**Florida Atlantic University**

**Faculty Assessment Grant Final Report**

September 8, 2010

**Project Title:**

**Assessment of Graduate Level Specialization Courses in Environmental and Economic Analysis Methods**

*Submitted to:*

**Gail Wisan, Ph.D.**

**University Director of Assessment**

**IEA, SO 303**

**Florida Atlantic University**

**gwisan@fau.edu**

*Submitted by:*

**Yanmei Li, PhD. Assistant Professor**

**Diana Mitsova, PhD, Assistant Professor**

**School of Urban and Regional Planning**

**Florida Atlantic University**

111 E Las Olas Blvd., HEC 10th Floor

Fort Lauderdale, FL 33316

[yli22@fau.edu](mailto:yli22@fau.edu)

[dmitsova@fau.edu](mailto:dmitsova@fau.edu)

Table of Contents

[1. Introduction 4](#_Toc271719835)

[2. Project Goals and Timeline 6](#_Toc271719836)

[3. Research Design and Data Collection 9](#_Toc271719837)

[4. Results 22](#_Toc271719838)

[5. Summary 46](#_Toc271719839)

[6. Dissemination 47](#_Toc271719840)

[7. List of Participants: 47](#_Toc271719841)

# Acknowledgments

We would like to acknowledge the guidance that we have received throughout this research effort from Dr. Gail Wisan, University Director of Assessment, and Dr. Jaap Vos, Director of the School of Urban and Regional Planning. We are thankful for their helpful comments and suggestions that have guided us through the project from its inception to its completion. We would like also to acknowledge the contribution of our internal and external reviewers who devoted time and effort in completing the assessment rubrics and provided useful feedback.

# Introduction

The assessment project was designed to evaluate the analytical and critical thinking skills of graduate level students in Urban and Regional Planning. The project focuses on two advanced methods courses: URP6425 Environmental Analysis in Planning and URP6545 Urban Revitalization Strategy. The courses introduce basic concepts and methodologies of environmental science and economic development and discuss their relevance to the planning practice. They employ a number of analytical tools and techniques such as Geographic Information Systems analysis, statistics, data analysis, cost-benefit and feasibility analysis, and various methods for climate change adaptation planning and stormwater management.

The objective of this project was to develop an assessment system for evaluating the analytical, problem solving, and critical thinking skills of students with regard to improving their learning outcomes in accordance with the new mission statement of the School of Urban and Regional Planning and the Planning Accreditation Board (PAB) criteria. More specifically, we developed a series of assignments, scoring rubrics and pre-post course skill assessment based on project goals and outcome measurements to test skill development over the course of the semester. Internal and external reviewers were invited to evaluate the student projects and project presentations.

These two advanced methods courses follow up on the specific skills developed in the introductory level courses in the planning curriculum: URP 6200 Planimetrics, URP 6270 Introduction to GIS in Planning, URP 6840 Urban and Regional Theory, and URP 6101 Planning Process and Skills. URP6425 Environmental Analysis in Planning and URP6545 Urban Revitalization Strategy build analytical and critical thinking skills that students apply in the subsequent core courses URP6920 Planning Workshop and URP6979 Planning Project.

**Figure 1** indicates the critical role of these two courses for developing an integrated set of research skills and preparing students for applying these analytical skills in their second year projects. These two courses need to synchronize the advanced methods content and skill development with specialized substantive knowledge about environmental and economic issues. As Figure 1 indicates, these two methods courses tie the content of the introductory courses from Fall 1 together, and move it to the next level creating a knowledge foundation for successful completion of the graduate program.

**Figure 1**. Flow chart of sequence of courses

The assessment system that we developed linked goals, learning outcomes, assessment tools and standards for level of performance on each goal. The assessment system provided information on how to improve student learning outcomes at individual topic, course and program levels. Data collected from student learning outcomes was analyzed. The report will be disseminated at the school, college and university levels. The results will be used to improve the curriculum related to the sequence of courses that provide method-oriented skills.

This report includes three major sections. The first section presents the project goals and project timeline. The second section describes the research design and data collection methods. The third section reports on preliminary results.

# 2. Project Goals and Timeline

**2.1 Project Goals**

The project has four major goals. The first assessment goal focuses on evaluating student learning outcomes in terms of analytical writing and critical thinking skills. It requires that at the end of both courses students can easily formulate research problems and questions, develop cohesive arguments, are able to apply data-driven approaches to support their argumentation, can critically evaluate arguments, create cohesive organization of ideas and findings, and can present them in a written form that follows the standards of academic writing. The second goal of the project is to evaluate student learning outcomes in terms of quantitative and qualitative analytical skills. The skill evaluation required development of rubrics that can assess understanding of data mining techniques, the level of mastering of data analysis and ability to use computer software to analyze and generate results. The third goal was to measure students’ ability to provide effective communication of their findings and project outcomes. In terms of learning outcomes we designed rubrics intended to measure student graphic and oral presentation skills. The fourth goal was to evaluate students’ ability to work in teams. Table 1 presents the project goals, outcomes, and assessment criteria.

Table 1. Project goals, outcomes, and assessment criteria

|  |  |  |
| --- | --- | --- |
| **Goals** | **Learning Outcomes** | **Assessment Criteria** |
| Goal 1: Proficient Analytical Writing and Critical Thinking Skills | * Clear formulation of research problems and arguments * Evidence-based analytical writing to support arguments * Critical evaluation of arguments * Cohesive organization of major ideas and findings * Effective utilization of academic writing language | Develop criteria and design a grading rubric to assess writing assignments based on the expected learning outcomes  Selected criteria:   * Content * Structure * Composition * Argument development * Style |
| Goal 2: Proficient Quantitative and Qualitative Analytical Skills | * Clear understanding of data mining techniques and ability to use them in collecting data * Mastering various techniques to analyze digital datasets creatively * Ability to integrate GIS and other related skills in data analysis | Design assignments and tests requiring demonstration of specific knowledge and skills evaluated and URP faculty and external evaluators  Design grading rubrics for tests and assignments evaluated by URP faculty    Develop effectiveness measures evaluated by URP faculty |
| Goal 3: Efficient and Effective Communicative Skills | * Mastering effective oral presentation skills * Capability to utilize various graphic and visual techniques to convey research results | Develop criteria and design a grading rubric to help external and internal evaluators evaluate presentations and final projects and assess students’ oral, written and graphic skills  Develop effectiveness measures evaluated by URP faculty |
| Goal 4: Significant Teamwork and Collaborative Skills | * Ability to create cohesive and effective teams that perform well in completing the assigned tasks | A scoring rubric of peer evaluation of each team member contribution |

**2.2 Measures of Effectiveness**

The purpose of the project effectiveness evaluation is to establish measures that provide information on the level of achievement of Goals 1 through 4 as identified in Table 1. The effectiveness evaluation draws conclusions about what has been achieved and what remained to be wished for in terms of course activities, schedules and student learning outcomes. This type of feedback information is particularly useful for future student assessments, course modifications, and curriculum improvement. The project effectiveness was measured and monitored using the following measures:

