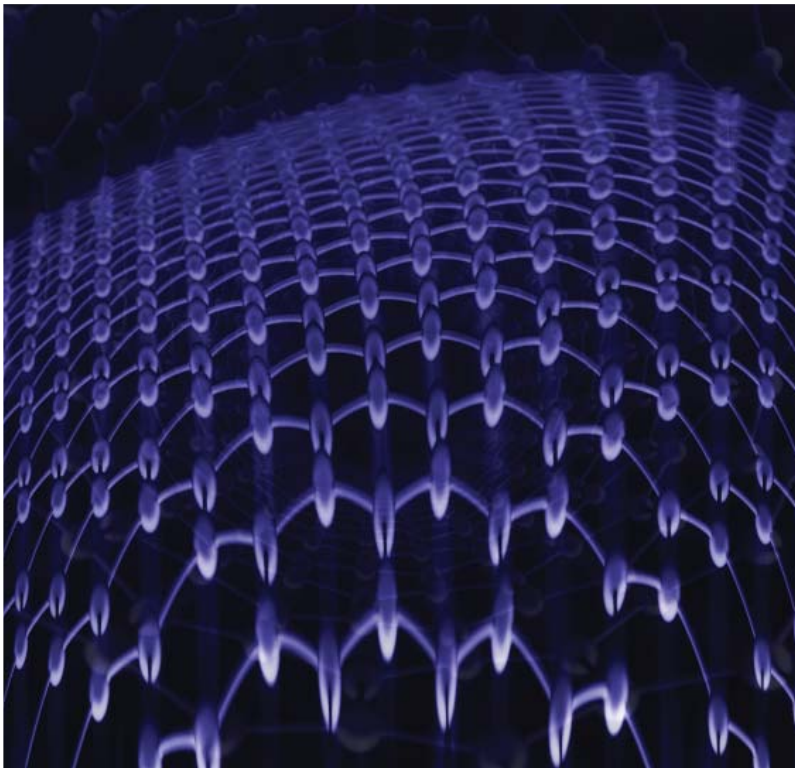
EYP/ research

Assessment of Trinity University STEM Buildings: Pre-Occupancy Evaluation Surveys

July 18, 2012



Executive Summary

As the construction of the Trinity Center for the Sciences and Innovation (CSI) was about to enter phase 3, EYP conducted surveys of students and faculty to assess their use and perceptions of three STEM buildings: Cowles, Halsell, and Moody. The object of the surveys was to provide benchmarks for assessing the impact of the new CSI. To provide a current point of comparison for interpreting survey results, we also presented data from surveys of a liberal arts college (College X) where EYP designed a recently completed science complex. The Trinity surveys produced several key findings:

- Many Trinity students rarely, if ever, go into the three STEM buildings. Since coming to Trinity, about a quarter of students had *never* entered Halsell or Moody, and during the current semester 49 percent of students had not gone into Moody and 71 percent had not gone into Halsell.

- The vast majority of students enter these buildings to attend class or meet with a faculty member; otherwise, they tend not to go there. This was especially true of Cowles Life Science Building. Those students who visited Halsell or Moody on a regular basis or who used them as places to study and meet other students were nearly always science majors. By contrast, at College X, a substantial percentage of the non-science majors chose to study or meet others in the new science complex.

- Students who used Moody as a gathering place tended to congregate in the Engineering Core Room or Chemistry Lounge. Aside from having these rooms available, students reported that they were attracted to Moody as a place to study or meet others by its lighting and proximity to classes and because it is a generally quiet and safe place to be.

- Overall, both students and faculty tended to rate the classrooms in the three STEM buildings as "average." By comparison, nearly 90 percent of College X faculty rated new STEM classrooms as "good" or "excellent," and over 90 percent of College X students rated the classrooms "above average" or "one of the best classrooms" at the college. In evaluating various classrooms features, the faculty gave its lowest ratings to flexibility in accommodating different teaching strategies, lighting quality, and accessibility of technology to students.

- Faculty generally were dissatisfied with the research facilities in Cowles and Moody and tended to see the teaching laboratories in these buildings as inadequate to meet their needs. Mean ratings of teaching laboratories were below average on nearly every dimension, from ease of sharing lab space and flexibility in accommodating different teaching styles to quality of acoustics and safety of the working environment. Research labs were rated most unfavorably in terms of level of environmental control, ease of sharing lab space, and the quality of lighting and acoustics. At College X, in contrast, the overwhelming majority of the faculty rated both the teaching and research laboratories as "excellent."

- Overall, faculty and students reported that they were not very satisfied with any of the three buildings. They were least satisfied with Moody: they did not believe it projected a favorable image of Trinity University; faculty did not find it a “comfortable place to work”; and students did not see it as a “comfortable place to study and learn.”

- When asked to make suggestions for improvement, both students and faculty most often mentioned having more areas for studying and meeting others.

Introduction

To assess the impact of its designs, EYP has launched a program of evaluation that includes pre- and post-occupancy surveys. At Trinity, EYP designed a new integrated science complex, to be called the Center for the Sciences and Innovation (CSI), which links all of Trinity's science and engineering programs. Prior to this project, science and engineering were housed in four buildings: Cowles Life Science, Halsell, Marrs McLean, and Moody Engineering. The new design includes the razing of the Moody Engineering Building, the complete renovation of Cowles Life Science Building, minor renovations to Marrs McLean, and new construction.

Prior to the razing of Moody and the renovation of Cowles and Marrs McLean, EYP conducted two surveys of the principal users, faculty and students. The faculty survey was designed to examine faculty perceptions of the quality of the buildings' classrooms and laboratories. The student survey was designed to gauge students' use of the buildings: How often they visit them, why they go there, what areas they use, and how attractive they find them as places to study and meet others.

