Assessing Student Acquisition of Knowledge of Learning Objectives for an Interprofessional Projects Program

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1. ABSTRACT

The Interprofessional Projects Program (IPRO®) at our university provides a six credit multi-disciplinary, project team based course required of all undergraduates which helps develop in these students various knowledge and skills deemed essential by ABET and future employers. This knowledge and skill, defined from our course Learning Objectives [LO], are competency in teamwork, communications, project management and ethical behavior, developed in the context of addressing a real world problem. Through this research, we are assessing whether or not students that participate in an IPRO course gain a more thorough understanding of the declarative knowledge supporting comprehension of the Learning Objectives by administering a knowledge test to each IPRO student both at the beginning and at the end of each semester. There are several reasons for giving these tests, one, faculty have asserted the hypothesis that the subject LO knowledge is gained through student work in other [non IPRO] courses and that the IPRO courses are unnecessary as general education requirements and two, faculty maintain that exposure to two IPRO courses is unnecessary as whatever needs to be learned about the LOs is/can be absorbed in one 3 credit course rather than two 3 credit courses.

Our first goal for the research is to measure what students actually comprehend about the Learning Objectives. Our second goal is to evaluate how much LO knowledge the non IPRO departments provide students before/outside the IPRO courses. Next we want to learn if IPRO students beginning and ending LO knowledge varies by background and other demographic factors. Our final research goals are to isolate the gains made in declarative LO knowledge or other values received in a second IPRO course as opposed to a first IPRO course and to evaluate various techniques for improving the declarative knowledge [test scores] of our students.

Many engineering programs have project based courses with similar learning objectives and the implications for engineering educators supporting these curriculum are related to measuring the acquisition of knowledge obtained directly from a course versus other courses or, for example, prerequisites. It is also beneficial to evaluate methods to measure the knowledge acquisition related to specific skills and behavior as described by learning objectives and defined competencies related to those Learning Objectives.

2. INTRODUCTION

The IPRO Program is a unique undergraduate experience offered at our university that enables students to cultivate a multitude of skills needed in today's workplace. The IPRO experience provides students with practical applications in the areas of teamwork, problem solving, innovation, leadership, communication, and other valuable professional skills. The multidisciplinary teams offer students the opportunity to communicate and collaborate with students from other majors (such as engineering, computer science, architecture, science and business), drawing from their knowledge, in order to complete the objectives of the project. The 30 to 35 IPRO teams that are formed each semester (involving about 24 instructors and approximately 400 students from across the university) participate in a real world problem solving experience. Each team consists of seven to fifteen students and at least one faculty member. Most projects also involve sponsors from various organizations, ranging from entrepreneurial businesses to non-profit health care agencies. These clients and sponsors propose a real world problem for each IPRO team to investigate. Faculty and students from the university are also encouraged to submit project proposals. All the proposals are reviewed before each semester commences and voted upon my chosen faculty and students. The review of proposals process is done in order to ensure quality projects that will engage participants and offer the chance to acquire knowledge of the Learning Objectives. Types of IPRO projects include research, design, process improvement, and business planning, performed as service learning projects, entrepreneurial projects, consulting projects and international service. IPRO projects are among the general education requirement for all undergraduates (i.e., two three-credit hour semester-long project courses fulfill the requirement). Over the past few years, the IPRO Program has begun to establish systematic evaluation of the various parts of the program in order to identify and strengthen program areas that need improvement or revision.

3. METHODS

During the spring and summer semesters of 2005, IPRO students, tenured faculty and IPRO faculty, worked together to develop an outline of the LO body of knowledge, LO study documents and references, and LO proficiency tests. See exhibit 2 for the Fall 2005 and Spring 2006 test questions. From the body of knowledge a multiple choice 15 to 25 question test per LO was developed and administered to a small sample [8] of IPRO students in Summer 2005. The IPRO Program established a minimum competency goal, as measured by test results, as: 80% correct answers on each LO test by the end of the semester. The results of the Summer 2005 pilot test (see Table 1 in Results) was 42% correct answers. This test result suggested a need for training in the Learning Objectives. As a result the development and execution of a pilot LO training program was added to the research goals for Fall 2005.

For the beginning of the Fall 2005 semester, a multiple choice LO test was generated that included 80 questions: 15 questions on Project Management, 15 questions on Communication, 25 questions on Ethics, and 25 questions on Teamwork. This test was administered to 290 IPRO students in August 2005. Using SPSS, an investigation of the data was performed and item analysis and cross tab analysis (year in school, first or second IPRO, major, team number) were generated. The statistical validity and reliability of each test item and of each LO section of the

test was also examined. From the Fall 2005 beginning of semester test many test questions were judged statistically unreliable and as a result, 27 of 80 test questions were removed and 12 new questions were inserted to create a new test of 65 questions for end of semester Fall 2005 and beginning of semester Spring 2006. Two types of questions were removed: 15 questions shown to be statistically unreliable and 12 questions where it appeared that students were randomly guessing at the answer (due to confusing distracters). For the Project Management section of the Fall 2005 test, 12 of 15 questions were replaced.