Table 2. Effectiveness measures for each goal

|  |  |
| --- | --- |
| **Goals** | **Effectiveness Measures** |
| Goal 1: Proficient Analytical Writing and Critical Thinking Skills | * 100 % of the students demonstrate writing proficiency evaluated as satisfactory or above by URP faculty and one external evaluator * 100 % of the students score above average on each item identified in the scoring rubric including content, structure, composition, argument development, and style. A sample of the writing assignments is randomly drawn and evaluated by one URP and one external evaluator. The scoring rubrics are evaluated. |
| Goal 2: Proficient Quantitative and Qualitative Analytical Skills | * 90% of the students demonstrate proficiency in using advanced Excel functions for data mining and data analysis assignments evaluated as above average by one URP faculty. * 90% of the students complete with a score of 80% or higher assignments involving advanced GIS functions such as Spatial Analyst, Network Analyst and Model Builder. A sample of these assignments and grading rubrics are evaluated by one URP faculty and one external evaluator. * 80% of the students demonstrate understanding of the basic methodological concepts covered in the course and are able to apply them to planning problems given in the final test. A sample of the final tests are evaluated by one URP faculty. |
| Goal 3: Efficient and Effective Communicative Skills | * 100% of the students demonstrate ability to communicate ideas using visual and effective speaking techniques evaluated as satisfactory or above by two URP faculty and one external evaluator. |
| Goal 4: Significant Teamwork and Collaborative Skills | * 100% of the students evaluate their peers’ participation in assigned projects as satisfactory or above. |

**2.3 Project Timeline**

Table 3. Project timeline

|  |  |
| --- | --- |
| **Activities** | **Period of Time** |
| Project begins: | January 9, 2010 |
| Three assignments to achieve Goal 1 | Assessment after 6 and 9 weeks of instruction |
| Four assignments to achieve Goal 2 | Assessment after 3, 6, 9 and 12 weeks of instruction |
| Final project to achieve Goals 1 through4 | Final assessment |
| Final exam to achieve Goals 1 through 3 | Final assessment |
| Project ends: | May 7, 2010 |
| Preliminary report submission | June 1, 2010 |
| Final report submission | September 10, 2010 |

# Research Design and Data Collection

The research design for this project includes development of goal-oriented rubrics and quasi-experimental design techniques that specifically address the collection of data allowing the investigators to measure learning outcomes. The data collection has been carried out in several steps. First, we designed a preliminary questionnaire that was administered at the beginning of both courses. The preliminary questionnaire was intended to measure the level of knowledge that students have accumulated in the four courses preceding the methods courses as shown in Figure 1. At the end of the semester, we used the same questionnaire to collect data to measure improvement in learning outcomes after the completion of the two methods courses. We have created a database and used paired sample t-test to compare the results of the preliminary and post-evaluation questionnaires.

In addition, we have designed six rubrics to measure learning outcomes based on the project goals:

1. Analytical skills rubric
2. Written communication skills rubric
3. Oral communication skills rubric
4. Poster design and presentation skills rubric
5. Peer evaluation assessment rubric
6. PAB (Planning Accreditation Board) criteria skill evaluation (pre and post)

In order to be able to assess effectiveness measures for each goal as identified in Table 2, for all the rubrics (except the written communication skills rubric) we developed a cumulative point earning scale with five levels: advanced (4 points), adequate (3 points), satisfactory (2 points), fair (1 point), and null (0 point).

The analytical skills and written communication rubrics measure learning outcomes under Project Goal 1 and Project Goal 2. The analytical skills rubric (see Table 4) consists of five major components which are further subdivided into five measurable criteria. The major components include numerical reasoning, analytical skills, critical thinking, problem solving and report writing.

The written communication rubric was designed to collect information on academic writing skills of the students. It has two measure components: content and strength of argumentation based on 11 criteria, and organization and style component based on 9 criteria. One point was assigned for each met criterion and zero was assigned if the criterion was not met.

The oral communication assessment rubric measures learning outcomes under Project Goal 3. It consists of two major components. The first component measures on a scale from 4 to 0 (excellent, good, fair, marginal, not completed) the ability of students to deliver effective presentations. Some of the criteria included in the first component are audience engagement, vocal delivery, eye contact, body language, and clarity of expression. The second component measures content and topic development in the oral presentation. It includes structure and organization of the presentation, ability to introduce the topic, ability to link analysis and synthesis to the content of the presentation, and ability to draw conclusions based on the materials presented. Table 5 includes a detailed description of the rubric.

The poster design and presentation rubric measures learning outcomes under Project Goal 3. It aims at assessing the graphic design skills of the students and their ability to make effective presentation of the topic. It has two major components: poster construction and content. The poster construction components consists of five criteria which includes titles and subtitles, text size and color, clarity of writing, data presentation, and graphic design, format and layout. The content component includes measures focused on accuracy of the data presentation, inclusion of key elements, logical structure and organization, and presentation of analytical methodology. Detailed description of the rubric is included in Table 6.

The peer evaluation rubric is intended to measure learning outcomes under Project Goal 4: significant teamwork and collaborative skills. The rubric contains measurements on 14 criteria. They are aimed at assessing whether students are willing to take active roles and responsibilities in their team project, including initiating ideas and actions, respecting differences in opinions, and providing leadership on specific tasks. The rubric is presented in Table 7.

The PAB (Planning Accreditation Board) criteria skill assessment rubric is related to all four project goals. This rubric is intended to provide more comprehensive assessment of students’ knowledge and skills as they relate to the PAB criteria. This rubric includes more general categories related to the planners’ professional development. It also provides information on how the learning outcomes in the methods courses fit into what is necessary to fulfill the requirements for the graduate degree. As the rubric shows most of the assessment items under the PAB criteria are covered by the two methods courses. Table 8 provides a detailed description of the rubric.

The rubrics together with sample of all assignments were distributed among internal and external evaluators for the purposes of data collection. All the data collected through the assessment rubrics was entered into a database and analysis was performed based on percentage students evaluated as advanced, adequate, satisfactory, fair, and null. For the preliminary and post-course questionnaires and the PAB skill assessment rubric pairwise t-test was conducted to compare the change in student learning outcomes before and after the two methods courses.

Table 4.