Methods

Sample

The faculty survey was administered to all tenured and tenure-track members of the five departments most affected by the construction: Biology, Chemistry, Computer Science, Engineering Science, and Psychology. With Computer Science currently residing in Halsell and the other four departments in Cowles and Moody, the survey focused on these three buildings. In addition to the faculty in the five affected departments, the survey also was administered to all other faculty members who had taught in Cowles, Halsell, or Moody. Of the 124 faculty contacted, 31 completed the survey, for a response rate of 25 percent. Twenty-seven faculty respondents were from a STEM discipline, including nine from biology, five from chemistry, five from engineering science, four from psychology, and three from computer science. The student survey was administered to a stratified random sample, stratified by science/non-science major, of all students enrolled and on campus in fall 2011. A total of 500 students, 250 science and 250 non-science majors, were contacted; 217 students—114 science majors and 103 non-science majors—completed the survey, for an overall response rate of 43.4 percent.

Procedure

Both surveys were conducted through the Internet with the online survey tool SurveyMonkey. The student survey was carried out between October 31, 2011 and January 16, 2012; the faculty survey between December 1, 2011 and January 8, 2012. In each case, we sent pre-survey letters to respondents via campus mail; the letters explained the purpose of the survey, provided the survey link, and assured respondents that the survey

was voluntary and either anonymous (students) or confidential (faculty). We also enclosed an incentive of $2 in all student letters. Within two days after the letters were mailed, we contacted all respondents via e-mail, expressing thanks to those who had completed the survey and encouraging those who had not to do so. Finally, at intervals of one week each, we followed up the initial contact with two e-mail reminders to students and two reminders to faculty.

Results

Below we summarize the findings with respect to students' *use* and student and faculty *perceptions* of the classrooms, laboratories, and other spaces in Cowles, Halsell, and Moody, hereafter referred to as "the STEM buildings." Altogether, the survey results provide important baseline information with which to compare the use and perceptions of the new Center for Science and Innovation once it is completed. In the meantime, we offer comparative data from recent post-occupancy surveys at a similar institution with a newly constructed, EYP-designed science complex.

Student Use of the STEM Buildings

All but a few students have entered at least one of the three STEM buildings since coming to Trinity. Of 217 respondents, only ten—mostly first-year non-science majors—reported that they had never been in any of the buildings. Nearly all students had visited Cowles, but as Table 1 shows, many students never or seldom had been in either Moody or Halsell. Most of the students who entered Moody on a regular basis were science majors, and most of the relatively few students who visited Halsell regularly majored in computer science, whereas there was little difference in how often science and non-science majors entered Cowles.

Table 1. Number of Times in STEM Buildings Since Coming to Trinity University and This Semester in Percents

Since Coming to Trinity	***N***	**Never**	**1-10 Times**	**11+ Times**
Cowles Life Science	217	7.8	10.6	81.6
Moody Engineering	215	21.4	17.2	61.4
Halsell	211	27.5	23.2	49.3
This Semester	***N***	**Never**	**.5-3 Times/wk**	**4+ Times/wk**
Cowles Life Science	205	32.7	34.6	32.7
Moody Engineering	193	49.2	21.2	29.5
Halsell	190	71.1	18.9	10.0

Why do students frequent these buildings? At Trinity, most students enter the STEM buildings primarily because they are taking a course that meets there. Almost nine of ten respondents had taken a course that met

in one of the three buildings. When we asked respondents the purposes that brought them to these buildings, the vast majority reported that one purpose was to "attend class." Table 2 shows the percentage of students who reported each of eight purposes among those who identified any purpose at all. As the table shows, students tended to go to Cowles either to attend class (86.2%) or to meet with a faculty member outside class (52.4%); otherwise, they tended to have no reason to go there. Moody and Halsell, by contrast, were more likely to be used for various other purposes, such as places to study and to meet with other students.

Table 2. Why Students Go to STEM Buildings in Percents

Purpose	Cowles (*N*=145)	Moody (*N*=111)	Halsell (*N*=69)	Any (*N*=166)
Attend class	86.2	78.4	73.9	93.4
Study or do homework alone	6.9	33.3	30.4	37.3
Study or work on group projects with others	15.9	37.8	34.8	48.8
Hang out with other students	6.9	20.7	26.1	25.3
Attend sessions at Peer Learning Center	6.2	30.6	4.3	24.1
Conduct independent research	13.1	17.1	8.7	24.1
Meet with a faculty member outside class	52.4	58.6	37.7	72.9
Work in a work/study job	6.9	13.5	11.6	17.5

Students most often enter the STEM buildings because external forces require them to be there, such as to attend a class or meet with a faculty member in his or her office; relatively few students go there by choice. As Table 3 shows, science majors are more likely than non-science majors to *choose* a STEM building as a place to study, work with others on group projects, or hang out with others.

Results from a post-occupancy survey at another college, where EYP designed numerous informal study and meeting spaces throughout the newly constructed science complex, tell a very different story. Students at this college, including a relatively large percentage of non-science majors, are more likely than Trinity students to go to the STEM buildings by choice. For example, at Trinity, 43.9 percent of science majors and 11.7 percent of non-science majors reported that they visited one of the STEM buildings to study or do homework alone; by contrast, 84.8 percent of science majors and 50 percent of non-science majors at College X visited the STEM buildings for this purpose.

