Expected Outcome 1: Ability to Collaborate Effectively

Students completing the Masters of Integrated Design and Construction Program will be able to collaborate and participate on teams consisting of members with varying backgrounds and objectives. When discussing collaboration it is certainly about learning how to work together, and the studio environment gives students constant practice in how to do that on a day to day basis. Collaboration is also about Leadership Strategies, Business Organization, Understanding Contracts and Role definition, Conflict Resolution, Scheduling and Fee Structures, as well as Identifying shared goals among diverse parties.

Assessment Method 1: Review of Final Project in INDC 7630

Assessment Method Description

INDC 7630 is offered once a year in the summer semester, and is the final required studio taken by the MIDC students. In the reporting period of 2012-2013, 12 students were enrolled in this course. Data for this group was collected by the faculty member responsible for teaching this course.

The assessment of the students was completed on a rubric/ form that was broken into 4 categories that asked for evaluation on a 1-5 scale with 1 equal to low performance and 5 equal to high performance. 4 of the assessment measures (within the categories) relate directly to student performance in the area effective collaboration.

1.I Does the Student work demonstrate an understanding of the functions and perspectives of the primary stakeholders in a capital asset project in the built environment?

3.I Does the student's work demonstrate the understanding of a broad range of collaborative opportunities between designers and builders?

3.II Does the student’s work demonstrate their ability to identify significant risks associated with the design and construction of projects in the built environment, and how to manage and/or mitigate that risk?

4.I Does the student's work reflect successful collaboration among their team?

Findings

1.I Does the Student work demonstrate an understanding of the functions and perspectives of the primary stakeholders in a capital asset project in the built environment?
3.I Does the student's work demonstrate the understanding of a broad range of collaborative opportunities between designers and builders? 16% (2/12) of the students exhibited work that demonstrated excellent understanding of this subject matter. 33% (4/12) of the students exhibited work that demonstrated good understanding of this subject matter. 50% (6/12) of the students exhibited work that demonstrated a fair understanding of this subject matter.

3.II Does the student's work demonstrate their ability to identify significant risks associated with the design and construction of projects in the built environment, and how to manage and/or mitigate that risk? 33% (4/12) of the students exhibited work that demonstrated excellent understanding of this subject matter. 33% (4/12) of the students exhibited work that demonstrated good understanding of this subject matter. 33% (4/12) of the students exhibited work that demonstrated a fair understanding of this subject matter.

4.I Does the student's work reflect successful collaboration among their team? 33% (4/12) of the students exhibited work that demonstrated excellent understanding of this subject matter. 58% (7/12) of the students exhibited work that demonstrated good understanding of this subject matter. 8% (1/12) of the students exhibited work that demonstrated a poor understanding of this subject matter.

How did you use findings for improvement?
In general, students exhibited strength in their ability to work together, to divide up tasks during a team-based design project, and to divide responsibilities when presenting directly to community partners and stakeholders. They were also able to synthesize and prioritize the concerns of local project stakeholders, which demonstrates an ability to analyze and assess a situation.

Weaknesses that were exhibited in the work had to do with the subject areas that relate to mitigating risk and project delivery methods. Question 3.I is actually a question about project delivery method, did the students understand delivery methods studied in another course (INDC 7550) well enough that they could replicate a given scenario in studio with their colleagues? The other weakness related to the legal definition of project roles on design and construction projects as a means of mitigating risk. Again the students were able to identify major risks on a construction site, but determining if the risk could have been solved in the design by the architect or on the site by the builder was difficult to assess.

Additional Comments
The assessment device as written did not offer a clear understanding of actual student performance. The INDC faculty is currently developing a Final Project Rubric that specifically evaluates the student's ability to collaborate effectively.
This rubric will be deployed during the next assessment cycle. A draft version of the rubric is attached to this report. This assessment method will be utilized by not just the faculty member teaching the class, but also other program faculty and external reviewers.

There are other classes in which the student’s ability to effectively collaborate could also be assessed. The INDC faculty is developing an additional rubric through which the theory of collaboration (Leadership Strategies, Business Organization, Understanding Contracts and Role definition, Conflict Resolution, Scheduling and Fee Structures, Identifying shared goals among diverse parties) can be assessed in the student work that is not associated with the studio class.

**Assessment Method 2: Student Exit Survey**

**Assessment Method Description**

In the final semester of the INDC program, students are asked to complete an anonymous survey in which they can offer personal perspectives and recommendations for the program. There are 20 questions in the survey, plus 3 open ended written response opportunities. During the 2012-2013 report period, 10 students out of the 12 enrolled students competed the survey. The following 5 question results were selected as they specifically addressed the student’s perception of their own ability to effectively collaborate. The answers were scaled 1-5 with 1 equal to strongly disagree and 5 equal to strongly agree.

