic political, social, cultural etc.)	3			0.603				
Leadership skills	3			0.520				
Computer skills	3			0.521				
Internet skills	3			0.562				
Library research skills	3			0.545				
Other research skills	3			0.566			0.355	
Ability to prepare and make a presentation	3			0.576				
Interpersonal (social) skills	3			0.537				

**Table 1: (Continued)**

	Assignment	F1	F2	F3	F4	F5	F6	F7
4. Similarly, please rate your abilities now and when you first began at this university on the following dimensions.								
Current ability level								
Ability to appreciate, tolerate and understand racial and ethnic diversity	2		0.516					
Ability to appreciate the fine arts (e.g., painting, music, drama, dance)	2		0.504					
Ability to appreciate cultural and global diversity	2		0.548					
Understanding the importance of personal social responsibility	2		0.573					
Self awareness and understanding	2		0.599					
Change between self-reported current skill level and skill level at entry								
Ability to appreciate, tolerate and understand racial and ethnic diversity	3			0.553				
Ability to appreciate the fine arts (e.g., painting, music, drama, dance)	3			0.501				
Ability to appreciate cultural and global diversity	3			0.592				
Understanding the importance of personal social responsibility	3			0.590				
Self awareness and understanding	3			0.587				
5. How frequently during this academic year have you done each of the following?								
Raised your standard for acceptable effort due to the high standards of a faculty member	4				0.381			
Extensively revised a paper at least once before submitting it to be graded	4				0.377			
Worked on class projects or studied as a group with other classmates outside of class	7						0.442	
Sought academic help from instructor or tutor when needed	4				0.334			
Helped a classmate better understand the course material when studying together	7							0.451

**Table 1: (Continued)**

	Assignment	F1	F2	F3	Factors			F7
					F4	F5	F6	
6. In how many service learning courses have you enrolled? (These are courses in which community-based public service activities are integrated with the academic content of the course)	8							
8. During an average term, how often do you use the campus libraries (including online resources)?								
For research	8							
For other purposes	8							
10. What is the HIGHEST academic degree or credential that you plan to eventually earn?	6						0.315	
11. Please rate your level of satisfaction with the following aspects of your University education.								
UC grade point average	1	0.405						
Overall social experience	1	0.409				0.320		
Overall academic experience	1	0.627						
Value of your education for the price you're paying	1	0.556						
I feel that I belong at this campus	1	0.475						
Knowing what I know now, I would still choose to enroll at this campus	1	0.517						
13. What factors were very important to you in deciding on your major?								
Intellectual curiosity	8							
Allows time for other activities	8							
Leads to a high paying job	7						0.532	
Provides international opportunities	8							



**Table 1: (Continued)**

	Assignment	F1	F2	F3	Factors			F7
					F4	F5	F6	
Prepares me for a fulfilling career	7							0.320
Prestige	7							0.393
Complements desire to study abroad	8							
Couldn't get into my first choice of major	8							
Parental desires	8							
Easy requirements	8							
14. Thinking back over your coursework this academic year, how often were you REQUIRED to do the following?								
Recognize or recall specific facts, terms and concepts	4				0.432			
Explain methods, ideas, or concepts and use them to solve problems	4				0.544			0.374
Break down material into component parts or arguments into assumptions to see the basis for different outcomes and conclusions	4				0.686			
Judge the value of information, ideas, actions and conclusions based on the soundness of sources, methods and reasoning	4				0.723			
Create or generate new ideas, products or ways of understanding	4				0.598			
15. Thinking back on this academic year, how often have you done each of the following?								
Used facts and examples to support your viewpoint	4				0.598			
Incorporated ideas or concepts from different courses when completing assignments	4				0.603			
Examined how others gathered and interpreted data and assessed the soundness of their conclusions	4				0.675			

**Table 1: (Continued)**

	Assignment	F1	F2	F3	Factors F4	F5	F6	F7
Reconsidered your own position on a topic after assessing the arguments of others	4				0.613			
16. Indicate your past, current, or planned involvement in the following research activities.								
Doing now or have done								
Completed a research project, creative activity, or paper as part of your coursework	8							
Completed at least one student research course (e.g., course 99)	6					0.505		
Completed at least one independent study course (e.g., 199)	6					0.610		
Assisted faculty in research, with course credit	6					0.638		
Assisted faculty in research for pay, without course credit	6					0.441		
Assisted faculty in research as a volunteer, without course credit	6					0.540		
Worked on creative projects under the direction of faculty, for example in the visual or performing arts	6						0.333	
Plan to do								
Completed a research project, creative activity, or paper as part of your coursework								
Completed at least one student research course (e.g., course 99)								
Completed at least one independent study course (e.g., 199)								
Assisted faculty in research, with course credit								
Assisted faculty in research for pay, without course credit								
Assisted faculty in research as a volunteer, without course credit								
Worked on creative projects under the direction of faculty, for example in the visual or performing arts								