Table 3. Why Students Go to STEM Buildings at Trinity and College X by Major in Percents

	Trinity		College X	
Purpose	Science (*N*=114)	Non-Science (*N*=103)	Science (*N*=171)	Non-Science (*N*=160)
Attend class	87.7	53.4	97.1	52.5
Study or do homework alone	43.9	11.7	84.8	50.0
Study or work on group projects with others	57.0	15.5	67.3	31.9
Hang out with other students	28.1	9.7	32.2	24.4
Attend sessions at Peer Learning Center[1]	21.9	14.6	76.6	45.0
Conduct independent research	28.1	7.8	22.8	1.9
Meet with a faculty member outside class	72.8	36.9	73.1	19.4
Work in a work/study job	18.4	7.8	12.9	4.4
No purpose given	8.8	39.8	0.0	15.6

[1]At College X, students were asked if they visited the science complex to "use the science library."

At Trinity, students were more likely to choose Moody than Cowles or Halsell as a place to study alone and to study or work on group projects with others. Whether studying or meeting others, the most popular areas were the Engineering Core Room (Moody 328), the Chemistry Lounge (Moody 220), and Peer Learning Center. Otherwise, students tended to use open classrooms or laboratories. Figures 1 and 2 show the ratings of Moody as a place to study and to meet others as compared with similar ratings of the new science complex at College X. In both surveys, only students who used the buildings for these purposes were asked to rate the buildings. The Figures show that even among these respondents there is a sharp difference in ratings at Trinity and College X. Four in 10 students at Trinity reported that Moody was a good or one of their favorite places to study and to meet with others; by comparison, 9 in 10 students at College X rated the new science complex as a good or one of their favorite places.

As one final point of comparison, we asked Trinity students as well as students at College X how strongly they agreed with the following statement "Moody Engineering Science Building (the 'new science complex' at College X) is a comfortable place to study and learn." At Trinity, one if five students agreed or strongly agreed with this statement and close to 50 percent disagreed or disagreed strongly. At College X, over 9 in 10 agreed or agreed strongly; only 1.3 percent disagreed.

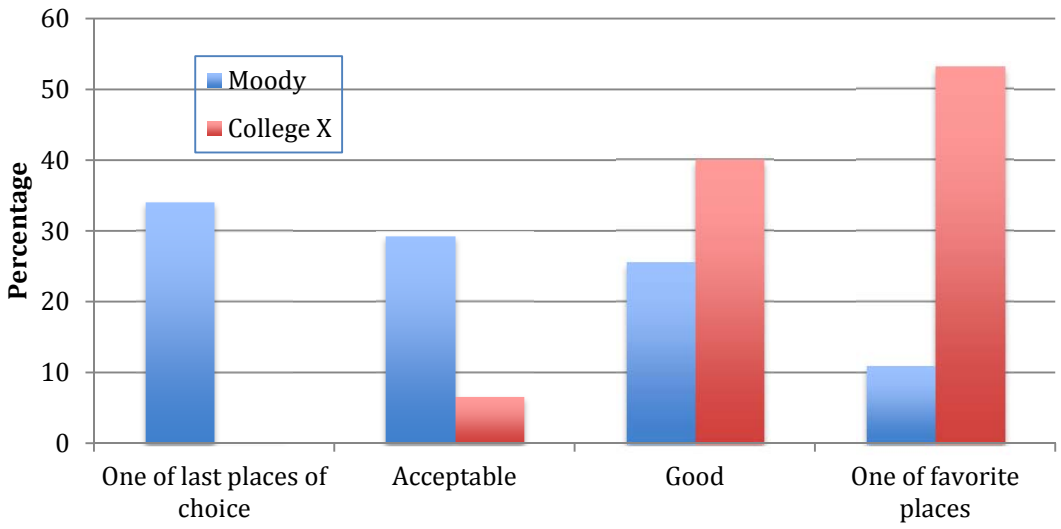


Figure 1. Student Ratings of Moody Engineering Science Building (*N*=135) and Science Complex at College X (*N*=269) as Places to Study.

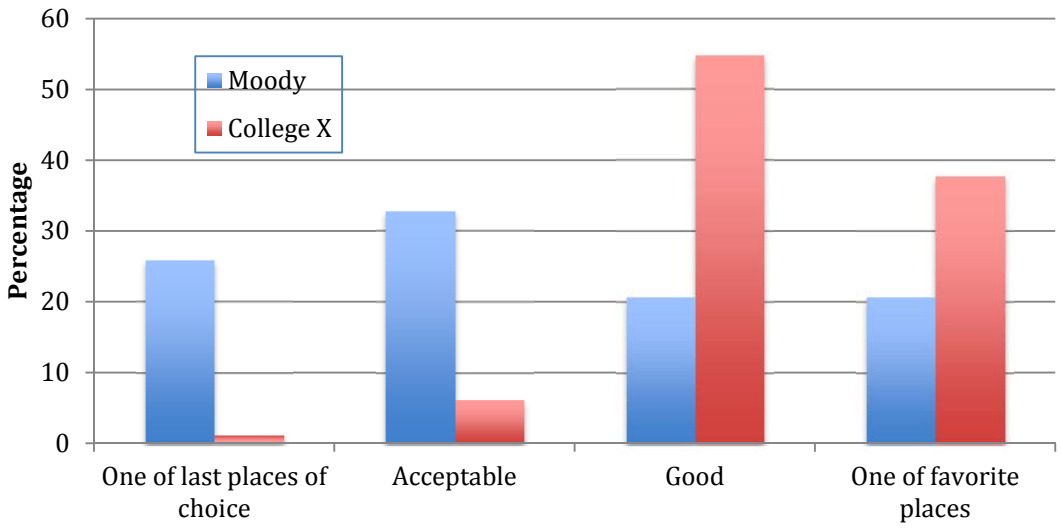


Figure 2. Student Ratings of Moody Engineering Science Buiding (N=159) and Science Complex at College X (N=259) as Places to Meet Others.