The statistical reliability of any assessment is crucial to the understanding of the results and the overall validity of the test. The reliability of the Fall 2005 LO post-test was higher than that of the pre-test, due to the removal of the questions from the assessment. The removal of questions was based on Item Analysis, which indicated how the internal stability of the section would change with respect to the removal of that specific question. The following question was a sample question that was confusing to most of the students and was therefore removed from the assessment tool:

A project manager makes a narrative description of the work that must be done for his/her project. This is called a:
   a. Project plan
   b. Control chart
   c. Statement of work
   d. Project objective

The Cronbach's Alpha value, which measures the internal consistency of the instrument, increased in each section in Fall 2005 from the pre-test to the post-test. The Cronbach Alpha value for the post-test in communication is 0.4, for teamwork it is 0.2, for ethics it is 0.6 and for project management it is 0.7. The overall validity of the assessment tool increased as a result of removing unreliable questions and distracters. The statistical reliability of each section of the test will continue to improve as the test is revised and updated in the upcoming semesters.

The updated test consists of 65 questions (15 questions in Project Management, Communication and Teamwork and 20 questions for Ethics) and was administered at the end of the Fall 2005 semester to 246 students. All but 11 students who started the test, completed the test. Test results from Fall 2005 are discussed below. This same test was also administered to 375 students at the start of the spring 2006 semester. All but 14 students completed substantially all of the test questions at that time. Students are required to give their student CWID [Campus Wide ID] when taking the test and actual test result comparisons across time periods are done on a student-by-student basis using the CWID.

Another initiative started in Fall 2005 was the selection of one or more textbooks and web sites that support each 'body of knowledge' outline and study document. The reasons for this decision were several. First, a large test bank of questions was desired both for testing and for training purposes. Second, there was criticism from the IPRO faculty for test questions that were based in whole or part on definitional or conceptual work by specific authors. The intention now is to provide those definitions both in test and in study materials but drawn from as few sources as

possible to minimize any unnecessary confusion over the meaning of terms or references that are used as study assignments and in tests. The selected text for project management is:

Kim Heldman, Project Management Professional Study Guide, Wiley Publishing, Inc. Third Edition. (Available on books 24X7 at http://www.gl.iit.edu/resources/io.htm)

During the course of the Fall 2005 semester, 5 out of 31 of the Fall 2005 IPRO teams also participated in a training program on the Learning Objectives. This training program included attending lectures, providing background LO documents to the team, participating in surveys, taking practice tests, and attending facilitated discussions administered by faculty. Four brief post-tests were given to help students absorb the training. The purpose of the training activities were to compare the test performance of students who had this additional training to those who did not [a control group of all 26 other teams] in order to evaluate the effectiveness of adding such a training program for all IPRO teams.

4. RESULTS AND DISCUSSION

The Summer 2005 pilot testing on LOs at the end of the summer term was not satisfactory with only 42% correct answers as shown in Table 1. It was decided that if the beginning of semester Fall 2005 test showed similar results that a training program would be established and tested to help improve the LO test scores.

Table 1: Results of the Pilot test administered in Summer 2005.

Learning Objective	Mean Score (Out of 15 questions)	Percent Correct
Communication	5.0	33%
Ethics	4.9	33%
Project Management	6.9	46%
Teamwork	8.6	57%

The Learning Objectives test was administered to approximately 290 IPRO students at the beginning of the Fall 2005 semester and 246 students at the end. A total of 278 and 235 usable tests respectively were generated. The Fall 2005 correct test score mean was only 45% correct, better but similar to Summer 2005 test results,

Table 2: Results of the pre-test administered at the beginning of the Fall 2005 semester to all students.

Learning Objective	Mean Score	Percent Correct
Communication	6.6/15	44%
Ethics	10.9/25	44%
Project Management	5.2/15	35%
Teamwork	13.4/25	54%

Table 3: Results of the post-test administered at the end of the Fall 2005 semester to all students.

Learning Objective	Mean Score	Percent Correct
Communication	6.45/15	43%
Ethics	9.9/20	50%
Project Management	8.9/15	59%
Teamwork	6.5/15	44%

Based upon the test data shown in Tables 2 and 3, the only natural or facilitated learning that is possibly taking place in the IPRO Course is related to project management, which shows a 24% increase in correct answers, pre-to post-test. However, this difference is most likely due to testing changes not actual learning. No other significant gain exists and teamwork scores actually decrease. A closer look between pre-test and post-test also indicate a slight improvement in the areas of Ethics. Overall, students performed no better on the post-test [48%] than on the pre-test [45%], indicating no significant increase in the knowledge-based understanding of the four Learning Objectives was achieved during the Fall 2005 semester.

Five IPRO teams participated in supplemental training programs in Fall 2005 to assist them in acquiring and retaining information about the Learning Objectives. Exhibit 1 shows test performance of all teams with BOS [beginning of semester] to EOS [end of semester] Fall 2005 tests. Teams utilizing the additional training scored a mean of 56.4% correct vs. the all team mean of 48% correct, a 16% test score improvement. Those five teams involved in training exercises also improved their beginning BOS to end of semester EOS test scores from 48.2% to 56.4% correct, a significant improvement if not a satisfactory test score. These same teams are also engaged in a pilot test of a reflection exercise that also may have contributed to their knowledge gain.