**Analytical Thinking Value Rubric   
for Learning Outcomes Assessment of Methods Assignments**

Total: 100 points

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Assessment Target Item** | **Cumulative Point Earning Scale** | | | | |
| * **1. Numerical Reasoning:**   **Total pts: [** **]** | **Advanced**  **Pts: 20** | **Adequate**  **Pts: 15** | **Satisfactory**  **Pts: 10** | **Fair**  **Pts: 5** | **Null**  **Pts: 0** |
| 1. Demonstrates proficiency in applying advanced analytical techniques to the assigned tasks. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| 1. Able to produced evidence of applying analytical tools and techniques (e.g., graphs, tables, maps, equations, etc.). | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| 1. Able to understand and evaluate models, analytical procedures and assumptions. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| 1. Demonstrates ability to select appropriate numerical reasoning tools to solve a problem. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| 1. Able to complete a complex sequence of advanced quantitative methods, including GIS and statistical techniques. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| * **2. Analytical Skills:**   **Total pts: [** **]** | **Advanced**  **Pts: 20** | **Adequate**  **Pts: 15** | **Satisfactory**  **Pts: 10** | **Fair**  **Pts: 5** | **Null**  **Pts: 0** |
| 1. Able to synthesize information beyond summaries and descriptions. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| 1. Uses quantitative analysis as a basis for competent judgment. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| 1. Masters the use of quantitative information to support the project stated objectives. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| 1. Able to develop and support a sequence of arguments with analytically derived information. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| 1. Structures and synthesizes analytically derived information to reveal patterns, trends, outcomes, consequences, implications. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| * **3. Critical Thinking:**   **Total pts: [**………**]** | **Advanced**  **Pts: 20** | **Adequate**  **Pts: 15** | **Satisfactory**  **Pts: 10** | **Fair**  **Pts: 5** | **Null**  **Pts: 0** |
| 1. Able to critically assess the meaning and significance of what has been observed and evaluated. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| 1. Able to formulate and express position with regard to existing or derived knowledge. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| 1. Able to determine whether there is adequate justification for the derived conclusion. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| 1. Goes beyond the perceived logic of the analytically derived argument and able to place it into its relevant context. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| 1. Demonstrates clarity, accuracy, relevance, depth, breadth, and credibility. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| * **4. Problem Solving:**   **Total pts: [**……….**]** | **Advanced**  **Pts: 20** | **Adequate**  **Pts: 15** | **Satisfactory**  **Pts: 10** | **Fair**  **Pts: 5** | **Null**  **Pts: 0** |
| 1. Able to redefine the problem in a planning context. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| 1. Able to use analytical tools to assess alternative solutions of the problem. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| 1. Able to formulate limitations and drawbacks of the proposed solutions. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| 1. Demonstrates understanding of the planning context in which solutions will be implemented. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| 1. Reviews analytical results relative to the problem with thorough, specific recommendations. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| * **5. Report Writing:**   **Total pts: [**……….**]** | **Advanced**  **Pts: 20** | **Adequate**  **Pts: 15** | **Satisfactory**  **Pts: 10** | **Fair**  **Pts: 5** | **Null**  **Pts: 0** |
| 1. Able to build strong, engaged argumentation. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| 1. Follows a logical, consistent, and well-defined structure. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| 1. Able to link research questions, problem definition, methodology, findings and conclusions in a well-thought framework. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| 1. Supports the main arguments with visuals (e.g., maps, graphs, tables, etc.). | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| 1. Vocabulary effectively communicates the main ideas. | Pts: 4 | Pts: 3 | Pts: 2 | Pts: 1 | Pts: 0 |
| **Total Points: [**……….**]** |  | | | | |

**Written Communication Skills Checklist**

1. **Content and strength of argumentation***The text...*   
   \_\_\_Focuses on the proposed topic   
   \_\_\_The main argument is supported by a thorough literature review   
   \_\_\_The argument is framed by a conceptual framework   
   *The introduction...*   
   \_\_\_The paper begins with an introduction  
   \_\_\_The intro presents the main ideas and hypothesis  
   \_\_\_The intro indicates how the paper is structured   
   *The argumentation...*   
   \_\_\_Arguments are relevant to the topic  
   \_\_\_Each argument develops one main idea  
   \_\_\_Each argument is supported by a thorough discussion of concepts, ideas and evidence  
   *The conclusion...*   
   \_\_\_Recaps the main points   
   \_\_\_Presents a closing statement supported by opinion and recommendation
2. **Organization and style**

*The entire composition*   
\_\_\_Is logically organized using sub-headings   
\_\_\_The sub-headings accurately reflect the conceptual framework  
*Main points*   
\_\_\_Are well-structured   
\_\_\_Are discussed with a relevant argument   
\_\_\_Vocabulary effectively communicates the main ideas  
 \_\_\_ Vocabulary is concise and precise  
 \_\_\_ Lack of spelling, punctuation, and grammar errors  
\_\_\_Lack of jargon and cliches   
\_\_\_Cites references correctly

Table 5

**Oral Communication Grading Rubric**

Student Name: Points:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Assessment Target item** | **Cumulative Point Earning Scale** | | | | |
| **4: Excellent** | **3: Good** | **2: Fair** | **1: Marginal** | **0: Not Completed** |
| **I. Oral Communication Skills [Total points: ]** | | | | | |
| * **Voice Projection** | Clearly and consistently audible | Mostly audible | Sometimes audible | Inaudible | No data |
| * **Vocal Delivery** | Energetically communicates strong enthusiasm | Some energy and enthusiasm | Little energy and enthusiasm | Monotone | No data |
| * **Clarity of Expression** | minimal gap-fillers (“um”, “uh”, “like”, etc.) | Few gap-fillers | some gap-fillers | Gap-fillers interfere with expression | No clear expression |
| * **Eye Contact** | Consistently makes eye contact with **all** members of audience | Consistently makes eye contact with **limited** group within audience | Makes some eye contact with audience | Makes little eye contact with audience | No eye contact |
| * **Body Language** | Consistently reinforces verbal message | Often reinforces verbal message | Sometimes reinforces verbal message | Detracts from verbal message | Excessive negative body language |
| * **Attire** | Very professional | Mostly professional | Somewhat professional | Casual and unprofessional | Very casual and unprofessional |
| * **Audience Engagement** | Raises very meaningful issues to stimulate thinking and comments; Demonstrates proactive listening: takes relevant notes, answers questions, asks questions that demonstrate mastery of topic | Raises some meaningful issues to stimulate thinking and comments; Demonstrates active listening: takes notes, answers questions with a prompt, demonstrates engagement with topic | Raises some meaningful issues to stimulate thinking; Demonstrates attentive listening: takes cursory notes, unable to respond to questions, demonstrates weak understanding of topic | Does not raise meaningful issues for discussion; Demonstrates passive listening: does not take notes, unable to respond to questions, demonstrates lack of understanding of topic | No engagement or stimulation |
| * **Pace** | Consistently effective and meets the allotted time limit | Mostly effective and meets the allotted time limit | At times too fast or too slow and slightly off the allotted time limit | Consistently too fast or too slow and significantly off the allotted time limit | Extremely off the allotted time limit |
| * **Visual Materials** | Appropriately and sufficiently support and enhance the presentation; graphically appealing with appropriate formatting; no errors or typos; easily readable and understandable | Mostly appropriate and sufficient, easily readable with appropriate formatting and design, few typographic errors | Somewhat appropriate, some graphic design with some appropriate formatting; some typographic errors | Not appropriate, many typographic errors, not easily readable, no graphic design with inappropriate formatting | No visual and supporting materials |
| **II. Content and Topic Development [ Total points: ]** | | | | | |
| * **Introduction** | Strong introductory statement to lay out the topic and engages audience | Adequate introductory statement to lay out the topic | Weak introductory statement to lay out the topic | Very weak introductory statement | No introductory statement |
| * **Conclusion** | Strong concluding statement summarizing key findings convincingly | Adequate concluding statement summarizing findings | Weak concluding statement summarizing findings | Very weak concluding statement summarizing findings | No concluding statement |
| * **Content** | Demonstrates mastery of topic | Demonstrates adequate understanding of topic | Demonstrates some understanding of topic | Demonstrates minimal understanding | No understanding |
| * **Structure and Organization** | Strong logical progression | Adequate logical progression | Weak logical progression | Minimal logical progression | Very confusing progression |
| * **Analysis and Synthesis** | Creates original analysis, uses compelling evidence to support arguments and insightfully synthesizes discrete parts into cohesive elements | Creates original analysis, use some strong evidence to support arguments and able to synthesize discrete parts into cohesive elements | Creates some original analysis but with some paraphrasing, uses some evidence to support arguments, no insightful synthesis | No original analysis and merely relies on paraphrasing and summarizing, minimal evidence to support arguments, no insightful synthesis | No analysis and synthesis |