1.1 Since starting the Program, have you developed useful insight into your industry counterparts’ perspective on collaboratively approaching a building project?

1.2 Since starting the Program, have you further developed significant insight into your own discipline’s perspective on collaboration between design and construction?

3.4 Do you think that all sustainable or otherwise “high performance” building projects can benefit from some type of collaborative delivery by which the builder is involved early in the design process?

4.1 Has the team format of the MIDC program helped develop your perspective of integrated delivery?

4.2 As a part of the Program, did you enhance your ‘soft skills’ that might be used to work in a collaborative environment (communication and presentation)\

**Findings**

1.1 Since starting the Program, have you developed useful insight into your industry counterparts’ perspective on collaboratively approaching a building project? Of the 10 respondents, 50% (5/10) strongly agreed with this statement while 50% agreed.

1.2 Since starting the Program, have you further developed significant insight into your own discipline’s perspective on collaboration between
design and construction? Of the 10 respondents, 40% (4/10) strongly agreed with this statement, 40% (4/10) agreed, while 20% (2/10) were neutral.

3.4 Do you think that all sustainable or otherwise "high performance" building projects can benefit from some type of collaborative delivery by which the builder is involved early in the design process? Of the 10 respondents, 40% (4/10) strongly agreed with this statement while 60% agreed.

4.1 Has the team format of the MIDC program helped develop your perspective of integrated delivery? Of the 10 respondents, 10% (1/10) strongly agreed with this statement, 50% (5/10) agreed, while 20% (2/10) were neutral and 20% (2/10) disagreed with the question.

4.2 As a part of the Program, did you enhance your 'soft skills' that might be used to work in a collaborative environment (communication and presentation)? Of the 10 respondents, 30% (3/10) strongly agreed with this statement, 60% (6/10) agreed, while 10% (1/10) was neutral.

How did you use findings for improvement?
Students from this reporting period felt very strongly in their ability to effectively collaborate. They felt they understood the perspective of team members who did not share the same educational background. They also felt strongly in the development of their collaborative soft skills. Interestingly a few students felt that the collaborative nature of the studio and the proximity of to their design or construction counterparts was actually detrimental or counterproductive. There were additional written comments concerning specific underperforming students. Collaboration requires hard work from everyone involved.

These comments highlighted a significant issue for the program which is the recruitment of highly qualified students. If we attempt to implement any strategy for program improvement we need to have excellent students. Team work requires competent skills in one’s own discipline.

Additional Comments
Having used this survey for a significant time period, it is appropriate to align the questions in the survey with the rubrics for student performance. Revisions to the exit survey should be expected for the next reporting cycle.

Course content and assignments from other classes can be used to assess this area of student performance. INDC 7550 and INDC 6640 have assignments that discuss many aspects of successful collaboration. Rubrics aligned to these other classes will be developed.

Expected Outcome 2: Effective Visual and Oral Communication
Students completing the Masters of Integrated Design and Construction Program should be able to effectively present a project with visual aids (drawings, models and animations). Students, regardless of discipline, should
be able to generate drawings, diagrams and charts that communicate their
design and construction ideas. It is important for students to exhibit the ability
to communicate complex ideas and proposals easily and effectively, as clarity in
the presentation often reflects a clarity of thought and a strong design process.

**Assessment Method 1:** Review of Final Project in INDC 7630

**Assessment Method Description**
INDC 7630 is offered once a year in the summer semester, and is the final
required studio taken by the MIDC students. In the reporting period of 2012-
2013, 12 students were enrolled in this course. Data for this group was
collected by the faculty member responsible for teaching this course.

The assessment of the students was completed on a rubric/ form that was
broken into 4 categories that asked for evaluation on a 1-5 scale with 1 equal
to low performance and 5 equal to high performance. 2 of the assessment
measures (within the categories) relate directly to student performance in the
area effective Visual and Oral Communication.

1. Does the Student work provide evidence of the development of their
   problem solving, decision making and critical thinking skills?

4. Does the student’s work reflect a comprehensive design and construction
   proposal in accordance with the project’s scope and deliverables?

**Findings**
1. Does the Student work provide evidence of the development of their
   problem solving, decision making and critical thinking skills? 33% (4/12) of the
   students exhibited work that demonstrated excellent ability in this subject area. 33% (4/12)
   of the students exhibited work that demonstrated good ability in this subject area.
   33% (4/12) of the students exhibited work that demonstrated a fair ability in this subject area.