Table 4: Pre- and post- test results for the Learning Objectives (LO) assessment for two IPRO teams that participated in the training sessions.

Sample of IPRO Teams that participated in LO Training		
IPRO Team Number	Pre-test Average of LO Test (% Correct), BOS	Post-test Average of the LO Test (% Correct), EOS
303	46%	54%
340	46%	56%

Table 5: Pre- and post- test results for the Learning Objectives (LO) assessment for two IPRO teams that did NOT participate in the Fall 2005 training sessions.

Sample of Teams that did NOT participate in LO Training		
IPRO Number	Pre-test Average of LO Test (% Correct), BOS	Post-test Average of the LO Test (% Correct), EOS
351	49%	44%
355	47%	47%

From the specific data regarding the effectiveness of training in raising test scores as shown in tables 4 and 5, it was concluded that the training sessions were an effective supplemental method for teaching the Learning Objectives knowledge. LO training is recommended to continue to be used and expanded if possible to more, if not all, IPRO teams.

Hypothesis about overlapping content have been suggested by several sources and therefore it is believed that differentiated test scores will be found. Unfortunately, no evidence exists as shown in Tables 6 or 7, so far, that any major or curriculum covers the full LO content of an IPRO course. Significant gains in a semester are demonstrated in acquisition of project management knowledge regardless of year or major at least in this first semester of testing but these gains are due to a poor test instrument BOS Fall 2005 not actual learning. However, presented with this test data, faculty challenged the appropriateness of test questions and whether the definition of the learning objectives and body of knowledge are 'correct'. Our observation is simply that IPRO students are not mastering these subjects as defined and tested, in other courses. As a consequence of the faculty challenge the LOs, support materials and testing materials are being reviewed and revised to provide more reliability and better training and study tools.

Table 6: Results (percent correct) of the Fall 2005 Learning Objectives test across majors, BOS to EOS or just BOS.

Majors	Communication	Project Management	Teamwork	Ethics	Total
MMAE	47%, 47%	39%, 65%	56%, 48%	45%, 52%	48%, 53%
ECE	43%, 43%	31%, 62%	55%, 40%	45%, 52%	45%, 49%
Other engineering	43%	37%	54%	45%	46%
Architecture	42%	33%	54%	41%	44%
Other majors	46%	35%	52%	44%	45%
Total	45%, 43%	35%, 62%	54%, 43%	44%, 49%	45%, 49%

Table 7: Results (percent correct) of the Fall 2005 Learning Objectives test between third and fourth year undergraduates from BOS to EOS.

Year	Communication	Project Management	Teamwork	Ethics	Total
Junior	45%, 47%	36%, 64%	54%, 44%	46%, 53%	47%, 53%
Senior	45%, 41%	35%, 59%	54%, 42%	44%, 47%	46%, 46%

A more vexing outcome is the finding represented in Table 8 which shows that no appreciable gain in test scores is obtained from participating in 1 or 2 IPRO courses except perhaps for project management knowledge. The fact that project management scores are low in the first test

of Fall 2005 is due unfortunately to the unreliability of that question set which is why 12 of 15 questions were replaced for the EOS test. There is no convenient explanation for this overall outcome except that the learning objectives are not taught or absorbed in an IPRO, at least as LO are currently defined and tested. Hence, the increased interest in reviewing the LO definitions and testing materials and expanding the LO training program.

Table 8: Results (percent correct) of the Learning Objectives test for students taking an IPRO for the first time versus for students taking an IPRO for the second time, BOS, EOS Fall 2005 and BOS Spring 2006.

Previous IPRO experience?	Communication	Project Management	Teamwork	Ethics	Total
First IPRO, BOS EOS Fall 2005	43%, 45%	35%, 62%	54%, 44%	44%, 50%	46%, 50%
First IPRO, BOS SPRING 2006	42%	61%	44%	49%	49%
NOT first IPRO, BOS, EOS Fall 2005	45%, 41%	34%, 60%	54%, 43%	44%, 47%	45%, 48%
NOT first IPRO, BOS SPRING 2006	43%	62%	43%	49%	49%

5. CONCLUSION

The primary goal for the development of the testing procedure discussed in this paper is to determine the state of LO knowledge of IPRO students at different stages relative to their participation in the IPRO Courses.

Regarding the first hypothesis, *"students have already have acquired the knowledge required for practicing the LOs from other courses or otherwise before entering the IPRO courses"*, the test results show that all types of students entering the IPRO program score at 46% and 48 % correct answers at the beginning and end of the Fall 2005 semester respectively. While two different but similar tests were used in this measurement, both tests were designed to measure acquisition of knowledge as defined from the same body of knowledge. In fact the average test scores of students without prior IPRO experience are shown in Tables 6 and 8 above at 46%. We conclude from these results regarding our defined LOs that students with all majors do not have prior knowledge of the necessary LO concepts.

