

## Nuggets from NSSE: Fundamental Learning Outcomes

Handout #1

The KSU experience was frequently rated as having had a strong impact on developing nine fundamental learning outcomes in undergraduate education. Nine out of every 10 respondents in the 2004 NSSE reported that their KSU experience contributed greatly (i.e., “Quite a Bit” or “Very Much”) to their acquisition of a broad general education. Typically, three-fourths or more of the respondents credited the KSU experience greatly for their development of knowledge and skills in critical thinking, writing, speaking, quantitative analysis, computer usage, working with others, independent learning, and job-related career preparation. Of the 16 undergraduate learning outcomes that were rated, these nine are arguably the most fundamental and important for a sound educational experience at a comprehensive public university like KSU. (See the top nine listings in Table 1.)

**Table 1**

**Percent of Students Crediting the KSU Experience Greatly for Their Growth in 16 Undergraduate Learning Outcomes and the Significance of Gains from the First Year to the Senior Year**

<b>Contribution of the KSU Experience to a Specific Learning Outcome</b>	<b>% Rating the Contribution as Great</b>		
	<b>1st-Yr</b>	<b>Senior</b>	<b>Difference*</b>
<b>Nine Fundamentals</b>			
Acquiring a broad general education	85%	87%	Not Significant
Thinking critically and analytically	77%	88%	Significant
Using computing and information technology	76%	81%	Not Significant
Writing clearly and effectively	72%	84%	Significant
Working effectively with others	71%	83%	Significant
Learning effectively on your own	67%	72%	Not Significant
Analyzing quantitative problems	59%	75%	Significant
Speaking clearly and effectively	58%	78%	Significant
Acquiring job or work-related education	50%	74%	Significant
<b>Four Additional Notables</b>			
Understanding yourself	52%	56%	Not Significant
Solving complex real-world problems	47%	59%	Not Significant
Understanding people of other races	46%	50%	Not Significant
Developing personal values and ethics	40%	45%	Not Significant
<b>Weakest Outcomes</b>			
Contributing to your community	28%	31%	Not Significant
Voting in local, state, national elections	28%	20%	Not Significant
Developing deepened spirituality	18%	9%	Not Significant

\* Significance of differences were tested using Chi Square at  $p < .05$ , d.f. = 1.

The percentages of seniors who gave great credit to the KSU experience were higher for all nine learning outcomes than the comparable percentages of first-year students. In six of those nine comparisons, the gains from the first year to the senior year were statistically significant and large enough to be meaningful as well. It is affirming to see this evidence that the percentages of students who experienced great educational and personal development at KSU were so high and grew significantly in critical thinking skills, writing skills, teamwork, quantitative skills, speaking skills, and career-related education from the freshman to the senior years, reflecting a value-added impact of both the general education program as well as study in the major field.

## Nuggets from FSSE: Convergent Findings on Learning Outcomes Handout #2

Item 21 in FSSE was similar to but not identical with item 11 in NSSE, both of which focused on student learning outcomes. Students were asked to report the level of the institution's overall contribution to their development on 16 specific outcomes. In contrast, faculty members were asked to report the extent to which they structured one particular lower or upper division course to help students develop in 14 of those 16 learning outcomes. The two learning outcomes which were included in NSSE, but were absent in FSSE, were "Contributing to the welfare of your community" and "Voting in local, state, or national elections" (which would have been two interesting items to examine for the American Democracy Project initiative had they been included in FSSE).

Because of the confounding effects of differences between the design of NSSE and FSSE items, direct comparisons of frequency distributions of student and faculty responses on the 14 common learning outcomes would not be methodologically sound. It is appropriate, however, to extract patterns of emphasis on the 14 learning outcomes that faculty reported for their courses and comment on the degree to which such findings appeared consistent with student perceptions of the contributions of the overall KSU experience toward their achievement of those same 14 learning outcomes. In that regard, the faculty's reported instructional emphasis on learning outcomes was highly consistent and convergent with student perceptions of their overall KSU experience.