**Table 1: (Continued)**

	Assignment	F1	F2	F3	F4	F5	F6	F7
17. Please answer the following questions about your major.								
Do you understand how the requirements of your major combine to produce a coherent understanding of a field of study?	1	0.330						
Are the program requirements well defined?	1	0.360						
Are there open channels of communication between faculty and students regarding student needs, concerns, and suggestions?	1	0.497						
Are department rules and policies clearly communicated?	1	0.425						
Are students treated equitably and fairly by the faculty?	1	0.457						
Is the description of the major in the catalogue accurate?	1	0.366						
Do faculty clearly explain what constitutes plagiarism and its consequences?	8							
18. How satisfied are you with each of the following aspects of your educational experience in the major?								
Advising by student peer advisors on academic matters	1	0.504						
Advising by college staff on academic matters	1	0.593						
Advising by departmental staff on academic matters	1	0.621						
Advising by faculty on academic matters	1	0.659						
Quality of faculty instruction	1	0.661						
Quality of teaching by graduate student TA's	1	0.545						
Availability of courses for general education or breadth requirements	1	0.600						
Availability of courses needed for graduation	1	0.619						
Access to small classes	1	0.567						
Access to faculty outside of class	1	0.664						
Ability to get into a major that you want	1	0.534						
Opportunities for research experience or to produce creative products	1	0.577						

**Table 1: (Continued)**

	Assignment	Factors						
		F1	F2	F3	F4	F5	F6	F7
Educational enrichment programs (e.g., study abroad, UCDC, internships)	1	0.521						
Variety of courses available in your major	1	0.654						
Quality of lower-division courses in your major	1	0.621						
Quality of upper-division courses in your major	1	0.692						
Accessibility of library staff	1	0.433						
Availability of library research materials	1	0.451						
19. How many professors do you know well enough to ask for a letter of recommendation in support of an application for a job or for graduate or professional school?	6						0.477	

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**Structure**

Factor 1: Satisfaction with Educational Experience  
 Factor 2: Current Skills Self-Assessment (Nonquantitative)  
 Factor 3: Gains in Self-Assessment of Skills (Nonquantitative)  
 Factor 4: Development of Scholarship  
 Factor 5: Understanding Other Perspectives  
 Factor 6: Research Experiences  
 Factor 7: Quantitative Professions  
 Factor X: Residual Elements  
 Factor T: Use of Time

Table 2 displays a five factor, oblique fit to the items of factor 1, Satisfaction with Educational Experience. While these five subfactors proved useful in breaking the rather long list into clusters with obvious similarities, the subfactors were not well supported by the scree plot or eignenvvalues. This first principal component is a single factor. The five subfactor solution was imposed for pragmatic reasons and the results were really very good. Likewise, the first subfactor was split based on

item content into two smaller factors. Instead of a single amorphous satisfaction variable, the subfactors address instruction, access and availability, sense of belonging, advising, program requirements, and library support. Each of these smaller components is of special interest to a campus constituency and therefore will be helpful. Fewer liberties were taken with subsequent solutions.

**Table 2: First Principal Factor**

	Assignment	Subfactors				
		1a	1b	2	3	4
11. Please rate your level of satisfaction with the following aspects of your University education.						
UC grade point average	1		0.483			
Overall social experience	1		0.750			
Overall academic experience	1		0.779			
Value of your education for the price you're paying	1		0.664			
Please rate your level of agreement with the following aspects of your University education.						
I feel that I belong at this campus	1		0.842			
Knowing what I know now, I would still choose to enroll at this campus	1		0.828			
17. Please answer the following questions about your major.						
Do you understand how the requirements of your major combine to produce a coherent understanding of a field of study?	1				0.559	
Are the program requirements well defined?	1				0.691	
Are there open channels of communication between faculty and students regarding student needs, concerns, and suggestions?	1				0.528	
Are department rules and policies clearly communicated?	1				0.618	
Are students treated equitably and fairly by the faculty?	1				0.506	
Is the description of the major in the catalogue accurate?	1				0.654	
18. How satisfied are you with each of the following aspects of your educational experience in the major?						
Advising by student peer advisors on academic matters	1				0.705	
Advising by college staff on academic matters	1				0.824	