However, regarding the second part of this hypothesis, *that IPRO students will gain the required LO knowledge through participation in the IPRO Courses,* we do not yet have any evidence that this hypothesis is true as shown by the data in Table 8. There is no significant difference in LO

test results if you have had 0, 1 or 2 IPROs. Therefore we have concluded that more intense and formal IPRO training programs and courses regarding the LO content are necessary. We intend to seek faculty approval for this initiative.

Our third research goal is to *identify the benefits and value received and/or knowledge gained from the 2nd IPRO course as opposed to the first IPRO course.* At this time there is no research data from the LO tests that identify measurable skills or knowledge gained by a second IPRO course. There are many anecdotes regarding leadership opportunities, sponsor outcomes and other contributions that 2nd semester IPRO students can and do make but nothing in the LO test data stands out so far in support of the 2nd IPRO.

In the Spring 2006 semester, the LO body of knowledge will be refined by integrating a major college text in each subject area as the primary source of examples, definitions, cases and training materials. This course development activity will eventually lead to the construction of a question bank, online training materials and on line self-training and self paced learning modules.

The findings from this research are important for all programs striving to provide meaningful education in support of the ABET meta-objectives and concerned about determining how well their learning objectives are being achieved. The significance of this work lies in the ability to establish a benchmark position for entering students and to quantitatively assess the declarative knowledge being gained by students through the IPRO experience. Having such assessment tools will also allow us, and other educators and researchers, to assess which specific training tools or experiences have a positive impact on the declarative knowledge gained regarding the Learning Objectives.

6. REFERENCES

1.   ABET (1999). *Criteria for Accrediting Engineering programs.* The Engineering Accreditation Board for Engineering and Technology.

2.   Aragaki, Koren. (2005). *Effectiveness of Assessment Tools on Project Based Interprofessional Education.* Proceedings of the 2005 American Society of Engineering Education Annual Conference and Exposition Copyright.

3.   Kaplan, Robert M. and Saccuzzo, Dennis P. (2000). *Psychological Testing: Principles, Applications and Issues*. San Diego, CA : Wadsworth Publishing Company

Exhibit 1

Learning Objectives Team Results for Fall 05

Team Number	Mean Score out of 80 questions Aug. 2005	Percent Correct Aug. 2005	Number of students taking test	Mean Score out of 65 questions Dec. 2005	Percent Correct Dec. 2005	Delta Aug-Dec	Teams in training and/or reflection pilot
301	34.4	43.0%	9	34.6	53.2%	10.20%	
302	36.9	46.1%	10	32.0	49.2%	3.10%	
303	36.8	46.0%	6	34.9	53.7%	7.70%	yes, yes
304	29.9	37.4%	12	30.0	46.2%	8.80%	
305	37.4	46.8%	14	35.5	54.6%	7.80%	
306	42.3	52.9%	8	32.6	50.2%	-2.70%	
307	35.3	44.4%	9	30.4	46.8%	2.40%	
310	34.3	42.9%	14	35.6	54.8%	11.90%	
311	34.7	43.4%	8	32.0	49.2%	5.80%	
313	31.5	39.4%	12	19.0	29.2%	-10.20%	
315	39.6	49.5%	10	31.7	48.8%	-0.70%	
317	37.2	46.5%	9	31.3	48.1%	1.60%	
318	34.1	42.6%	7	30.0	46.2%	3.60%	
319	36.6	45.8%	15	23.4	36.0%	-9.80%	
329	33.0	41.3%	13	20.4	31.4%	-9.90%	
333	37.5	46.9%	11	37.6	57.8%	10.90%	yes, yes
335	34.8	43.5%	8	31.3	48.2%	4.70%	
338	39.3	49.1%	10	36.5	56.2%	7.10%	yes, yes
339	41.4	52.8%	7	37.9	58.3%	5.50%	yes,yes
340	36.7	45.9%	7	36.3	55.8%	9.90%	yes,yes
341	36.7	45.9%	6	34.7	53.4%	7.50%	
350	40.2	50.3%	6	39.0	60.0%	9.70%	yes
351	38.8	48.5%	8	28.5	43.8%	-4.70%	yes
352	32.9	41.1%	10	30.0	46.2%	5.10%	yes
353	36.4	45.5%	7	29.7	45.7%	0.20%	yes
354	34.0	42.5%	8	26.0	40.0%	-2.50%	yes
355	37.4	46.8%	11	30.7	47.2%	0.40%	yes
357	38.3	47.9%	8	32.8	50.5%	2.60%	yes
358	39.6	49.5%	7	30.3	30.3%	-19.20%	yes
Mean	36.45	45.7%		31.5	47.97%		

Exhibit 2

IPRO Program Learning Objectives Test

The following is a test on the four learning objectives set forth by the IPRO program. Sufficient knowledge of teamwork, project management, communication, and ethics is required in every field of the work force today. The IPRO program is dedicated to preparing students for a successful life after college no matter what field they enter. To be the most prepared, students not only need to get the hands on experience offered by IPROs, but also some additional training and information in these four specific subject areas.