4. Does the student’s work reflect a comprehensive design and construction
   proposal in accordance with the project’s scope and deliverables? 66% (8/12)
   of the students exhibited work that demonstrated excellent ability in this
   subject area. 33% (4/12) of the students exhibited work that demonstrated
   good ability in this subject area.

**How did you use findings for improvement?**
Students exhibited strength in their ability to work together to develop a
comprehensive design solution to a given problem. The visual aids were the
primary evidence that the project was developed to a comprehensive level. This
would include architectural drawings, scheduling charts, and spreadsheets for
estimates and phasing proposals.

Weaknesses that were exhibited in the work had to do with the development of
visual material that relied heavily upon a skill set already developed by the
student in undergraduate school. It is important that in the teams, the student
roles should sometimes be reversed or intentionally inverted, architects working
on estimates and contractors sketching perspectives. Presentations are
Additional Comments
The assessment device as written did not offer a clear understanding of actual student performance. The INDC faculty is currently developing a Final Project Rubric that specifically evaluates the student’s ability to communicate effectively. This rubric will be deployed during the next assessment cycle. This new assessment method will be utilized by not just the faculty member teaching the class, but also other program faculty and external reviewers.

There are other classes in which the student’s ability to effectively communicate could also be assessed. The INDC faculty is developing an additional rubric through which communication skills can be assessed in the student work that is not associated with the studio class.

Assessment Method 2: Student Exit Survey

Assessment Method Description
In the final semester of the INDC program, students are asked to complete an anonymous survey in which they can offer personal perspectives and recommendations for the program. There are 20 questions in the survey, plus 3 open ended written response opportunities. During the 2012-2013 report period, 10 students out of the 12 enrolled students competed the survey. The following 2 question results were selected as they specifically addressed the student’s perception of their own ability to effectively collaborate. The answers were scaled 1-5 with 1 equal to strongly disagree and 5 equal to strongly agree.

1.3 Since starting the Program, have you enhanced your problem solving and decision making skills associated with the design and construction process?

1.4 As a result of the courses in the INDC curriculum, have you enhanced your ability to think critically about issues associated with integrated design and construction?

Findings
1.3 Since starting the Program, have you enhanced your problem solving and decision making skills associated with the design and construction process? Of the 10 respondents, 40% (4/10) strongly agreed with this statement, 30% (3/10) agreed, while 30% (3/10) were neutral.
1.4 As a result of the courses in the INDC curriculum, have you enhanced your ability to think critically about issues associated with integrated design and construction? Of the 10 respondents, 30% (3/10) strongly agreed with this statement, 50% (5/10) agreed, while 20% (2/10) were neutral.
**How did you use findings for improvement?**

Students from this reporting period felt very strongly in their ability to solve open ended problems and then communicate to an audience the complexity of their proposed solution. They feel equally strong about their ability to think critically. This area of assessment concentrates on the student’s ability to then communicate this critical reasoning to many different audiences (professors, invited professionals, community stakeholders). This form of communication can be oral or through drawings, charts and spread sheets.

**Additional Comments**

Having used this survey for a significant time period, it is necessary to refine the scope of the survey to include more objectives and to align the prompts with the areas of assessment. Revisions to the rubric should be expected for the next reporting cycle.

Course content and assignments from other classes can be used to assess this area of student performance. INDC 7550 and INDC 6640 have assignments that discuss many aspects of successful communication. Rubrics aligned to these other classes will be developed.

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**Expected Outcome 3: Ability to Utilize and Integrate Technology**

Students completing the Masters of Integrated Design and Construction Program will be able to utilize and integrate technology into the workflow of their project team. Students will be able to conceptually understand when certain tools may be appropriate for certain tasks, or when a new tool needs to be invented to bridge the gap between existing digital tools. The Design and Construction industries are experiencing rapid change brought on by new digital tools. Students will be exposed to these tools, allowed to experiment with them, but will also understanding their limitations and effectiveness. Building Information Modeling, Energy Performance Modeling, Cloud computing, 3d Printing and Presentation Software should be essential skills of every MIDC student.

**Assessment Method 1: Review of Final Project in INDC 7630**

**Assessment Method Description**

INDC 7630 is offered once a year in the summer semester, and is the final required studio taken by the MIDC students. In the reporting period of 2012-2013, 12 students were enrolled in this course. Data for this group was collected by the faculty member responsible for teaching this course.