Table 6

**Poster Grading Rubric**

Student Name: Points:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Assessment Target item** | **Cumulative Point Earning Scale** | | | | |
| **4: Excellent** | **3: Good** | **2: Fair** | **1: Marginal** | **0: Not Completed** |
| **I. poster construction [ Total points: ]** | | | | | |
| * **Titles and Subtitles** | Very clear and significantly enhance readability | Mostly clear and enhance readability | Somewhat clear and somewhat enhance readability | Not clear and minimally enhance readability | No titles and subtitles |
| * **Text Size and Color** | Very clear and readable with variations to enhance understanding | Mostly clear and readable | Somewhat clear and readable | Not clear with minimal readability | No text |
| * **Writing** | Very well written and highly organized, very clear and easy to follow | Adequately written and organized, clear and reasonably easy to follow | Somewhat adequately written and organized, some unclear points and moderately easy to follow | Poorly written, no logical organization, unclear and difficult to follow | No text |
| * **Data Presentation** | Data presented clearly in labeled tables, charts, maps and renderings with accurate titles and sources | Data presented in labeled tables, charts, maps and renderings with titles and sources | Data presented in tables, charts, maps and renderings but some contents or elements are missing | Raw data are presented without proper labeled tables, charts, maps and rendering | No data presentation |
| * **Graphic Design, Format and Layout** | Very professional, excellent visual appeals and creativity | Professional, good visual appeal and some creativity | Somewhat professional, adequate visual appeal with limited creativity | Not professional, not visually appealing nor creative | Not completed |
| **II. Content [ Total points: ]** | | | | | |
| * **Accuracy** | Very accurate texts, tables, graphs, facts, evidence, argument and findings, no grammar and convention mistakes | Accurate texts, tables, graphs, facts, evidence, arguments and findings, minimal grammar, content and convention mistakes | Somewhat accurate texts, tables, graphs, facts, evidence, arguments and findings with some errors | Inaccurate texts, tables, graphs, facts, evidence, arguments and findings with many errors and mistakes | Not completed |
| * **Key Elements** | Key elements (title and subtitles, student names, course name, major findings) are included with additional information | Key elements are included | Some elements are missing | Most elements are missing | No elements |
| * **Structure and Organization** | Strong logical structure | Adequate logical structure | Weak logical structure | Minimal logical structure | Very confusing |
| * **Analysis and Methodology** | Very solid and appropriate analytical methodology | Adequate and proper analytical methodology | Weak analytical methodology | Very weak analytical methodology | No analysis or missing |

Table 7

**Peer Evaluation Rubric for the Group Projects**

**Spring 2010**

**Name of the Evaluator:**

**Evaluate yourself and your team members based on a 5-point scale on the following items and write the score that you believe best reflects that person’s efforts and contributions to the team projects for each item.**

**If the person:**

* Always demonstrates the quality, you would give a score of 5.
* Frequently demonstrates the quality, you would give a score of 4.
* Sometimes demonstrates the quality, you would give a score of 3.
* Seldom demonstrates the quality, you would give a score of 2.
* Never demonstrates the quality, you would give a score of 1.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Item/Student Name** |  |  |  |  |  |  |
| Takes active role on initiating ideas and actions |  |  |  |  |  |  |
| Is willing to frequently share ideas and resources |  |  |  |  |  |  |
| Accepts responsibilities for tasks determined |  |  |  |  |  |  |
| Respects differences of opinions and backgrounds |  |  |  |  |  |  |
| Provides leadership and support whenever necessary |  |  |  |  |  |  |
| Acknowledges other members’ good work and provides positive feedback |  |  |  |  |  |  |
| Is willing to work with others for the purpose of group success |  |  |  |  |  |  |
| Communicates with others friendly |  |  |  |  |  |  |
| Sensitive to the needs and feelings of other members of the team |  |  |  |  |  |  |
| Understands problems and responds with helpful comments |  |  |  |  |  |  |
| Openly shares needs and feelings with team members |  |  |  |  |  |  |
| Keeps in close contact with the rest of the team about the project |  |  |  |  |  |  |
| Produces high quality work |  |  |  |  |  |  |
| Meets team’s deadlines |  |  |  |  |  |  |

**Other comments:**

Table 8

**Pre-Post Course Student Skill Assessment**

4/22/2010

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Skills and Tools** | **Before** | | | | | **After** | | | | |
|  | Basic | Somewhat Moderate | Moderate | Somewhat Proficient | Proficient | Basic | Somewhat Moderate | Moderate | Somewhat Proficient | Proficient |
| **Education** | | | | | | | | | | |
| 1. Visioning and Goal Setting | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 2. Quantitative Research Methods | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 3. Qualitative Research Methods | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 4. Collecting and Organizing data | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 5. Analyzing and Reporting Information | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 6. Literature Review | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 7. Planning Theories | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 8. Critical Thinking Skills | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| **Application** | | | | | | | | | | |
| 1. Legal Principles (Standards) | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 2. GIS/Spatial Analysis | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 3. Policies | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 4. Land Use Planning | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 5. Transportation Planning | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| **Knowledge** | | | | | | | | | | |
| 1. Plan Making and Design | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 2. Communication Techniques | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 3. Intergovernmental Relationship | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 4. Other Stakeholder Relationship | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 5. Planning at Multi-level | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 6. Public Participation | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 7. Sustainable Development | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| **Experience** | | | | | | | | | | |
| 1. Collaborative (group) Work | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 2. Delegation of Responsibilities | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| 3. Client Based Interaction | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |

# Results

This section provides a summary of the analysis of the data collected through the preliminary questionnaires and rubrics described in the methodology section. The results are divided into seven subsections: results from the preliminary and post-course questionnaires, and subsections describing results based on data collected through the analytical skills rubric, written communication rubric, oral communication rubric, poster design and presentation rubric, peer evaluation rubric, and PAB criteria rubric.

**4.1 Results from the preliminary and post-course assessment questionnaires**

We have conducted pre-assessment of the students’ knowledge on major concepts covered in preceding courses in January, 2010. We redistributed the same questionnaire in May, 2010 to assess whether the students’ knowledge and skills have improved. The results from the pre and post assessment questionnaires have been coded so each item identified and defined under each question was given a score of 1. We conducted a pairwise t-test to evaluate the difference in students’ knowledge. Table 9 presents the results of the test.