The purpose of this test is to document the knowledge of participants in the areas of teamwork, project management, communication, and ethics after participating in an IPRO. Currently the IPRO office is interested in how much students know prior to their IPRO experiences, how much they learn during the course, and what they take away from the experience. <u>This test is required of all IPRO students,</u> and the results will be used solely to find the current effectiveness of the IPRO program in teaching these four learning objectives. Please put the appropriate time and effort into this test to ensure accurate results, and answer all questions to the best of your ability.

Name: _____

Signature: _____

Student Identification Number: _____

COMMUNICATION

1. What is the purpose of communication?

    a. To convey a message
    b. To download files
    c. To ensure quality
    d. To establish a relationship

2. Which of the following is a component of the process of communication?

    a. Channel
    b. Recorder
    c. Summarizer
    d. Gate keeper

3. Which of the following roles are necessary for effective communication?

    a. Sender
    b. Skeptic
    c. Receiver
    d. Initiator

4. Which one of the following skills is essential for effective communication?

    a. Active listening
    b. Verbal and non verbal communication
    c. Eye contact
    d. Asking questions

5. How should one communicate online?

    a. Focus on the purpose of your idea
    b. Be flexible
    c. Maintain social etiquette
    d. Be courteous

6. How can participants communicate effectively in IPROs?

    a. Set up a system
    b. Giving a formal oral presentation
    c. Avoiding serious disagreements
    d. Using the iKNOW system

7. What is one of the barriers to effective communication?

    a. Lack of accountability standards
    b. Not sharing files systematically
    c. Lack of personal touch
    d. Not sharing daily schedules

8. Which of the following media can a communicator use to present information?

    a. Visual
    b. Audio and visual
    c. Tactile
    d. Visual, audio, and tactile

9. Which of the following are filters that the receiver uses to filter messages?

    a. Language and knowledge
    b. Distance
    c. Culture and distance
    d. Language, distance, culture, and knowledge

10. What is encouraged by the use of brainstorming as a communications technique?

    a. Team building and convergent thinking
    b. Divergent thinking
    c. Analytical results
    d. Use of the scientific method

11. Which of the following is NOT a standard type of communication?

    a. Written
    b. Verbal
    c. Nonverbal
    d. Clairvoyant

12. Communication between the sender and the receiver are often affected by communication barriers. What is NOT a communication barrier?

    a. Cultural differences
    b. Differences in motivation
    c. Educational differences
    d. Lack of a communications device

13. Communication involves a sender and receiver. The sender is responsible for which of the following activities?

    a. Scheduling the communications to take place
    b. Confirming that the message was understood
    c. Sending feedback to the receiver
    d. Understanding the best channel to use

14. The three main types of communication are:

    a. Written, oral, and graphic
    b. Written, oral, and visual
    c. Verbal, written, and electronic
    d. Verbal, formal documentation, and informal documentation.

15. A team member finds that he/she is having trouble concentrating on what is being said in meetings. What is one of the things that he/she might do to improve his/her listening ability?

    a. Interrupt the speaker to give his/her own opinion
    b. Make telephone calls when the subject is not interesting
    c. Show the speaker that he/she is interested by showing attention and support
    d. Concentrate exclusively on the facts the speaker is using

TEAMWORK

1.   In what area can a team assess its own ability?

    a. Group organization
    b. Group mission, planning, and goal setting
    c. Intergroup relations
    d. All of the above

2.   What is a realistic expectation about the team process?

    a. Sometimes team members will face stressful issues
    b. Team members will pitch in and help out without being asked
    c. Team members will all support each other on every issue
    d. Everything will be great

3.   Which of the following is NOT the behavior of a helpful facilitator?

    a. Confronting
    b. Correcting
    c. Refocusing
    d. Easygoing

4.   What should be done if one member of the team is out of control?

    a. Make sure the team has a clearly defined goal
    b. Set clear agenda boundaries
    c. Select strong facilitators and process observers who will try to redirect some of the behavior
    d. All of the above

5.   Which is NOT a condition required for effective problem solving?

    a. Belief that conflict is vital to good decisions
    b. Supporting one plan of action
    c. Refusal to use power as a problem solving tool
    d. Willingness and ability to listen

6.   Which of the following are ways teams can make decisions?

    a. Majority rule
    b. Minority rule
    c. Consensus
    d. All of the above

7.   A task-oriented team member, who enjoys providing the team with good technical information and data, does his homework, and pushes the team to set high performance standards and to use their resources wisely. Most people see him as dependable, although he sometimes becomes too bogged down in the details, misses the big picture, or does not see the need for a positive team climate. He is responsible, authoritative, reliable, proficient, and organized." Which team member role does this paragraph describe?

    a. Contributor
    b. Collaborator
    c. Communicator
    d. Challenger

8.   Which of the following is NOT a responsibility of the team?

    a. Scheduling
    b. Quality control
    c. Providing a happy workplace
    d. Safety

9.   Which is the final step in the rational problem-solving sequence?

    a. Generate alternative solutions
    b. Define the problem
    c. Plan action steps and accountability and measurement systems
    d. Evaluate and select a solution

10.   In the five stages of team development: forming, storming, norming, performing, transforming, which of the following refers to the norming stage of development?