What draws students to these buildings to study or to meet with other students? Having accessible areas to meet, especially rooms earmarked for specific majors, is clearly important. Nearly all of the Engineering Science majors (26 of 27) reported that they studied or met others in the Engineering Core Room. Similarly, the

majority of the biochemistry majors reported that they did the same in the Chemistry Lounge. In addition, certain environmental features may attract students. To understand this, we asked students to rate the importance of several features in making each building "an attractive place to study" and "an attractive place to meet with other students." As Tables 4 and 5 show, most students deemed every aspect of the Moody Engineering Building at least "moderately important" in attracting them. Moody's most important attractions as a place of study were its lighting and proximity to classes and that it is a generally quiet and safe place to be. Making it most appealing as a place to meet others was the availability of tables and chairs, followed by having comfortable furniture, location, proximity to class, and lighting.

Table 4. Importance of Various Features in Making Moody Engineering Science Building an Attractive Place to Study in Percents (*N*=141)

Feature	Not at all Import	Slightly Import	Moderately Import	Very Import	Extremely Import	Mean[1]	S.D.
Convenient place to be before and after class	9.2	7.9	25.0	21.1	36.8	3.68	1.30
Comfortable furniture in public spaces	13.2	7.9	25.0	30.3	23.7	3.43	1.30
Good lighting	6.6	2.6	15.8	39.5	35.5	3.95	1.11
Generally quiet	9.1	7.8	22.1	33.8	27.3	3.62	1.22
Safe place to be	14.5	5.3	18.4	21.1	40.8	3.68	1.43
Pleasing décor	17.1	21.1	26.3	18.4	17.1	2.97	1.34
Openness and spacious- ness of public spaces	17.1	14.5	25.0	23.7	19.7	3.14	1.36
Many friends go there	30.3	11.8	22.4	23.7	11.8	2.75	1.42
Average	14.6	9.9	22.5	26.4	26.6	3.40	1.31

[1] Not at all important = 1; Slightly important = 2; Moderately important = 3; Very important = 4; Extremely important = 5.

The pattern of ratings was very similar for Cowles Life Science Building. That is, the ranking or relative importance of the various features was nearly identical to Moody. Moreover, the ratings of Trinity students are fairly similar to those of students at College X. As a point of comparison, Table 6 shows the mean ratings of each feature for Moody and for the new science complex at College X as a place to study on a scale from 1 to 5, where 1 = not at all important and 5 = extremely important. At both places, good lighting is most important; being generally quiet, convenience, and safety tend to be rated as "very important" on average; and having a pleasing décor and friends who go there are least important. However, the ratings at Trinity differ from College X in two ways that may reveal something about the impact of the physical environment. First, at College X, all features are seen as more important than at Trinity. Second, the largest differences occur on features that were emphasized in the design of the new science complex: spaciousness (or the availability of open study areas),

presence of comfortable furniture in public spaces, and pleasing décor. Thus, it appears that spacious public areas to study, comfortable furniture, and an aesthetically appealing décor may seem more important if these features are built into the environment. If they're not there, it is as if students don't know what they're missing.

Table 5. Importance of Various Features in Making Moody Engineering Science Building an Attractive Place to Meet with Other Students in Percents (*N*=160)

Feature	Not at all Import	Slightly Import	Moderately Import	Very Import	Extremely Import	Mean[1]	S.D.
Comfortable furniture in public spaces	5.3	8.8	29.8	31.6	24.6	4.00	.925
Good lighting	0.0	3.5	17.5	38.6	40.4	3.88	.998
Availability of tables and chairs	1.8	1.8	8.8	31.6	56.1	4.33	.745
Convenient location	1.8	7.1	25.0	26.8	39.3	3.93	1.00
Close to classes and labs	0.0	8.8	17.5	29.8	43.9	3.92	1.05
Availability of enclosed study rooms to meet	3.5	15.8	28.1	21.1	31.6	3.74	1.16
Average	2.4	8.2	19.7	34.3	35.3	3.92	1.01

[1] Not at all important = 1; Slightly important = 2; Moderately important = 3; Very important = 4; Extremely important = 5.

Table 6. Importance of Various Features in Making Moody Engineering Science Building (*N*=141) and the New Science Complex at College X Attractive Places to Study in Percents (*N*=268)

	Moody		College X	
Feature	Mean	S.D.	Mean	S.D.
Convenient place to be before and after class	3.68	1.30	4.08	.906
Comfortable furniture in public spaces	3.43	1.30	3.95	.947
Good lighting	3.95	1.11	4.19	.804
Generally quiet	3.62	1.22	4.00	.936
Safe place to be	3.68	1.43	3.81	1.19
Pleasing décor	2.97	1.34	3.46	1.09
Openness and spaciousness of public spaces	3.14	1.36	3.75	1.00
Many friends go there	2.75	1.42	2.99	1.21
Average	3.40	1.31	3.76	1.03

Faculty and Student Perceptions of Classrooms

There are 17 classrooms in the three STEM buildings that were the targets of the Trinity surveys. These classrooms range in capacity from 10 to 66 students in design from seminar rooms to tiered lecture halls. To assess faculty perceptions of the quality of these classrooms, we asked faculty members to rate the classroom in which they most recently had taught on several criteria. With only 26 respondents, who had taught most recently in 12 different classrooms, there are too few ratings to break them down by classroom. Still, ratings do not differ appreciably across classrooms, and the overall pattern reveals much about faculty perceptions. Table 7 shows faculty ratings across all classrooms. On only two criteria were the classrooms clearly rated as above average: Sight lines between instructor and student and accessibility of technology to instructors. On every other criterion, the vast majority of instructors rated the classroom in which they had taught as average or slightly above average. Features most in need of attention appear to be flexibility in accommodating different teaching strategies, lighting quality, and accessibility of technology to students.