Table 9. Results from the pairwise t-test for pre and post assessment questionnaires

|  |  |  |  |
| --- | --- | --- | --- |
| **Skills and Tools** | **Mean Difference** | **t-value** | **Pr > |t|** |
| 1. Explain why using GIS-based analytical methods in environmental planning is important (X1) | -1.15 | -3.09 | 0.0060 |
| 2. Provide examples of GIS applications (X2) | -1.60 | -3.51 | 0.0023 |
| 3. Define and explain land use suitability analysis (X3) | -1.65 | -3.88 | 0.0010 |
| 4. Explain how different map projections change the outcomes of your analysis (X4) | -0.35 | -1.00 | 0.3299 |
| 5. Explain geocoding and how it is used in planning (X5) | -0.60 | -1.83 | 0.0828 |
| 6. Briefly define the following statistical concepts: |  |  |  |
| mean (X6) | 0.05 | 0.57 | 0.5770 |
| median (X7) | -0.05 | -0.44 | 0.6663 |
| mode (X8) | -0.20 | -2.18 | 0.0421 |
| standard deviation (X9) | -0.10 | -0.81 | 0.4283 |
| normal distribution (X10) | -0.15 | -1.00 | 0.3299 |
| frequency (X11) | -0.35 | -2.67 | 0.0150 |
| hypothesis testing (X12) | -0.25 | -2.03 | 0.0563 |
| 7. Define regression models and explain the major components of a regression model (X13) | -0.40 | -0.78 | 0.4424 |
| 8. Explain the major components of a plan (X14) | 1.55 | 1.54 | 0.1400 |

In the table above, the mean difference is the difference between before-course scores and post-course scores, and Pr > |t| indicates significance level. The number of observations is 20.

The t-test results are significant for questions 1, 2 and 3 at 0.01 significance level, which indicates that most of the GIS knowledge and skills have improved. The t-test results for variables X8 an X11 are significant at 0.05 significance level, which also shows that the knowledge in some of the basic statistical concepts has improved. All the remaining items are not statistically significant. These results can be explained by the fact that the nonsignificant items were not specifically covered in these two courses, although they have been used in completion of some of the assignments. However, the results from another pariwise t-test that we ran on pre-post PAB skills assessment showed that all the skill and knowledge items are significant (see Table 18) which indicated that learning outcomes in general have improved.

**4.2 Analytical Skills Assessment**

Tables 10 through 13 present the results from the analytical skills assessment in Environmental Analysis (URP 6425) and Urban Revitalization Strategy (URP 6545). The data was collected through the Analytical Skills Assessment Rubric completed by internal and external evaluators. The results indicate that on average 45 % of the students have shown advanced numerical reasoning skills over all the assignments, 37 % on average have demonstrated adequate skills, and 16 % satisfactory level. Only 7 % on average had a fair level of numerical skills. Overall, 93 % of the students in URP 6425 have demonstrated a level of numerical reasoning skills that is satisfactory and above.

Table 10. Analytical skills assessment for URP 6425 Environmental Analysis

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Numerical Reasoning** | Advanced | Adequate | Satisfactory | Fair | Null |
| Assignment 1 | 0.39 | 0.31 | 0.20 | 0.11 | 0.00 |
| Assignment 2 | 0.55 | 0.28 | 0.11 | 0.07 | 0.00 |
| Assignment 3 | 0.37 | 0.41 | 0.13 | 0.08 | 0.00 |
| Assignment 4 | 0.49 | 0.29 | 0.19 | 0.03 | 0.00 |
| Average | 0.45 | 0.32 | 0.16 | 0.07 | 0.00 |
| **Analytical Skills** | Advanced | Adequate | Satisfactory | Fair | Null |
| Assignment 1 | 0.39 | 0.31 | 0.21 | 0.09 | 0.00 |
| Assignment 2 | 0.41 | 0.37 | 0.16 | 0.05 | 0.00 |
| Assignment 3 | 0.27 | 0.44 | 0.20 | 0.09 | 0.00 |
| Assignment 4 | 0.43 | 0.35 | 0.20 | 0.03 | 0.00 |
| Average | 0.37 | 0.37 | 0.19 | 0.07 | 0.00 |
| **Critical Thinking** | Advanced | Adequate | Satisfactory | Fair | Null |
| Assignment 1 | 0.33 | 0.40 | 0.13 | 0.07 | 0.00 |
| Assignment 2 | 0.43 | 0.33 | 0.17 | 0.07 | 0.00 |
| Assignment 3 | 0.32 | 0.40 | 0.20 | 0.08 | 0.00 |
| Assignment 4 | 0.53 | 0.28 | 0.15 | 0.04 | 0.00 |
| Average | 0.40 | 0.35 | 0.16 | 0.06 | 0.00 |
| **Problem Solving** | Advanced | Adequate | Satisfactory | Fair | Null |
| Assignment 1 | 0.16 | 0.31 | 0.28 | 0.25 | 0.00 |
| Assignment 2 | 0.25 | 0.49 | 0.17 | 0.08 | 0.00 |
| Assignment 3 | 0.27 | 0.48 | 0.19 | 0.07 | 0.00 |
| Assignment 4 | 0.47 | 0.33 | 0.16 | 0.04 | 0.00 |
| Average | 0.29 | 0.40 | 0.20 | 0.11 | 0.00 |
| **Report Writing** | Advanced | Adequate | Satisfactory | Fair | Null |
| Assignment 1 | 0.27 | 0.36 | 0.20 | 0.17 | 0.00 |
| Assignment 2 | 0.41 | 0.28 | 0.16 | 0.15 | 0.00 |
| Assignment 3 | 0.43 | 0.31 | 0.17 | 0.09 | 0.00 |
| Assignment 4 | 0.43 | 0.33 | 0.17 | 0.07 | 0.00 |
| Average | 0.38 | 0.32 | 0.18 | 0.12 | 0.00 |

In terms of analytical skills, 37 % have shown advanced level of performance, 37 % adequate level, and 19 % satisfactory level of performance. Overall, 93% of the students have demonstrated a level of performance that is above satisfactory. On average, 40 % of the students had advanced critical thinking skills, and 35 % adequate critical thinking skills. On average, 92 % of the students have indicated through their assignments that their critical thinking skills are above satisfactory. On average, 29 % of the students have shown advanced and 40 % adequate problem solving skills. Overall, 89% of the students in Environmental Analysis course have demonstrated that their problem solving skills are above satisfactory. On average, 38 percent of the students have shown advanced report writing skills, and 32 % adequate skills. It is noteworthy that only 27% of the students had advanced report writing skills at the beginning of the course when Assignment 1 was submitted. As Figures 2 through 6 indicate the whole set of skills covered by the Analytical Skills Assessment Rubric steadily improve throughout the course, from Assignment 1 to Assignment 4. The results also indicate that the problem solving skills are weaker compared to the remaining set of skills included in the rubric, and therefore we need to focus on the development of this set of skills in the future.

Similar trends were observed in URP 6545 Urban Revitalization Strategy. There is a significant improvement in advanced numerical skills between assignments 1 and 2, and assignments 3 and 4. On average, 24 % of the students completing Assignment 1 and only 11 % of the students completing Assignment 2 have achieved advanced level of numerical skills, compared to 67 % of those completing Assignment 3 and 73 % of those completing Assignment 4 have shown advanced numerical skills. Overall, throughout the semester 74% on average have demonstrated performance level in numerical reasoning that is above satisfactory. However, 19 % have shown no advanced numerical reasoning skills which is also due to the fact that the assignments could also be performed using qualitative methods. Similar trend has been observed in the assessment of the analytical skills. On average, 22 % of the students have used advanced analytical skills while completing assignments 1 and 2, and 71 % have used advanced analytical skills while completing assignments 3 and 4. Again, 12 % have shown no advanced analytical skills. On average, 41 % of the students have demonstrated advanced critical thinking skills and 38% - advanced problem solving skills. Overall, 89% of the students have shown analytical skills level that is above satisfactory, and 84% problem solving skills level that is above satisfactory. On average, 55 % of the students have shown advanced report writing skills. Overall, 88 % had report writing skills above satisfactory throughout the course.