    a. Teamwork
    b. Conflict
    c. Start up
    d. Change

11.   What is the difference between teamwork and group work?

    a. Teamwork focuses more on the outcome, while group work focuses more on the process
    b. Teamwork is a more collective effort than group work
    c. Teamwork and group work can be used interchangeably
    d. Group work does not require communication among members of the group

12.   What type of team is created for the purpose of developing innovative possibilities or solutions?

     a.   Tactical
     b. Creative
     c.   Problem solving
     d.   Resolution

13.   Which of the following is NOT an advantage of teamwork?

     a.   Increased commitment and motivation
     b.   Transfer of expertise
     c.   Low social overhead
     d.   Generation of more ideas

14.   Which of the following is NOT an element of team building?

     a.   Roles
     b.   Goals
     c.   Interactions
     d.   All of the above

15.   What type of team is organized around a non-routine task of limited duration, after which the team disbands?

     a.   Project team
     b.   Self-managed work team
     c.   Creative team
     d.   Executive team

ETHICS

For the following scenarios, please choose the most appropriate approach to solving the problems

1. You are browsing the internet and see some software that may be useful in your job. What do you do?

    a. Download the software at home and bring it to work
    b. Never use software off the internet
    c. Check with the appropriate organization to make sure this software is available free of charge for the task you intend to use it
    d. Download the software and use it

2. One of your coworkers is copying company software at work and taking it home. You need the same software for your personal use and are having problems raising the money to buy it. What do you do?

    a. Tell your coworker that it's unfair that you have to save in order to buy the software that he didn't
    b. Report the matter to a supervisor, and ask whether you can copy the software for personal use
    c. Copy the software for yourself; your co-worker hasn't been caught
    d. Contact your software support representative for guidance

3. A potential customer asks you to explain how your company's products and services are superior to a competitor's products and services. What is an acceptable response?

    a. Call into question the competitor's expertise and experience
    b. Decline to pass judgment on the competitor, but explain the positive aspects of your product
    c. If quantitative performance data is publicly available, comparative data can be used
    d. Say that your customer service program is superior, offering greater convenience and higher customer satisfaction than your competitor

4. A member of your immediate family has a financial interest in a small, privately-owned supplier to your company. Are you required to report this fact?

    a. Yes, all employees are required to report any conflict or appearance of conflict
    b. Yes, because it could look bad even though you don't deal directly with that supplier at work
    c. No, if you don't allow that financial interest to improperly influence your job responsibilities
    d. No, if that financial interest is less than 10,000 dollars

5. For several months, one of your colleagues has been performing poorly at work and you are faced with an increased workload in order to compensate for the colleague's poor performance. What do you do?

   a. Recognize this as an opportunity for you to demonstrate how capable you are
   b. Go to your supervisor and discuss the situation
   c. Discuss the problem with you colleague in an attempt to solve the problem without involving others
   d. Discuss the problem with the human resources department

6. You work in production control. You plan to add a porch to your house, and you visit a lumberyard to get ideas and a price. During the discussion, the sales manager say, "Oh, you work at the XYZ company. They buy a lot from us, so I'm going to give you a special discount." What do you do?

   a. Take the discount. When you get back to the office on Monday ask the supervisor if all employees were eligible for that discount
   b. Say, "I work for a different division of the XZY Company-am I still eligible for the discount?"
   c. Ask for clarification-"Is that special discount available to all XYZ employees?"
   d. Do not accept it. If a deal sounds too good to be true it probably is

7. You are purchasing manager for your company. Your spouse works for one of your vendors. Your spouse's company has given her two tickets to basketball playoffs valued at $60 each. Can you accept one of the tickets and go to the playoffs with your spouse?

   a. You can go to the playoffs with your spouse because the gift was based on a pre-existing relationship, independent of any business relationship
   b. Because the face value of the ticket is more that $20, you should not accept or use the ticket
   c. You can use the ticket to go to the playoffs, but must reimburse the vendor for the face value of the ticket
   d. You can accept the ticket, but should consult your supervisor to determine whether or not you can use it

8. You work for a company that has implemented a smoke-free workplace policy. You discover employees smoking in the bathrooms of the building. You also smoke and don't like having to go outside to smoke. What do you do?

   a. You ignore the situation
   b. You confront the employees and ask them to stop
   c. You join them, but only occasionally
   d. You contact your supervisor and ask her to handle the situation

9. A team submits a suggestion to the suggestion program. In the meantime, some employees on the team are laid off. The suggestion has been adopted. How do you distribute the award payment?

    a. Divide it equally among the members of the team still employed
    b. Divide it among all former team members, whether they are still working or not
    c. If the remaining team members agree, donate the check to a charity
    d. Divide the check among all current employees. If the former employees find out about the award, they can call and request their share

10. A co-worker is injured on the job. You are a witness and what you saw reflects poorly on the company. What do you do?

    a. Don't get involved
    b. Contact the injured co-worker and offer to testify on his/her behalf
    c. Report what you saw to the human resources office
    d. Protect the company by refusing to testify as a witness for the injured person

11. In a department meeting your supervisor takes credit for some excellent work done by a colleague who is absent. What do you do?