The assessment of the students was completed on a rubric/ form that was broken into 4 categories that asked for evaluation on a 1-5 scale with 1 equal to low performance and 5 equal to high performance. Only 1 of the assessment measures (within the categories) relate directly to student performance in the area technological workflow integration.
2.1 Does the student’s work demonstrate development of appropriate information technology skills associated with the curriculum?

**Findings**

2.1 Does the student’s work demonstrate development of appropriate information technology skills associated with the curriculum? 50% (6/12) of the students exhibited work that demonstrated excellent ability in this subject area. 33% (4/12) of the students exhibited work that demonstrated good ability in this subject area. 33% (2/12) of the students exhibited work that demonstrated a fair ability in this subject area.

**How did you use findings for improvement?**

In general students have been energetic and curious in their approach to new software and digital tools. They quickly understand the limitations and advantages of these tools. Because these tools are often the device through which collaboration and teamwork are executed during the development of studio projects it is essential that every student have some facility with the basic programs like Revit or AutoCAD. As a school, we do not want to become simply a computer training program nor do we want to become overly invested in a piece of software which will be obsolete in a few years. But at the same time, there are collaborative entities and business organizations that would not have existed a decade ago when these tools did not exist.

Additional rubrics for classes such as INDC 7550 and INDC 7650 need to be developed as this student ability can be assessed in other settings other than just studio.

**Additional Comments**

The assessment device as written did not offer a clear understanding of actual student performance. The INDC faculty is currently developing a Final Project Rubric that specifically evaluates the student’s ability to integrate technology into a team workflow strategy. This rubric will be deployed during the next assessment cycle. This new assessment method will be utilized by not just the faculty member teaching the class, but also other program faculty and external reviewers.

There are other classes in which the student’s ability to integrate technology into a team workflow strategy could also be assessed. The INDC faculty is developing an additional rubric through which these skills can be assessed in the student work that is not associated with the studio class.

**Assessment Method 2: Student Exit Survey**

**Assessment Method Description**

In the final semester of the INDC program, students are asked to complete an anonymous survey in which they can offer personal perspectives and recommendations for the program. There are 20 questions in the survey, plus 3 open ended written response opportunities. During the 2012-2013 report period, 10 students out of the 12 enrolled students competed the survey. The following 3 question results were selected as they specifically addressed the
student’s perception of their own ability to effectively collaborate. The answers were scaled 1-5 with 1 equal to strongly disagree and 5 equal to strongly agree.

2.1 As part of the coursework and assignments within the INDC program, have you developed a better understanding of the application of Building Information Modeling and related technologies in collaborative design and construction?

2.2 Since starting the program, have your skills in related technology and software improved measurably?

2.3 Do you think that the MIDC Program’s use of Building Information Modeling and related technologies in the curriculum is at an appropriate level?

Findings
2.1 As part of the coursework and assignments within the MIDC program, have you developed a better understanding of the application of Building Information Modeling and related technologies in collaborative design and construction? Of the 10 respondents, 10% (1/10) strongly agreed with this statement, 60% (6/10) agreed, while 10% (1/10) were neutral, 10% (1/10) disagreed, and 10% (1/10) strongly disagreed.

2.2 Since starting the program, have your skills in related technology and software improved measurably? Of the 10 respondents, 30% (3/10) strongly agreed with this statement, 20% (2/10) agreed, while 20% (2/10) were neutral and 30% (3/10) disagreed with this statement.

2.3 Do you think that the MIDC Program’s use of Building Information Modeling and related technologies in the curriculum is at an appropriate level? Of the 10 respondents, 10% (1/10) strongly agreed with this statement, 40% (4/10) agreed, while 30% (3/10) were neutral. 20% (2/10) students strongly disagreed with this statement.

How did you use findings for improvement?
Students from this reporting period felt very strongly that they had not developed a better understanding of Building Information Modeling, nor that this technology being taught in the curriculum at an appropriate level. More directed training in these programs will need to be offered.

Additional Comments
Having used this survey for a significant time period, it is necessary to refine the scope of the survey to include more objectives and to align the prompts with the areas of assessment. Revisions to the rubric should be expected for the next reporting cycle.

Course content and assignments from other classes can be used to assess this area of student performance. INDC 7550 and INDC 6640 have assignments that discuss many aspects of successful communication. Rubrics aligned to these other classes will be developed.
Appendix A

Master of Integrated Design & Construction Program
Assessment – 2013

*Method/Vehicle: Final Studio Deliverables*

Student ______________________________

Faculty Assessing ______________________

1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

1. As a result of completing the MIDC Program at Auburn University, graduates will have developed an understanding of the cross-disciplinary perspectives of design teams, construction teams, and clients; and how to leverage problem solving, decision making, and critical thinking skills of each to facilitate successful project outcomes.