Table 11. Analytical skills assessment for URP 6545 Urban Revitalization Strategy

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Numerical Reasoning** | Advanced | Adequate | Satisfactory | Fair | Null |
| Assignment 1 | 0.24 | 0.33 | 0.02 | 0.00 | 0.40 |
| Assignment 2 | 0.11 | 0.22 | 0.36 | 0.13 | 0.18 |
| Assignment 3 | 0.67 | 0.13 | 0.00 | 0.00 | 0.20 |
| Assignment 4 | 0.73 | 0.11 | 0.04 | 0.11 | 0.00 |
| Average | 0.44 | 0.20 | 0.11 | 0.06 | 0.19 |
| **Analytical Skills** | Advanced | Adequate | Satisfactory | Fair | Null |
| Assignment 1 | 0.24 | 0.40 | 0.13 | 0.02 | 0.20 |
| Assignment 2 | 0.20 | 0.38 | 0.20 | 0.02 | 0.20 |
| Assignment 3 | 0.67 | 0.33 | 0.00 | 0.00 | 0.00 |
| Assignment 4 | 0.76 | 0.13 | 0.02 | 0.00 | 0.09 |
| Average | 0.47 | 0.31 | 0.09 | 0.01 | 0.12 |
| **Critical Thinking** | Advanced | Adequate | Satisfactory | Fair | Null |
| Assignment 1 | 0.29 | 0.33 | 0.29 | 0.09 | 0.00 |
| Assignment 2 | 0.33 | 0.13 | 0.29 | 0.09 | 0.16 |
| Assignment 3 | 0.47 | 0.33 | 0.20 | 0.00 | 0.00 |
| Assignment 4 | 0.56 | 0.22 | 0.11 | 0.11 | 0.00 |
| Average | 0.41 | 0.26 | 0.22 | 0.07 | 0.04 |
| **Problem Solving** | Advanced | Adequate | Satisfactory | Fair | Null |
| Assignment 1 | 0.27 | 0.27 | 0.27 | 0.20 | 0.00 |
| Assignment 2 | 0.24 | 0.18 | 0.27 | 0.16 | 0.18 |
| Assignment 3 | 0.53 | 0.20 | 0.27 | 0.00 | 0.00 |
| Assignment 4 | 0.49 | 0.29 | 0.11 | 0.00 | 0.11 |
| Average | 0.38 | 0.23 | 0.23 | 0.09 | 0.07 |
| **Report Writing** | Advanced | Adequate | Satisfactory | Fair | Null |
| Assignment 1 | 0.51 | 0.20 | 0.18 | 0.09 | 0.00 |
| Assignment 2 | 0.38 | 0.24 | 0.09 | 0.13 | 0.16 |
| Assignment 3 | 0.67 | 0.13 | 0.20 | 0.00 | 0.00 |
| Assignment 4 | 0.64 | 0.20 | 0.09 | 0.04 | 0.02 |
| Average | 0.55 | 0.19 | 0.14 | 0.07 | 0.04 |

Figure 2. Percentage of measured outcomes in numerical reasoning for URP 6425 (left) and URP 6545 (right)

Figure 3. Percentage of measured outcomes in analytical skills for URP 6425 (left) and URP 6545 (right)

Figure 4. Percentage of measured outcomes in critical thinking for URP 6425 (left) and URP 6545 (right)

Figure 5. Percentage of measured outcomes in problem solving for URP 6425 (left) and URP 6545 (right)

Figure 6. Percentage of measured outcomes in problem solving for URP 6425 (left) and URP 6545 (right)

Tables 12 and 13 as well as Figures 7 through 11 summarize measured outcome by detailed assessment target items. Within the numerical reasoning category 50 % of the students in URP 6425 have shown an advanced ability to evaluate applicable quantitative methods, while 48 % use advanced evidence-based reasoning. In URP 6545, 66.7 % of the students were able to apply advanced evidence-based reasoning, and 47 % demonstrated ability to evaluate applicable techniques and complete a complex sequence of tasks. On average, 90 % of the students have performed above satisfactory in all assessment target items with the exception of item 3 under problem solving skills. In both courses, only a few students (17% in URP 6425 and 3 % in URP 6545) were able to discuss at an advanced level the limitations and drawbacks of the proposed analytical methods. According to the results of this assessment, this is an area that requires further improvement.

Table 12. Detailed assessment based on internal and external evaluation for URP 6425 Assignments 1 - 4

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Numerical Reasoning** | Advanced | Adequate | Satisfactory | Fair | Null |
| Demonstrate proficiency | 0.37 | 0.38 | 0.13 | 0.12 | 0.00 |
| Uses evidence-based reasoning | 0.48 | 0.28 | 0.18 | 0.05 | 0.00 |
| Evaluates applicable techniques | 0.50 | 0.28 | 0.15 | 0.07 | 0.00 |
| Selects appropriate tools | 0.47 | 0.32 | 0.17 | 0.05 | 0.00 |
| Completes a complex sequence of tasks | 0.43 | 0.35 | 0.15 | 0.07 | 0.00 |
| **Analytical Reasoning** | Advanced | Adequate | Satisfactory | Fair | Null |
| Synthesizes information | 0.35 | 0.40 | 0.20 | 0.05 | 0.00 |
| Uses competent judgment | 0.38 | 0.38 | 0.18 | 0.05 | 0.00 |
| Supports stated objectives | 0.35 | 0.37 | 0.22 | 0.07 | 0.00 |
| Develops arguments based on results | 0.42 | 0.32 | 0.20 | 0.07 | 0.00 |
| Reveals patterns, trends, implications | 0.27 | 0.47 | 0.17 | 0.10 | 0.00 |
| **Critical Thinking:** | Advanced | Adequate | Satisfactory | Fair | Null |
| Critically assesses observations | 0.37 | 0.35 | 0.18 | 0.10 | 0.00 |
| Able to formulate position | 0.43 | 0.32 | 0.18 | 0.07 | 0.00 |
| Able to provide adequate justification | 0.45 | 0.33 | 0.17 | 0.05 | 0.00 |
| Places analysis into a relevant context | 0.38 | 0.42 | 0.15 | 0.05 | 0.00 |
| Demonstrates clarity, accuracy, credibility | 0.38 | 0.35 | 0.22 | 0.05 | 0.00 |
| **Problem Solving:** | Advanced | Adequate | Satisfactory | Fair | Null |
| Identifies the planning context | 0.35 | 0.38 | 0.18 | 0.08 | 0.00 |
| Assess alternative solutions analytically | 0.30 | 0.38 | 0.18 | 0.13 | 0.00 |
| Formulates limitations and drawbacks | 0.17 | 0.43 | 0.25 | 0.15 | 0.00 |
| Explains the implementation context | 0.32 | 0.42 | 0.20 | 0.07 | 0.00 |
| Formulates relevant recommendations | 0.30 | 0.40 | 0.18 | 0.12 | 0.00 |
| **Report Writing** | Advanced | Adequate | Satisfactory | Fair | Null |
| Builds strong arguments | 0.37 | 0.37 | 0.15 | 0.12 | 0.00 |
| Follows a logical structure | 0.42 | 0.23 | 0.18 | 0.17 | 0.00 |
| Links problem definition to methods and findings | 0.32 | 0.38 | 0.17 | 0.13 | 0.00 |
| Provides visual support | 0.45 | 0.30 | 0.17 | 0.08 | 0.00 |
| Vocabulary communicates main ideas | 0.37 | 0.32 | 0.22 | 0.10 | 0.00 |