    a. Put the word out to your fellow workers as to who really did the work
    b. Seek a private meeting with the supervisor in order to make sure your colleague gets the proper credit
    c. During an informal conversation with the boss, casually let it slip that your colleague did not get the credit he deserved on a recent project
    d. Inform your colleague as to what took place, and let him take whatever action he desires

12. Your company wishes to expand its operations globally. Bribery payments to local government officials are common in the market you wish to enter, even though such payments are illegal under the law of that country. If you don't make the payments, you will likely lose the contract. Which of the following actions are acceptable?

    a. Make the payments directly and accurately account for them
    b. Hire a local consultant or agent, pay the customary commission and do not inquire about the agent methods
    c. Refuse to make the payments
    d. Do not do business in the country

13. After three months you discover that a recently-hired employee, who appears to be very competent, exaggerated her credentials on her employment application, by claiming that she had been a supervisor at her previous position when she had not. As the manager, what do you do?

   a. You're happy with the new employee, so you do nothing
   b. Fire the employee on the spot
   c. Discuss the matter with the employee to get her perspective
   d. Discuss the matter with human resources to determine company policy and the appropriate action

14. Your direct report tells you that a fellow employee is HIV positive. What do you do?

   a. Before doing anything else, ask the employee if he really is HIV positive
   b. Transfer the HIV-positive employee to a job where he has little contact with other people
   c. At your next staff meeting, remind everyone that it is unacceptable to discriminate against those who are HIV positive
   d. Ask the employee who raised the issue to discuss her perception of the situation, and make sure she understands the company's non-discrimination policy.

15. One of your project managers has been accused of knowingly directing mischarging on a government contract. The legal department's investigation supported the allegation. As president of the company, what action do you take?

   a. Counsel all your employees that mischarging will not be tolerated
   b. Consult the legal department before taking disciplinary and corrective action
   c. Transfer the project manager to a non-supervisory assignment
   d. Give the project manager a 30-day suspension without pay

16. Your company is currently preparing business plans for the upcoming year. Your supervisor asks you to try to acquire information about one of your competitors, including cost and pricing data and new product plans. What do you do?

   a. Under the pretext of being a business school student doing research, ask the competitor's Public Relations office for the information
   b. Ignore public information; immediately file a Freedom of Information request with the U.S. Government
   c. Ask one of your co-workers who formerly worked for the competitor to obtain the information for you
   d. Use publicly available information from industry or trade publications

17. You are a member of a proposal team on a must win contract. In the Best and Final Offer (BAFO) process, you've just received and opened the customer's latest set of questions. In addition to receiving your company's information, your customer also sent you your competitor's information. What do you do?

    a. Throw it away without reading it
    b. Review both sets, adjust your company's BAFO appropriately, and submit
    c. Immediately contact the legal department before reading the information
    d. Confirm that all of the other competitors have the same information, so no one has an unfair advantage

18. A company-sponsored training course is being held in Orlando, Florida, and you have been selected to attend. You have no interest in the training, but you are ready for a vacation and have never been to Florida. What would you do?

    a. Ask your supervisor if she thinks it will be beneficial–if so, pack your bags
    b. Under the theory that any training will be of some benefit to you, sign up
    c. Forget about the training
    d. Convince your supervisor that the course will be beneficial, then go only to the session that have an obvious relationship to your current work assignment

19. Two of your subordinates often provide their children with school supplies from the office. How do you handle this situation?

    a. Lock up the supplies and issue only as needed and signed for
    b. Discuss the issue with the two subordinates, and explain that supplies are only for office use
    c. Report the theft of supplies to Security, because it is security's responsibility to deal with matters of this nature
    d. Tell the two subordinates that supplies are only for office use, and send a memo to all employees that office supplies are for office use only

20. You are company purchasing manager. A supplier tells you that one of your buyers, while negotiating a purchase, persistently asked to be considered for a job with the supplier's company. What do you do?

    a. Fire the buyer immediately
    b. Transfer the buyer off that account. Counsel the buyer on the necessity of separating official and personal business. Make it clear that a recurrence of this behavior could result in removal from the account
    c. Counsel the buyer about the need to separate official and personal business. Make it clear that a recurrence of this behavior could result in removal from the account
    d. Ask the buyer why she wants to leave the company

PROJECT MANAGEMENT

1. What is a person who is involved in or may be affected by the activities of the project called?

   a. Team member
   b. Customer
   c. Stakeholder
   d. Supporter

2. What is a temporary endeavor undertaken to create a new product or service called?

   a. New product development
   b. Project
   c. Program
   d. Enterprise

3. During the course of the project it is important that the stakeholders be informed of the progress of the project. One of the reports that is frequently used is a progress report. Which of the following is true about progress reports?

   a. They allow stakeholders to judge the performance of the project according to its plan
   b. They are generally considered to be overkill on very small projects
   c. They require the use of earned value reports
   d. They must be produced by the project manager

4. One of the stakeholders of the project you are managing asks why you consider the scope statement so important in your project management methodology. You answer her question with which of the following answers?