On these items, the findings from FSSE (see Table 2) were very consistent with the findings from NSSE. The list of nine fundamental learning outcomes from the students in NSSE overlapped the faculty's in FSSE in all cases except one. The substantial overlap between what faculty say they emphasize in their courses and what students report they experience as KSU's greatest educational impact helps to confirm that the faculty's curricular intentions are achieving their expected results. Significant differences between lower and upper division courses in FSSE and the first year and senior student experience in NSSE are also strikingly similar.

**Table 2**

**Percent of KSU Faculty Who Reported Structuring Their Selected Course to Greatly Facilitate Particular Undergraduate Learning Outcomes and the Significance of Differences Between those Reports for Lower Division and Upper Division Courses**

<b>Course Contribution to a Particular Learning Outcome</b>	<b>% Reporting Great Emphasis</b>		
	<b>Lower Div</b>	<b>Upper Div</b>	<b>Difference</b>
<b>Nine Fundamentals</b>			
Thinking critically & analytically	95%	99%	Not Significant
Learning effectively on their own	93%	82%	Significant
Acquiring a broad general education	76%	59%	Significant
Using computing & info technology	68%	56%	Not Significant
Writing clearly & effectively	60%	82%	Significant
Solving complex real-world problems	57%	67%	Not Significant
Acquiring job or work-related education	55%	83%	Significant
Working effectively with others	55%	74%	Significant
Speaking clearly & effectively	39%	60%	Significant
<b>Four Additional Notables</b>			
Understanding themselves	53%	55%	Not Significant
Understanding people of other races	47%	45%	Not Significant
Analyzing quantitative problems	48%	40%	Not Significant
Developing personal values & ethics	41%	58%	Significant
<b>Weakest Outcome</b>			
Developing deepened spirituality	11%	13%	Not Significant

\*Significance of differences were tested using Chi Square at  $p < .05$ , d.f. = 1.

No notable differences existed between KSU students and NSSE’s national samples in their reports of coursework emphasis on critical thinking and higher-order learning skills. However, there were several important findings between lower-order and higher-order thinking skills within KSU between freshmen and seniors.

For example, both first-year and senior students reported the least emphasis in their coursework on the lower-order thinking skills of memorizing facts and ideas and the most emphasis on the higher-order thinking skills of analyzing ideas and experiences. This difference was significant and notable for seniors. That finding corresponds to the ideals of the educational philosophy in higher education in which critical thinking, especially analyzing and synthesizing information, is valued more than rote memorization and grows in emphasis throughout the undergraduate experience.

Significantly more KSU seniors also reported great emphasis (i.e., “Quite a Bit” or “Very Much”) on analyzing and synthesizing activity in their coursework than freshmen reported for their first-year experience. That finding is consistent with expectations that upper division coursework would entail greater higher-order thinking skills than lower division coursework as students advance in their collegiate studies. (See Table 3.)

Several related NSSE items that focused on student engagement in synthesizing intellectual activity yielded convergent findings of support. For example, KSU freshmen and seniors reported working significantly more often than their national counterparts on a paper or project that required integration of ideas or information from various sources (item 1d). Significantly more reported putting together ideas or concepts from different courses when completing assignments or during class discussions (item 1i). This building block effect of drawing on other courses increased significantly and very substantially from the freshman to the senior year for KSU students (52% of first-year students often did so compared to 75% of seniors).

**Table 3**

**KSU Coursework Emphasis on Critical Thinking**

<b>Critical Thinking Dimension Emphasized in Coursework</b>	<b>% Reporting a Great Emphasis</b>		
	<b>1st-Yr</b>	<b>Senior</b>	<b>Difference*</b>
Analyzing	73%	88%	Significant
Synthesizing	63%	78%	Significant
Applying	74%	82%	Not Significant
Making Judgments	68%	76%	Not Significant
Memorizing	63%	69%	Not Significant
Difference Between Analyzing and Memorizing	Not Significant	Significant	

Significance of differences were tested with Chi Square  $p < .05$ , d.f. = 1

When focusing on one particular course in FSSE, a substantial majority of the KSU faculty (seven to nine out of 10) reported giving great emphasis (i.e., “Quite a Bit” or “Very Much”) to the higher-order thinking skills of analysis, synthesis, application, and making judgments and a significantly lower emphasis to lower-order memorization. These results are consistent for the most part with the students' perceptions of their coursework's emphasis on critical thinking skills. (See Table 4.)