Table 7. Faculty Ratings of Trinity Classrooms Combined in Percents (*N*=26)

Criterion	Very poor	Poor	Average	Good	Excellent	Mean[1]	S.D.
Flexibility in accommodating different teaching strategies	7.7	38.5	38.5	15.4	0.0	2.62	.852
Sight lines between you and your students	0.0	0.0	19.2	53.8	26.9	4.08	.688
Accessibility of technology to instructors	0.0	4.0	32.0	52.0	12.0	3.72	.737
Accessibility of teaching technology to students	8.0	24.0	40.0	24.0	4.0	2.92	.997
Placement and visibility of blackboards and whiteboards	3.8	23.1	38.5	30.8	3.8	3.08	.935
Size or spaciousness	3.8	19.2	15.4	53.8	7.7	3.42	1.027
Quality of lighting	3.8	26.9	46.2	23.1	0.0	2.88	.816
Quality of acoustics	0.0	7.7	61.5	30.8	0.0	3.23	.587
Overall quality as a teaching environment	0.0	15.4	65.4	19.2	0.0	3.04	.599
Average	3.0	17.6	39.6	33.7	6.0	3.22	.804

[1]Very poor = 1; Poor = 2; Average = 3; Good = 4; Excellent = 5.

Once again, a post-occupancy survey at College X provides a useful point of comparison. On every dimension shown in Table 7, the faculty rated the new classrooms in the redesigned science complex at College X as "good" to "excellent." Figure 3 compares Trinity and College X ratings of the "overall quality of the classroom as

a teaching environment." Trinity faculty assessed overall quality as decidedly "average," whereas nearly 90 percent of College X faculty rated the classroom as "good" or "excellent."

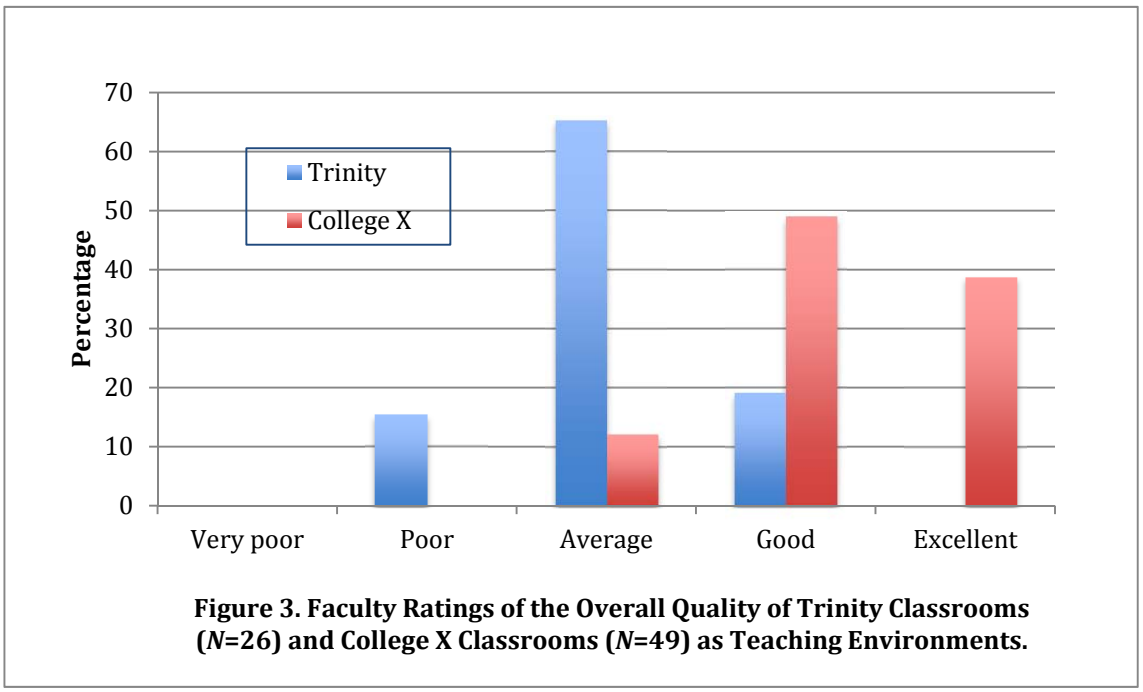


Figure 3. Faculty Ratings of the Overall Quality of Trinity Classrooms (*N*=26) and College X Classrooms (*N*=49) as Teaching Environments.

Trinity students also rated the STEM classroom in which they had taken a course most recently. In this case, the question asked students to assess "the quality and feel of" the classroom "compared with most other classrooms at Trinity University." Table 8 shows these ratings by classroom. With one exception, Halsell 228, which is seen as "above average," all STEM classrooms tend to be rated "average" to "below average." More than half the students rated Moody 103 and Moody 105 below "average." Further, the student comparison with College X is as striking as that of the faculty. Over 90 percent of College X students rated the new STEM classroom "above average," and almost two-thirds reported that it was "one of the best classrooms" at the college.

Table 8. Student Ratings[1] of STEM Classroom in Percents

Classroom	*N*	One of worst	Below average	Average	Above average	One of best	Mean[2]	S.D.
Cowles 149	30	3.3	23.3	46.7	20.0	6.7	3.03	.928
Cowles 336	17	11.8	5.9	64.7	17.6	0.0	2.88	.857
Cowles 421	14	7.1	35.7	57.1	0.0	0.0	2.50	.650
Moody 103	12	33.3	16.7	50.0	0.0	0.0	2.17	.937
Moody 105	14	14.3	50.0	28.6	7.1	0.0	2.29	.825
Moody 322	14	14.3	7.1	64.3	14.3	0.0	2.79	.893
Moody 323	11	9.1	18.2	36.4	27.3	9.1	3.09	1.136
Halsell 228	23	0.0	4.3	21.7	56.5	17.4	3.87	.757
Other classrooms[3]	48	2.1	20.8	41.7	29.2	6.3	3.17	.907
All classrooms	187	7.5	19.8	44.9	22.5	5.3	2.98	.970

[1] Compared with most other classrooms at Trinity University, which of the following best describes the quality and feel of [this classroom]?