**Table 2: (Continued)**

	Assignment	Subfactors					
		1a	1b	2	3	4	5
Advising by departmental staff on academic matters	1			0.815			
Advising by faculty on academic matters	1			0.744			
Quality of faculty instruction	1	0.683					
Quality of teaching by graduate student TA's	1	0.549					
Availability of courses for general education or breadth requirements	1		0.710				
Availability of courses needed for graduation	1		0.738				
Access to small classes	1		0.671				
Access to faculty outside of class	1		0.691				
Ability to get into a major that you want	1		0.577				
Opportunities for research experience or to produce creative products	1		0.588				
Educational enrichment programs (e.g., study abroad, UCDC, internships)	1						0.544
Variety of courses available in your major	1		0.720				
Quality of lower-division courses in your major	1	0.642					
Quality of upper-division courses in your major	1	0.742					
Accessibility of library staff	1						0.882
Availability of library research materials	1						0.881

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**Structure**


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## Factor 1: Satisfaction with Educational Experience

Subfactor 1a\_i: Quality of Instruction and Courses in the Major

Subfactor 1a\_ii: Satisfaction with Access and Availability of Courses in the Major

Subfactor 1b: Sense of Belonging and Satisfaction

Subfactor 1c: Satisfaction with Advising

Subfactor 1d: Clarity of Program Requirements, Policies &amp; Practices

Subfactor 1e: Satisfaction with Library Support

The second factor was comprised of the majority of self-ratings of current skills except for quantitative skills and foreign language skills. A simple two factor solution worked well and divided items into one cluster that was more cognitive and academic and a second cluster that reflected cultural and social issues.

**Table 3: Second Factor**

	Assignment	Subfactors	
		1	2
3. Please rate your level of proficiency in the following areas when you started at this campus and now.			
Current ability level			
Analytical and critical thinking skills	2	0.717	
Ability to be clear and effective when writing	2	0.697	
Ability to read and comprehend academic material	2	0.724	
Understanding of a specific field of study	2	0.689	
Ability to speak clearly and effectively in English	2	0.688	
Understanding international perspectives (economic political, social, cultural etc.)	2	0.580	
Leadership skills	2	0.645	
Computer skills	2	0.655	
Internet skills	2	0.687	
Library research skills	2	0.650	
Other research skills	2	0.720	
Ability to prepare and make a presentation	2	0.725	
Interpersonal (social) skills	2		0.505
4. Similarly, please rate your abilities now and when you first began at this university on the following dimensions.			
Current ability level			
Ability to appreciate, tolerate and understand racial and ethnic diversity	2	0.792	
Ability to appreciate the fine arts (e.g., painting, music, drama, dance)	2	0.716	
Ability to appreciate cultural and global diversity	2	0.855	
Understanding the importance of personal social responsibility	2	0.787	
Self awareness and understanding	2	0.699	

#### Structure

Factor 2: Current Skills Self-Assessment (Nonquantitative)

Subfactor 2a: Critical Thinking and Communication

Subfactor 2b: Cultural Appreciation and Social Awareness

The third factor was forced to share its structure with the second factor. That meant that a couple items were moved from the second subfactor to the first in order to facilitate communication. Differences in factor loadings were slight for the items moved.

**Table 4: Third Factor**

	Assignment	Subfactors	
		1	2
3. Please rate your level of proficiency in the following areas when you started at this campus and now.			
Change between self-reported current skill level and skill level at entry			
Analytical and critical thinking skills	3	0.682	
Ability to be clear and effective when writing	3	0.668	
Ability to read and comprehend academic material	3	0.703	
Understanding of a specific field of study	3	0.619	
Ability to speak clearly and effectively in English	3	0.546	
Understanding international perspectives (economic political, social, cultural etc.)	3	0.527	
Leadership skills	3	0.458	
Computer skills	3	0.554	
Internet skills	3	0.582	
Library research skills	3	0.669	
Other research skills	3	0.712	
Ability to prepare and make a presentation	3	0.644	
Interpersonal (social) skills	3		0.545
4. Similarly, please rate your abilities now and when you first began at this university on the following dimensions.			
Change between self-reported current skill level and skill level at entry			
Ability to appreciate, tolerate and understand racial and ethnic diversity	3		0.733
Ability to appreciate the fine arts (e.g., painting, music, drama, dance)	3		0.619
Ability to appreciate cultural and global diversity	3		0.790
Understanding the importance of personal social responsibility	3		0.724
Self awareness and understanding	3		0.676

#### Structure

Factor 3: Gains in Self-Assessment of Skills (Nonquantitative)

Subfactor 3a: Gains in Critical Thinking and Communication

Subfactor 3b: Gains in Cultural Appreciation and Social Awareness

The fourth factor proved to be difficult to label. It was best fit by three subfactors: critical reasoning and assessment, curricular foundations for reasoning, and elevated academic effort. In fact the transition from foundations to critical reasoning was as expected from the items based on Bloom's taxonomy. This factor includes most of the items that might constitute engagement or depth of processing.