Table 13. Detailed assessment based on internal and external evaluation for URP 6545 Assignments 1 - 4

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Numerical Reasoning** | Advanced | Adequate | Satisfactory | Fair | Null |
| Demonstrate Proficiency | 36.11 | 47.22 | 8.33 | 2.78 | 5.56 |
| Uses evidence-based reasoning | 66.67 | 13.89 | 13.89 | 5.56 | 0.00 |
| Evaluates applicable techniques | 47.22 | 30.56 | 13.89 | 2.78 | 5.56 |
| Selects appropriate tools | 47.22 | 5.56 | 11.11 | 5.56 | 30.56 |
| Completes a complex sequence of tasks | 22.22 | 2.78 | 5.56 | 13.89 | 55.56 |
| **Analytical Reasoning** | Advanced | Adequate | Satisfactory | Fair | Null |
| Synthesizes information | 44.44 | 33.33 | 16.67 | 0.00 | 5.56 |
| Uses competent judgment | 16.67 | 50.00 | 0.00 | 0.00 | 33.33 |
| Supports stated objectives | 50.00 | 22.22 | 16.67 | 5.56 | 5.56 |
| Develops arguments based on results | 58.33 | 27.78 | 5.56 | 0.00 | 8.33 |
| Reveals patterns, trends, implications | 63.89 | 22.22 | 5.56 | 0.00 | 8.33 |
| **Critical Thinking:** | Advanced | Adequate | Satisfactory | Fair | Null |
| Critically assesses observations | 25.00 | 36.11 | 27.78 | 5.56 | 5.71 |
| Able to formulate position | 47.22 | 27.78 | 13.89 | 11.11 | 0.00 |
| Able to provide adequate justification | 30.56 | 22.22 | 33.33 | 8.33 | 5.71 |
| Places analysis into a relevant context | 44.44 | 16.67 | 25.00 | 8.33 | 5.71 |
| Demonstrates clarity, accuracy, credibility | 58.33 | 25 | 11.11 | 2.78 | 2.86 |
| **Problem Solving:** | Advanced | Adequate | Satisfactory | Fair | Null |
| Identifies the planning context | 61.11 | 19.44 | 11.11 | 0.00 | 8.33 |
| Assess alternative solutions analytically | 11.11 | 47.22 | 27.78 | 11.11 | 5.56 |
| Formulates limitations and drawbacks | 2.78 | 19.44 | 50.00 | 13.89 | 13.89 |
| Explains the implementation context | 63.89 | 16.67 | 5.56 | 11.11 | 2.78 |
| Formulates relevant recommendations | 52.78 | 13.89 | 19.44 | 8.33 | 5.56 |
| **Report Writing** | Advanced | Adequate | Satisfactory | Fair | Null |
| Builds strong arguments | 27.78 | 25.00 | 38.89 | 2.78 | 5.56 |
| Follows a logical structure | 83.33 | 5.56 | 0.00 | 2.78 | 5.56 |
| Links problem definition to methods and findings | 41.67 | 27.78 | 11.11 | 13.89 | 5.56 |
| Provides visual support | 63.89 | 16.67 | 5.56 | 8.33 | 5.56 |
| Vocabulary communicates main ideas | 58.33 | 22.22 | 13.89 | 5.56 | 0.00 |

Figure 7. Percentage of measured outcomes by assessment target item in numerical reasoning across all the assignments in URP 6425 (above) and URP 6545 (below)

Figure 8. Percentage of measured outcomes by assessment target item in analytical skills across all the assignments in URP 6425 (above) and URP 6545 (below)

Figure 9. Percentage of measured outcomes by assessment target item in critical thinking skills across all the assignments in URP 6425 (above) and URP 6545 (below)

Figure 10. Percentage of measured outcomes by assessment target item in problem solving skills across all the assignments in URP 6425 (above) and URP 6545 (below)

Figure 11. Percentage of measured outcomes by assessment target item in report writing across all the assignments in URP 6425 (above) and URP 6545 (below)

**4.3 Written Communication Rubric**

Figures 12 and 13 display the results of the internal and external evaluation of the written communication skills. As Figure 12 indicates, 90 % of the students were able to focus on the proposed topic, write an introduction and develop arguments that are relevant to the topic. Overall, 80 % and above were able to support their arguments by a thorough discussion of concepts and theories, present main ideas and hypotheses, and indicate how the paper is structured. The weakest points in written communication skills in the Environmental Analysis course are related to summarizing the main points, framing the argument by a conceptual framework, and presenting a closing statement supported by opinion and recommendation. More than 90 % of the students have demonstrated ability to discuss their topic without too much repetition, use vocabulary that effectively communicates the main ideas, and is concise and precise. Close to 100 % show lack of spelling, punctuation and grammar errors and a lack of jargon and clichés. Weakest points in the organization and style of the students’ papers are using correct citations, dividing the paper into sub-sections with relevant sub-headings that can improve the logic of the papers’ organization.

Better results have been observed in URP 6545 Urban Revitalization Strategy. Overall, 100 % of the students in the course have demonstrated to frame their argument by a conceptual framework, introduce the topic at the beginning of the paper in the form of an introduction, and provide arguments that are relevant to the topic. Overall, 94 % of the students were able to focus on the proposed topic, 89 % presented thwir main ideas and hypothesis in the introduction, 78 % have supported their arguments by a thorough literature review, and 83 % indicated how the paper was structured. 100 % of the students achieved high performance with regard to paper organization and style. The only areas that need further improvements are structure and proper citations and acknowledgement of sources.



Figure 12. Assessment outcomes for written communication skills in URP 6425

 Figure 13. Assessment outcomes for written communication skills in URP 6545

**4.4 Oral Communication Skills Assessment**

Tables 14 and 15, along with Figures 14 and 15, present the assessment outcomes for oral communication skills for both courses. More than 80% of the students have shown advanced ability to engage the audience, to use adequate voice projection, and adequate pace of speech. Overall, 94 % have shown clarity of expression that is above satisfactory, More than 80 % have used eye contact and body language that are assessed as being above satisfactory. In both courses, 100 % of the students were able to demonstrate content and topic development that is assessed by the internal and the external evaluators as satisfactory and above.