   It is mandatory to consult the plan before authorizing any change
   Project managers must document any changes before approving or declining them
   The project scope serves as a reference for all future project decisions
   The project plan and EVM work together to assess the risk involved with proposed
       changes

5. You have finished the project scope according to plan. For the customer to accept the project what must happen next?

   a. Nothing. The plan is complete so the project is complete
   b. Scope verification should be conducted
   c. Lessons learned should be finalized
   d. Proof-of-concept should be implemented

6. What is NOT determined by the project schedule?

    a. Cost estimates
    b. Activity start dates
    c. Float times
    d. Activity end dates

7. You are the project manager for the XYZ Project. You and your team are about to estimate the duration of the project process. Which of the following will NOT be helpful in your meeting?

    a. Constraints
    b. Assumptions
    c. The project charter
    d. Identified risks

8. You are the project manager for the NBG Project. This project must be completed within six months. This is an example of which of the following?

    a. Schedule
    b. Assumption
    c. Constraint
    d. Planning process

9. Of the following, which one is NOT a typical activity of a project manager?

    a. Controlling the project work
    b. Planning the project schedule
    c. Completing assigned tasks
    d. Planning

10. You are the project manager for the Advertising Specialties Project. This project will mail each client a pen, coffee mug, and magnet- all to be designed with your company logo and mascot on it. You have worked on a similar project before, but have a new project team for this particular task. Of the following, which is the best source of information for creating the project schedule?

    a. Project team input
    b. Historical information input
    c. Project sponsor input
    d. Vendor input

11. Bertha is the project manager for the HAR project. The project is behind schedule and Bertha has elected, with management's approval, to add more members to the team. This process adds more what?

    a. Cost
    b. Time
    c. Risk
    d. Documentation

12. Of the following, which one is an example of informal communication?

    a. Memos
    b. Presentations to groups
    c. Briefings
    d. Speeches

13. You are the project manager of the Speaker Design Project. Your project sponsor wants to know why you believe the planning process will last throughout the project. Of the following, which is the best answer?

    a. You are not very familiar with speakers and will have to revisit the planning process often
    b. The design of a new product requires planning throughout the closing process
    c. The design of any project should allow the project manager and the project team to revisit the planning phase as needed
    d. All processes within a project are iterative

14. You are the project manager for a technical project. The project product is the complete installation of a new operating system on 4500 workstations. You have, in your project cost and time estimates, told the customer that the estimates provided will be accurate if the workstations meet the hardware requirements of the new operating system. This is an example of which of the following?

    a. Risk
    b. Assumption
    c. Constraint
    d. Level of Confidence

15. You are the project manager for a new training program at your customer's site. This program will require each of the customer's employees to attend the half-day class and complete an assessment exam. You will be completing the training at the customer's facility, and will need a trainer for the duration of the training, which is six months. This is an example of which of the following?

    a. Resource requirements
    b. Assumption
    c. Cost constraint
    d. An issue for human resources

Please answer the following questions. These questions will be used to gain a better understanding of the students' perspective of the Learning Objectives as well as to gain a better understanding of students' interests/recommendations.

1. **On a scale from 1-5, how confident do you feel in your knowledge about the Learning Objectives (Communication, Teamwork, Ethics, and Project Management)?**

   5 - Very confident
   4 - Somewhat confident
   3 - Neutral
   2 - Not very confident
   1 – Not at all confident

2. **By what means/methods would you prefer to learn information about the Learning Objectives (Circle all that apply)?**

   Monthly IPRO lectures given by chosen faculty/IPRO 339
   Lectures by individual IPRO Professors
   Online lectures
   Online tutorials
   Written texts
   Independent Study

   Other: _____

3. **Please add any additional comments about your overall IPRO experience.**

   _____
   _____
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DEMOGRAPHIC INFORMATION

Instructions:
To complete this section, please place an 'X' next to the appropriate response.

1. Sex: **a. Male** _____   **b. Female** _____

2. Year in school: a. Freshman _____
                          b. Sophomore _____
                          c. Junior _____
                          d. Senior _____
                          e. Graduate _____

3. Academic major/majors:

a. Aerospace Engineering _____

b. Applied Math _____

c. Architecture _____   p. Environmental Engineering _____

d. Architectural Engineering _____   q. Honors Pharmacy Program _____

e. Biology _____   r. Information Tech & Management _____

f. Biomedical Engineering _____   s. Internet Communication _____

g. Business Administration _____   t. Manufacturing Tech & Management _____

h. Chemical Engineering _____   u. Mechanical Engineering _____

i. Chemistry _____   v. Materials Engineering _____

j. Civil Engineering _____   w. Molecular Biochemistry _____

k. Computer Engineering _____   x. Professional & Technical Comm _____

l. Comp Information Sys _____   y. Physics _____

m. Computer Science _____   z. Political Science _____

n. Electrical Engineering _____   aa. Psychology _____

o. Engineering Management _____   bb. Humanities _____

                                      cc. Undeclared Engineering _____

4.   IPRO Team #: _____   dd. Undeclared _____

5.   Is this your first IPRO?   Yes   No
     If No, which other IPRO(s) have you

     taken _____

ANSWER SHEET

**Instructions: Please indicate your answer choice for the corresponding question in the space provided.
Please use CAPITAL LETTERS.**

Communication:

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Project Management:

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Teamwork:

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Ethics:

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