**Table 5: Fourth Factor**

	Assignment	Subfactors		
		1	2	3
5. How frequently during this academic year have you done each of the following?				
Raised your standard for acceptable effort due to the high standards of a faculty member	4			0.75
Extensively revised a paper at least once before submitting it to be graded	4			0.8
Sought academic help from instructor or tutor when needed	4			0.81
14. Thinking back over your coursework this academic year, how often were you REQUIRED to do the following?				
Recognize or recall specific facts, terms and concepts	4		0.81	
Explain methods, ideas, or concepts and use them to solve problems	4		0.86	
Break down material into component parts or arguments into assumptions to see the basis for different outcomes and conclusions	4		0.67	
Judge the value of information, ideas, actions and conclusions based on the soundness of sources, methods and reasoning	4	0.75		
Create or generate new ideas, products or ways of understanding	4	0.71		
15. Thinking back on this academic year, how often have you done each of the following?				
Used facts and examples to support your viewpoint	4	0.69		
Incorporated ideas or concepts from different courses when completing assignments	4	0.72		
Examined how others gathered and interpreted data and assessed the soundness of their conclusions	4	0.82		
Reconsidered your own position on a topic after assessing the arguments of others	4	0.78		

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**Structure**

## Factor 4: Development of Scholarship

Subfactor 4a: Critical Reasoning and Assessment Experiences

Subfactor 4b: Curricular Foundations for Reasoning

Subfactor 4c: Elevated Academic Effort

The fifth factor was comprised of a set of items designed to measure attribution of the development of appreciation and understanding of other perspectives and is an especially important factor for the University of California. Note that these items were not limited to changes in understanding but asked the frequency with which those changes happened because of the diversity of our student body. It could be asserted that change of perspectives about race, gender or other factors can occur even in a homogeneous environment but the quality and magnitude of change would seem to be affected when the interactions were with people who possessed the differences under discussion. The environment is diverse and these items attempt to measure the direct impact of that diversity.

**Table 6: Fifth Factor**

	Assignment	Subfactors	
		1	2
2. How often have you gained a deeper understanding of other perspectives through conversations with fellow students because they differed from you in the following ways?			
Their religious beliefs were very different than yours	5		0.841
Their political opinions were very different from yours	5		0.856
They were of a different nationality than your own	5	0.927	
They were of a different race or ethnicity than your own	5	0.936	
Their sexual preference was different	5		0.644
They were from a different social class	5	0.653	

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**Structure**


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Factor 5: Understanding Other Perspectives

    Subfactor 5a: Gains from Interactions with Students from Different Backgrounds

    Subfactor 5b: Gains from Interactions with Students with Different Views and Orientations

The sixth factor consists of the majority of research experience items and no further clustering was required. It is important to note that items asking about intention to do research did not fall here or in any other principal component. Only the items asking about current or past involvement in research made the cut. It also appears that research is a good way within the University of California of making contact with faculty who might then provide a letter of recommendation.

**Table 7: Sixth Factor**

	Assignment	1
16. Indicate your past, current, or planned involvement in the following research activities.		
Doing now or have done		
Completed at least one student research course (e.g., course 99)	6	0.505
Completed at least one independent study course (e.g., 199)	6	0.610
Assisted faculty in research, with course credit	6	0.638
Assisted faculty in research for pay, without course credit	6	0.441
Assisted faculty in research as a volunteer, without course credit	6	0.540
19. How many professors do you know well enough to ask for a letter of recommendation in support of an application for a job or for graduate or professional school?		
	6	0.477

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**Structure**


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Factor 6: Research Experiences

The seventh factor was formed from a cluster of items about quantitative skills, collaborative learning, and a career focus. The work group's first reaction was that these were engineering, premed and physical science students and the label SEM (science, engineering, and math) was offered. Subsequent analysis discovered that these majors were high on this factor but that business majors should be included as well. The label was changed to quantitative professions. As mentioned previously, the work group was pleased to see a factor directed at the large percentage of public university students with a quantitative foundation studying for good, financially rewarding jobs. The work group expects to see many first generation students score high on this factor.