Table 14. Assessment outcomes for oral communication skills in URP 6425



Figure 14. Assessment outcomes for oral communication skills in URP 6425

Table 15. Assessment outcomes for oral communication skills in URP 6545



Figure 15. Assessment outcomes for oral communication skills in URP 6545

**4.5 Poster Design and Presentation Skills Assessment**

The poster design and presentation rubric assess students’ skills in graphic design, format and layout, as well as their skills in presenting their research questions, methods and key finding in a concise graphical form. The results of the assessment for both courses indicate that approximately 50 % of the students have advanced skills in poster construction and above 50 % - advanced skills in presenting the poster content. The target items that require further improvement include text size and color (apparently, the students need to work on selecting the appropriate elements), graphic design and layout, highlighting the key elements, and presenting adequately their analysis and methodology. Overall, more than 90 % of the students have poster design and presentation skills that have been assessed as adequate and above.

Table 16. Assessment outcomes for poster design and presentation in URP 6425



Figure 16. Assessment outcomes for poster design and presentation in URP 6425

Table 17. Assessment outcomes for poster design and presentation in URP 6545



Figure 17. Assessment outcomes for poster design and presentation in URP 6545

**4.6 Peer Evaluation Assessment**

Both courses require students to form groups in conducting advanced environmental and economic analysis by formulating research questions, collecting data, analyzing the data, proposing solutions to planning problems, and reporting the findings to the class. At the end of the semester students should complete a final report or a paper and present the project to the class by using visual and graphic presentations. At the completion of the project students are required to assess their peers based on 14 criteria as shown in Table 7. Based on the assessment each group has some students taking active leadership roles and in general more than 98% of the students view the team and collaborative work above satisfactory. Extreme negative evaluations focused on one student who was rated as below fair for most of the criteria items. Overall most students are willing to take responsibilities, respect for each other’s opinions, are willing to work with others effectively as a group, and keep frequent and friendly communication with other group members. However, meeting deadlines and willing to openly communicate about feelings are somewhat difficult for many of the students.

In general, peer evaluation assessment has helped improve students’ ability to work as teams significantly, as is shown in next section where students’ self assessment of PAB skills rated the largest improvement in collaborative work (see Table 4.7). However, as in other self-reported assessment, biases might skew the results due to strong subjective measurements in this assessment.

**4.7 PAB Criteria Skills Assessment**

The PAB criteria skills assessment includes the most comprehensive professional skills criteria and provides the foundations of curriculum design in planning education. It plays critical roles in reaccreditation of the School of Urban and Regional Planning and has strong linkage to all four project goals. Therefore, we used these criteria to assess whether students grasped various skills and tools used in planning, comparing their learning outcomes before and after they took the methods courses. Although the two courses are not intended to cover all the criteria listed in PAB accreditation requirements the t-test results indicates that students have significant improvements across all assessment criteria items (see Table 18).

We collapsed four different categories to assess levels of proficiency (with the scale of 1 to 5 to indicate the least proficient to the most proficient) in terms of skills and tools used in planning: education, application, knowledge and experience. Education assesses various methods and skills generally acquired from formal educational curriculum. Application evaluates how students are able to use the skills and knowledge in specific and practical elements of planning such as land use planning, transportation planning, policies, and legal principles. Knowledge stresses items obtained through both formal and informal learning experience and experience focuses on the overall experience in teamwork, client interaction and delegation of responsibilities.

Overall visioning and goal setting, and collaborative work show the largest improvements among all students of the two courses. Students reported very positive experience in teamwork and client-based projects in URP 6545. They feel owning the projects, instead of completing the projects simply for the sake of coursework requirements. Clients were very pleased by students’ enthusiasm of “adopting” their district to formulate economic analysis and redevelopment planning. Fourteen (14) out of 23 items are significant at the level of 0.001, which represents about 61% of the assessment criteria items. Critical thinking skills and the knowledge about public participation have the smallest increases in proficiency levels comparing before and after the courses. This implies that we should strengthen critical thinking skills and help students gain more knowledge in the importance of public participation in urban and regional planning. Larger sample sizes should be accumulated so that the results will be more convincing.

Table 18. Results from the pairwise t-test



# Summary

Table 19 provides a summary of some of the major results of the assessment analysis and links them to the project goals and measurements tools.

Table 19. Relationship between project goals, assessment tools and learning outcomes

|  |  |  |
| --- | --- | --- |
| **Project Goals** | **Measurement Tools** | **Assessment of Learning Outcomes** |
| Goal 1: Proficient Analytical Writing and Critical Thinking Skills | * Analytical skills rubric * Written communication rubric | On average, 90 % of the students demonstrated writing proficiency that is evaluated as satisfactory and above by internal and external evaluators. |
| Goal 2: Proficient Quantitative and Qualitative Analytical Skills | * Analytical skills rubric * Pre-post PAB skill assessment rubric * Pre-post questionnaires | On average, 90 % of the students have performed above satisfactory in all assessment target items. Over 90 % of the students have demonstrated a level of numerical reasoning skills that is satisfactory and above.  Over 90 % of the students have indicated through their assignments that their critical thinking skills are above satisfactory. Overall, 89% of the students have demonstrated that their problem solving skills are above satisfactory.  Almost 70% of the students were able to apply advanced evidence-based reasoning, and 47 % demonstrated ability to evaluate applicable techniques and complete a complex sequence of tasks. |
| Goal 3: Efficient and Effective Communicative Skills | * Oral communication rubric * Poster design and presentation rubric | 100 % of the students were able to demonstrate content and topic development that is assessed by the internal and the external evaluators as satisfactory and above.  94 % have shown clarity of expression that is above satisfactory.  80 % have used eye contact and body language that are assessed as being above satisfactory.  More than 90 % of the students have poster design and presentation skills that have been assessed as adequate and advanced. |
| Goal 4: Significant Teamwork and Collaborative Skills | * Peer evaluation rubric | More than 98% of the students view the team and collaborative work above satisfactory. |

# Dissemination

The project team will make the project contents available upon request to interested institutions, students and faculty. The dissemination plan will include:

1. Departmental outcome assessment methods will be put in place
2. The final results will be reported at a faculty meeting
3. The team will inform the instructors who teach the introductory level courses about gaps in student knowledge with regard to relevant skills and learning outcomes.
4. We would provide project information to the PAB site visitors who are expected to perform on-site accreditation evaluation of the graduate program in Urban and Regional Planning (February 2010).
5. We will prepare a final report for the University Director of Assessment which will be developed into a publication for the Journal of Planning Education and Research and presented at a conference.

# List of Participants:

Instructors:

Yanmei Li, PhD. Assistant Professor, URP 6545 Urban Revitalization Strategy

Diana Mitsova, PhD, Assistant Professor, URP 6425 Environmental Analysis in Planning

Students: (depends on enrollment) approximately 24 total

For internal evaluation, we will rely on the feedback of senior faculty. For external evaluation, we will invite planning professionals to evaluate student skills and achievements and the quality of instruction.

Internal Evaluators:

Jaap Vos, PhD, Associate Professor

David Prosperi, PhD, Professor

Ann-Margaret Esnard, PhD, Professor

External Evaluators:

Michael Stamm (Senior Planner, Planning and Zoning Board, City of Pembroke Pines, FL) for URP6425

Jeremy Earl (Director, City of Dania Beach Community Redevelopment Agency) for URP6545

Scott Timm (Executive Director, MiMO Business Improvement Committee) for URP 6545