   I. Does the student’s work demonstrate an understanding of the functions and perspectives of the primary stakeholders in a capital asset project in the built environment?

   Evidenced by Final Deliverables 1 2 3 4 5

   II. Does the student’s work provide evidence of the development of their problem solving, decision making, and critical thinking skills?

   Evidenced by Final Deliverables 1 2 3 4 5

2. As a result of completing the MIDC Program at Auburn University, graduates will understand and have developed skills associated with technology tools and resources available to team management that better facilitate success in a collaborative project delivery process.

   I. Does the student’s work demonstrate development of appropriate information technology skills associated with the curriculum?

   Evidenced by Final Deliverables 1 2 3 4 5
II. Does the student’s work demonstrate the successful use of resources in collaboration with team members?

Evidenced by Final Deliverables 1 2 3 4 5

3. As a result of completing the MIDC Program at Auburn University, graduates will understand the range and benefits of collaborative and integrated process options available to design and construction teams and their clients; and the risk-reward factors which must be considered when selecting an appropriate delivery model for sustainable, high-performance building solutions.

I. Does the student’s work demonstrate the understanding (and employment) of a broad range of collaborative opportunities between designers and builders?

Evidenced by Final Deliverables 1 2 3 4 5

II. Does the student’s work demonstrate their ability to identify significant risks associated with the design and construction of projects in the built environment, and how to manage and/or mitigate that risk?

Evidenced by Final Deliverables 1 2 3 4 5

4. As a result of completing the MIDC Program at Auburn University, graduates will have demonstrated the ability to collaborate successfully in a cross-disciplinary team to develop a comprehensive building project design and construction proposal.

I. Does the student’s work reflect successful collaboration among their team?

Evidenced by Final Deliverables 1 2 3 4 5

II. Does the student’s work reflect a comprehensive design and construction proposal in accordance with the project’s scope and deliverables?

Evidenced by Final Deliverables 1 2 3 4 5
**Appendix B**

**Master of Integrated Design & Construction (formerly 'Design Build) Program at Auburn University - Anonymous Exit Survey SUMMARY**

Survey Questions [Likert Scale, where 1 is “Strongly Disagree,” 2 is “Disagree,” 3 is “Neutral,” 4 is “Agree,” and 5 is “Strongly Agree”]

1. Since starting the Program, have you developed useful insight into your industry counterparts’ perspective on collaboratively approaching a building project?

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1.2 Since starting the Program, have you further developed significant insight into your own discipline’s perspective on collaboration between design and construction?

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1.3 Since starting the Program, have you enhanced your problem solving and decision making skills associated with the design and construction process?

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1.4 As a result of the courses in the DBLD curriculum, have you enhanced your ability to think critically about issues associated with integrated design and construction?

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2.1 As part of the coursework and assignments within the DBLD program, have you developed a better understanding of the application of Building Information Modeling and related technologies in collaborative design and construction?

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2.2 Since starting the program, have your skills in related technology and software improved measurably?
2.3 Do you think that the Master of Design Build Program’s use of Building Information Modeling and related technologies in the curriculum is at an appropriate level?

3.1 As a function of the curriculum, has your understanding of the range of project delivery methods been measurably expanded?

3.2 Since entering the Program, has your perspective on the potential of integrated design and construction improved?

3.3 Since starting the Program, do you have increased empathy for your future industry counterparts and their potential risks and rewards associated with their profession?

3.4 Do you think that all sustainable or otherwise “high performance” building projects can benefit from some type of collaborative delivery by which the builder is involved early in the design process?

3.5 Do you think that the early involvement referenced in the previous question poses threats or compromises to the design process?

4.1 Has the predominant team/group format of the Master of Design Build Program helped develop your perspective of integrated delivery?
4.2 As part of the Program, did you enhance your ‘soft skills’ that might be used to work in a collaborative environment (communication, presentation, negotiation, etc.?)

1 2 3 4 5
12-13
0 0 1 6 3 10 4.20

4.3 Has the utilization of real clients in the program’s projects and assignments been a positive characteristic?

1 2 3 4 5
12-13
0 0 2 3 5 10 4.30

4.4 Has often having multiple/parallel projects underway been viewed as realistic as compared to what you expect to experience in industry?

1 2 3 4 5
12-13
0 0 2 4 4 10 4.20