[2] 1 = One of the worst; 2 = Below average; 3 = Average; 4 = Above average; 5 = One of the best.

[3] Classrooms in which fewer than 10 respondents had taken a course: Cowles 124, Cowles 128, Cowles 320, Cowles 321, Cowles 344, Cowles 349, Cowles 438, Moody 206, and Halsell 340.

Faculty Perceptions of Teaching and Research Laboratories

To assess perceptions of the quality of the Trinity laboratories, we asked faculty respondents in science and engineering how strongly they agreed with two statements about Cowles and Moody: "The teaching laboratories in [Cowles/Moody] are adequate for my instructional needs"; "I am generally satisfied with the research facilities in [Cowles/Moody]." Table 9 shows the responses to these questions. For both items and both buildings, the majority of respondents "disagreed" or "neither agreed nor disagreed"; no one "agreed strongly." In addition, faculty members were somewhat less satisfied with the laboratory facilities in Moody than with those in Cowles.

Of the 23 faculty respondents in science and engineering, 19 reported that they had taught in one of the teaching laboratories. Sixteen of these faculty members rated the laboratory in which they most recently had taught on several criteria; nine of the labs were located in Cowley and seven were in Moody. Table 10 presents the ratings of Trinity teaching laboratories on eleven dimensions. The vast majority of the ratings are "poor" to "average," indicating that Trinity faculty members perceive their teaching labs even more negatively than they

do ordinary classrooms. In marked contrast, 80 percent of faculty respondents at College X rated the new teaching laboratory in which they most recently taught as "excellent."

Table 9. Faculty Satisfaction with Trinity Science Laboratories in Percents (*N*=21)

Question	Disagree strongly	Disagree	Neither	Agree	Mean[1]	S.D.
Cowles						
Teaching laboratories are adequate for needs	14.3	33.3	38.1	14.3	2.52	.928
Satisfied with research facilities	22.7	18.2	45.5	13.6	2.50	1.01
Moody						
Teaching laboratories are adequate for needs	19.0	23.8	57.1	0.0	2.38	.775
Satisfied with research facilities	28.6	42.9	28.6	0.0	2.00	.805

[1]Disagree strongly = 1; Disagree = 2; Neither agree nor disagree = 3; Agree = 4; Agree strongly = 5.

Table 10. Faculty Ratings of Trinity Teaching Labs Combined in Percents (*N*=16)

Criterion	Very poor	Poor	Average	Good	Excellent	Mean[1]	S.D.
Accessibility of laboratory instruments	6.3	12.5	56.3	18.8	6.3	3.06	.929
Safety of working environment	6.3	37.5	37.5	18.8	0.0	2.69	.873
Flexibility in accommodating different teaching strategies	12.5	62.5	18.8	6.3	0.0	2.19	.750
Ease with which one can monitor student activities	0.0	37.5	37.5	25.0	0.0	2.88	.806
Ease with which lab exercises and techniques can be demonstrated	12.5	31.3	43.8	12.5	0.0	2.56	.892
Ease of sharing lab space with other instructors/courses	18.8	37.5	37.5	6.3	0.0	2.31	.873
Ease with which students can perform assigned tasks	6.3	25.0	37.5	31.3	0.0	2.94	.929
Size or spaciousness	6.3	25.0	56.3	6.3	6.3	2.81	.911
Quality of lighting	6.3	25.0	50.0	12.5	6.3	2.88	.957
Quality of acoustics	13.3	40.0	40.0	6.7	0.0	2.40	.828
Overall quality as a teaching environment	0.0	43.8	50.0	6.3	0.0	2.62	.619
Average	8.1	34.3	42.3	13.7	1.7	2.67	.852

[1]Very poor =1; Poor = 2; Average = 3; Good = 4; Excellent = 5.

Twenty-five faculty respondents reported that they currently had a research lab—including 14 in Cowley and 9 in Moody—where they had worked an average of 8.32 years. During the academic year, the faculty spent a mean of 7.88 hours per week in the research lab, which increased to 17.88 hours in the summer. On average, between 5 and 6 students worked in the lab during the academic year and 2 students were in the lab in the summer.

Faculty assessment of Trinity research labs was no better than the teaching labs. Table 11 shows lab ratings on nine dimensions. The three highest ratings, each slightly above "average," are accessibility of lab instruments, safety of working environment, and ease of performing assigned tasks. The faculty is especially critical of the level of environmental control in the lab, followed by the quality of lighting, ease of sharing lab space, and quality of acoustics. On the all-important criterion of the lab's overall capability of supporting a research program, two-thirds rate their lab as "average" or worse than "average." By contrast, at College X, 83 percent of the ratings across all dimensions were "excellent," and the faculty unvaryingly assessed the lab's overall capability of supporting a research program as "excellent."