**Table 8: Seventh Factor**

	Assignment	Subfactors		
		1	2	3
3. Please rate your level of proficiency in the following areas when you started at this campus and now.				
Current ability level				
Quantitative (mathematical and statistical) skills	7			0.823
Change between self-reported current skill level and skill level at entry				
Quantitative (mathematical and statistical) skills	7			0.892
5. How frequently during this academic year have you done each of the following?				
Worked on class projects or studied as a group with other classmates outside of class	7	0.923		
Helped a classmate better understand the course material when studying together	7	0.918		
13. What factors were very important to you in deciding on your major?				
Leads to a high paying job	7		0.764	
Prepares me for a fulfilling career	7		0.659	
Prestige	7		0.747	

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#### Structure

Factor 7: Quantitative Professions  
    Subfactor 7a: Collaborative Learning  
    Subfactor 7b: Career Orientation  
    Subfactor 7c: Quantitative Skills

The use of time items had been thoroughly examined before the work group session by Dr. Bob Hanneman and shown to fall cleanly into academic and employment time subcomponents. Due to the successive inclusion of subsequent employment items, it is probably useful to treat employment outside the factor solution. It is very important to note that the two were not correlated in that increased time employed was not negatively correlated with time preparing for and attending class.

**Table 9: Factor T -- Use of Time**

	Assignment	Subfactors	
		1	2
1. During your TYPICAL 7-day (168 hour) week during the academic term, how many hours do you spend doing the following?			
Attending classes, discussion sections or labs	Use of Time	0.820	
Studying and other academic activities outside of class	Use of Time	0.826	
Paid employment (include paid internships)	Use of Time	0.817	
Of your total hours spent working for pay, about how many hours did you work on campus?	Use of Time	0.727	
Of your total hours spent working for pay, about how many hours were related to your academic interests?	Use of Time	0.750	

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**Structure**


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Factor T: Use of Time  
 Subfactor Ta: Time Employed  
 Subfactor Tb: Academic Time

**Residual Factors**

The last Table, Table 10, shows items that did not load sufficiently on any of the principal components but that can be clustered into interesting and meaningful subfactors if so desired. Foreign language fit here as did many of the reasons for selecting a major, planned research, and the use of libraries.

**Table 10: Factor X -- Free\_Range Factor**

	Assignment	Subfactors				
		1	2	3	4	5
10. What is the HIGHEST academic degree or credential that you plan to eventually earn?	X	-0.007	-0.310	-0.210	0.160	-0.007
3. Please rate your level of proficiency in the following areas when you started at this campus and now.						
Current ability level						
Foreign language skills	X	0.788	-0.109	-0.013	0.003	0.064
Change between self-reported current skill level and skill level at entry						
Foreign language skills	X	0.782	-0.050	0.022	0.017	0.054
6. In how many service learning courses have you enrolled? (These are courses in which community-based public service activities are integrated with the academic content of the course)	X	0.078	-0.110	0.018	-0.119	0.544
8. During an average term, how often do you use the campus libraries (including online resources)?						
For research	X	-0.129	0.832	-0.047	-0.094	-0.141
For other purposes	X	-0.079	0.838	0.000	0.042	0.043
13. What factors were very important to you in deciding on your major?						
Intellectual curiosity	X	-0.028	-0.098	0.024	0.644	-0.092
Provides international opportunities	X	0.512	-0.169	0.430	0.552	-0.174
Complements desire to study abroad	X	0.507	-0.147	0.427	0.543	-0.165
Allows time for other activities	X	-0.032	0.053	0.702	-0.084	0.015
Easy requirements	X	0.057	0.013	0.729	0.156	0.029
Couldn't get into my first choice of major	X	-0.006	-0.044	0.310	-0.360	0.041
Parental desires	X	0.023	-0.040	-0.020	-0.311	-0.126

**Table 10: (Continued)**

	Assignment	Subfactors				
		1	2	3	4	5
16. Indicate your past, current, or planned involvement in the following research activities.						
Doing now or have done						
Completed a research project, creative activity, or paper as part of your coursework	X	0.005	-0.041	0.087	0.246	0.549
Worked on creative projects under the direction of faculty, for example in the visual or performing arts.						
17. Please answer the following questions about your major.						
Do faculty clearly explain what constitutes plagiarism and its consequences?	X	0.037	0.020	-0.027	0.135	0.085
<b>Structure</b>						

## Factor X: Residual Elements

Subfactor Xa: Foreign Language

Subfactor Xb: Library Use

Subfactor Xc: Choice of Major -- Non-Demanding

Subfactor Xd: Choice of Major - Intrinsic and International Opportunities

Subfactor Xe: Enriching Coursework