A visual comparison of Tables 3 and 4 suggests that KSU faculty and students differ notably in their perceptions of emphasis on memorization. Again, caution is advised about making direct comparisons of student responses with faculty responses because of the confounding differences that exist in the item design of the NSSE and FSSE. Regardless, it is probably fair to say that in general, students report expending more memorization effort in their college experience than faculty intend to emphasize in their courses. However, it is also reasonable to conclude that a student’s preparation for tests and exams in a course often entails extensive memorization, not all of which is rote or lower level. Memorization to facilitate lower-order learning of facts and information is probably present along with memorization for higher-order learning of problem-solving methods and analytical strategies.

Perhaps most importantly, many more faculty reported emphasizing and many more students reported experiencing great emphasis in higher-order learning and critical thinking skills than in lower-order learning and memorization. That finding is consistent with higher education’s philosophical ideals.

**Table 4**

**The Faculty's Emphasis on Critical Thinking in Their Selected Lower Division or Upper Division Courses**

<b>Course Emphasis on a Dimension of Critical Thinking</b>	<b>% Reporting Great Emphasis</b>		
	<b>Lower Div</b>	<b>Upper Div</b>	<b>Difference</b>
Analyzing	90%	88%	Not Significant
Synthesizing	84%	88%	Not Significant
Applying	84%	90%	Not Significant
Making Judgments	70%	83%	Significant
Memorizing	29%	22%	Not Significant
Difference Between Memorizing and All Other Higher-Order Skills	Significant	Significant	

\*Significance of differences were tested with Chi Square,  $p < .05$ , d.f.=1.

## Nuggets from NSSE & FSSE: Exceptional Impact on Computing Handout #5

KSU's results from the NSSE on most of the 16 student learning outcomes are not significantly different from the results of comparator groups at the national level. The few exceptions involved a small effect size and are not especially notable. Basically, KSU first-year and senior students reported achievements in learning that were solidly in the national mainstream with those reported by the entire national sample of NSSE respondents and by the national sample from Master's I & II Carnegie classifications.

One notable exception involved information technology. KSU's significantly greater impact on the development of computing and information technology skills for freshmen and seniors affirms the value of the institution's extensive investments for improving instructional and information technology under a CIO over the past five years (see Table 5). This significant distinction for KSU on a key fundamental learning outcome was reinforced by results from three additional NSSE items related to technology (items 11, 1m, and 10g). Nine out of every 10 freshmen and seniors reported that KSU places great emphasis on the use of computers in academic work. Significantly more KSU students reported this strong emphasis than their counterparts at other Masters I & II institutions, although the difference was rather modest (90% of KSU freshmen compared to 83% elsewhere and 92% of KSU seniors compared to 87% elsewhere). In addition, significantly more KSU seniors reported using an electronic medium frequently to complete assignments than students in the national comparator groups (81% of KSU seniors often did so compared to 59% of both national samples). KSU seniors also reported using email to communicate with their instructors significantly more often (87% of KSU seniors often did compared to 76% and 79% of the two national samples respectively). The significantly large gains made by KSU students from their freshmen to senior years in using technology to complete assignments (58% of KSU freshmen often did so compared to 81% of KSU seniors) and to communicate with their professors (63% of freshmen compared to 87% of seniors) were especially noteworthy of value-added learning. The convergence of these findings underscores exceptional strength in the use of computing and information technology in KSU's educational experience.

Rarely did nearly all faculty members and nearly all students share similar opinions about any of the same items in the FSSE and NSSE. They did so, however, in regard to their belief that KSU strongly encourages students to use computers in their academic work. Nearly all faculty and student respondents, more than nine out of every 10, affirmed the institution's strong commitment to and advancements in the use of technology in KSU's educational experience.

**Table 5**

### Great Use of Computing & Information Technology as a Learning Outcome (11 g)

Student Level	KSU	% Reporting Great Use		Differences*
		Master's	NSSE	
First-Year	76%	65%	65%	Significant
Seniors	81%	76%	77%	Significant

\*Significance of differences between KSU and comparators were tested using Chi Square at  $p < .05$ , d.f. = 1.