Table 11. Faculty Ratings of Trinity Research Labs Combined in Percents (*N*=25)

Criterion	Very poor	Poor	Average	Good	Excellent	Mean[1]	S.D.
Accessibility of laboratory instruments	0.0	20.0	32.0	36.0	12.0	3.40	.957
Safety of working environment	4.0	8.0	48.0	32.0	8.0	3.32	.900
Level of environmental control	16.7	66.7	16.7	0.0	0.0	2.00	.590
Ease of sharing lab space with other researchers	16.0	20.0	48.0	12.0	4.0	2.68	1.030
Ease with which students can perform assigned tasks	0.0	16.0	52.0	32.0	0.0	3.16	.688
Size or spaciousness	12.0	28.0	32.0	12.0	16.0	2.92	1.256
Quality of lighting	4.0	44.0	36.0	12.0	4.0	2.68	.900
Quality of acoustics	12.0	20.0	48.0	20.0	0.0	2.76	.926
Overall capability of sup- porting a research program	4.0	32.0	32.0	24.0	8.0	3.00	1.041
Average	7.6	28.3	38.3	20.0	5.8	2.88	.921

[1]Very poor = 1; Poor = 2; Average = 3; Good = 4; Excellent = 5.

General Impressions

We also included a few items that measured general impressions of the Trinity STEM buildings. Thus, we asked faculty respondents, "How satisfied overall are you with the Cowles Life Science Building (Moody Engineering Science Building/ Halsell Building)?" As Figure 4 shows, more than two-thirds of faculty respondents were no better than "slightly satisfied" with any of the three buildings; and almost three quarters reported that they were "not satisfied at all" with Moody.

A majority of respondents also "disagreed" or "disagreed strongly"—only two respondents "agreed"—that any of the three STEM buildings "projects a favorable image of Trinity University"; indeed, with respect to Moody, 82 percent "disagreed strongly" with this statement. Finally, only two respondents "agreed" that any of the buildings "is a comfortable place to work." For Cowles and Moody, the pattern of responses on the latter item closely corresponds to the faculty's overall satisfaction with the buildings; that is, Cowley is perceived somewhat more favorably than Moody. Figure 5 compares the faculty with students' level of agreement with a similar statement—"Moody Engineering Science Building is a comfortable place to study and learn." Although students are not as negative as the faculty, a near majority of students disagrees.

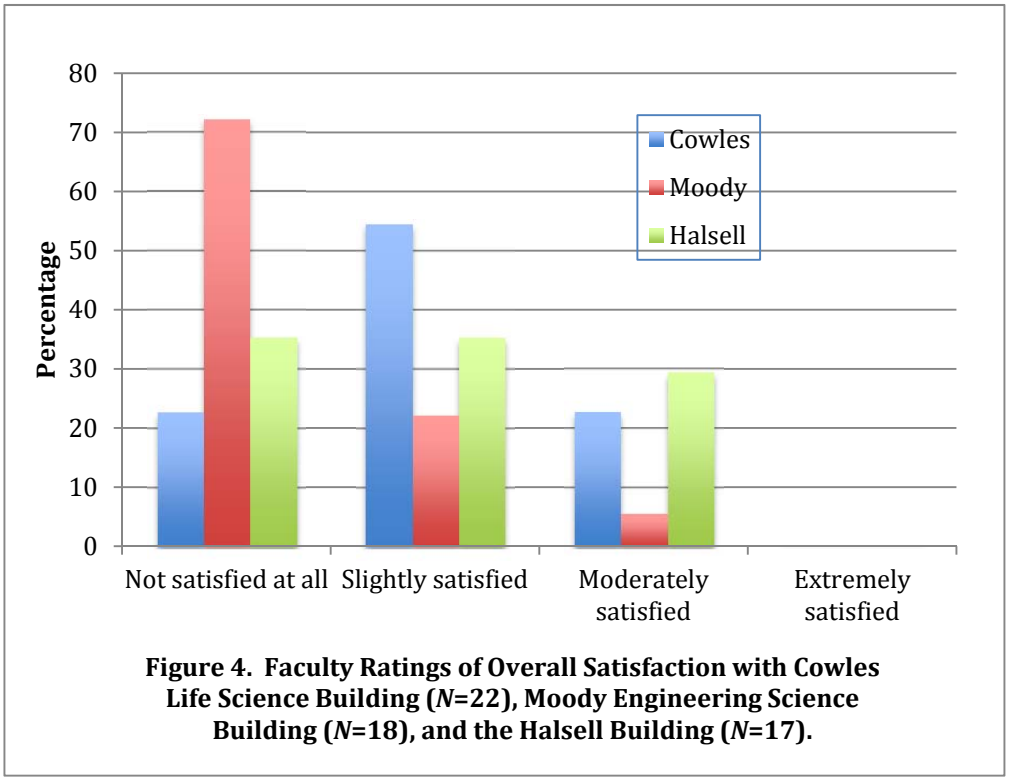


Figure 4. Faculty Ratings of Overall Satisfaction with Cowles Life Science Building (*N*=22), Moody Engineering Science Building (*N*=18), and the Halsell Building (*N*=17).

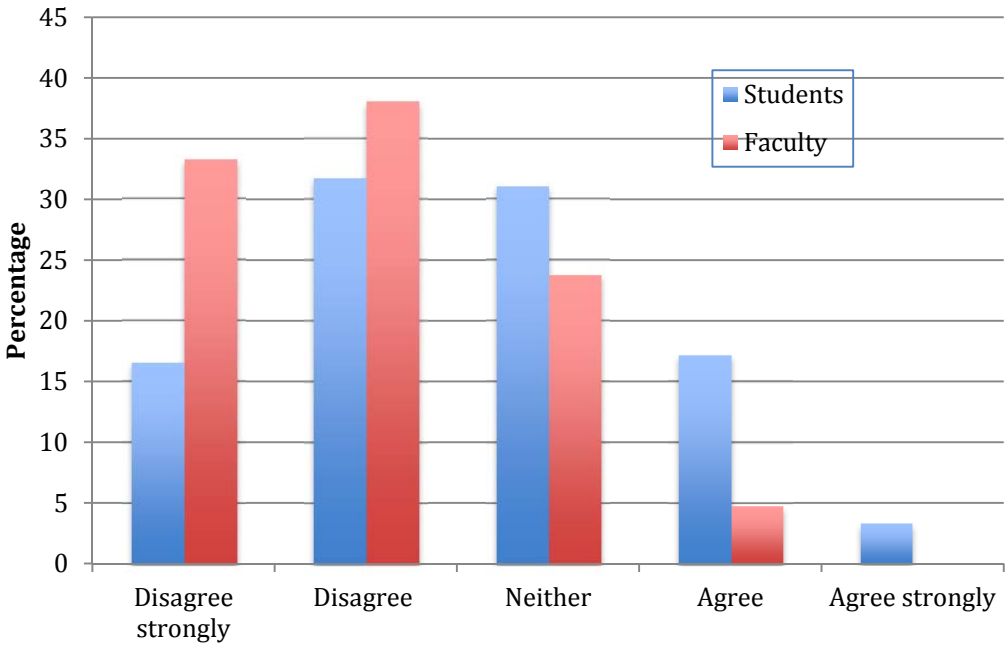


Figure 5. Agreement with the Statement "Moody Engineering Science Building Is a Comfortable Place to Work" (Faculty; *N*=21) and "Moody Engineering Science Building Is a Comfortable Place to Study and Learn" (Students; *N*=151).

Areas of Strength and Suggestions for Improvement

To gauge perceived strengths and deficiencies of the STEM buildings, we asked two open-ended questions of both faculty and students: What do you like best about the existing science and engineering facilities at Trinity University? What suggestions do you have for improving the . . . ?" Fewer than half of the student respondents answered either question. Those who answered identified more suggestions for improvement than features that they liked best about the facilities. Most frequently mentioned as "like best" features were the Moody Engineering Core Room (*N*=12), accessibility of laboratories and classrooms throughout much of the day (8), comfortable atmosphere (8), and availability of computers and computer software (7). Related to the latter, students also liked that the laboratories were well equipped (7). The first two responses suggest that students like having spaces to study and meet others. In fact, over one-quarter of students who made suggestions (*N*=26) indicated that to improve the buildings, there should be more "study rooms," "lounge areas," "areas to hang out and/or study," or "open space and closed spaces for studying in groups or alone." Other frequent suggestions (see Table 12) included improving the lighting and putting in more windows and bathrooms.

Table 12. Student Suggestions for Improving the Science and Engineering Facilities at Trinity University (*N*=93)

	N	Percent of responses	Percent of cases
Add study or commons areas	26	18.7	28.0
Improve lighting	18	12.9	19.4
Put in more windows	12	8.6	12.9
Put bathrooms in	10	7.2	10.8
Upgrade labs	8	5.8	8.6
Modernize the design	7	5.0	7.5
Add whiteboards or smart boards	7	5.0	7.5
Add computers	6	4.3	6.5
Make the elevators work	6	4.3	6.5
Make it more aesthetically pleasing	5	3.6	5.4
Put in vending machines	4	2.9	4.3
Other	30	21.6	32.3
	139	100.0	135.3

The faculty most often reported that what they liked best about the STEM facilities was their research lab (*N*=7). A few liked the "sense of community," as reflected, for example, in the use of the "core room." Two faculty members liked "the size and layout" of their offices; two others mentioned "up-to-date" instrumentation or equipment. In answer to both open-ended questions, several respondents essentially reported that the university should do "precisely what we're doing." One person wrote, for example, that what he liked best was that the facilities are "going to be updated." Another elaborated, suggesting:

> Demolishing MEB, gutting and renovating CLS, building a new building that brings in our CSCI colleagues, links CLS and MMS, and better supports interactions across departmental boundaries (shared research and instrument spaces and facilities and research space clustering).

A few faculty members mentioned the need to eliminate mold, improve lighting, and upgrade laboratories and classrooms. But like the students, the faculty most often suggested adding "space for student and faculty interaction," with some persons also noting that these spaces should be "aesthetically pleasing" to encourage interaction or "invite you in."

Summary and Conclusions

Findings from surveys of Trinity University faculty and students indicate a high level of dissatisfaction with the three buildings that were targeted: Cowles Life Science, Halsell, and Moody Engineering. A large percentage of students, especially non-science majors, seldom enter these buildings, except when they must do so to attend classes or meet faculty in their offices. Both faculty and students rate the classrooms as "average" overall, and faculty found them deficient in several ways. The faculty also expressed dissatisfaction with the teaching and research labs in Cowles and Moody, which they saw as inadequate to meet their teaching needs and to support their research programs.

These results support the need to upgrade the science and engineering facilities at Trinity University. Indeed, when asked for suggestions to improve the facilities, several faculty respondents reported that the University should do "precisely what [it is] doing." On the other hand, as one faculty respondent argued, the timing of the survey could not have been worse for obtaining an objective assessment of the existing STEM buildings. For with the construction of the Center for the Sciences and Information well underway, needed repairs to the existing buildings have been delayed, faculty in Cowles and Moody are preparing to move their offices and labs, and the situation is far from normal. We agree with this faculty member that better comparative information would have been obtained if the survey had been conducted "before the restrooms were torn out of Cowles."

Still, the surveys provide key data on student use of the buildings and also indicate areas most in need of improvement. And, we doubt that this information would have been any different had EYP, ideally, conducted the surveys even before the new CSI was planned and approved. The data tell us that students do not enter these buildings unless they must; that they are not comfortable places to study, learn, and work; that they have too few areas where students and faculty can sit, relax, and interact with one another; and that their facilities need to be upgraded.

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