Online Assessment Critique: A Study in Workforce Training

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Introduction

For my Online Assessment Critique, I chose to review an online workforce training course offered through the Regional Center for Advanced Manufacturing (or RCAM). RCAM is part of Northeast State Community College's (or NeSCC) Academic Village located in downtown Kingsport, Tennessee. I made this decision for several reasons; I am very interested in corporate training, and RCAM happens to be where I work. Luckily, online workforce training constitutes the bulk of services provided at RCAM. While RCAM does host multiple Northeast State classes geared towards a two year degree or certificate, the primary purpose of RCAM is to "meet the industrial training and educational needs of existing industry, to build a pipeline of industrial skilled labor for the region, and to provide a training and educational resource for economic development" (Customized Workforce, 2015).

According to Fall 2014 student demographics, Northeast State currently serves a total of 5,685 students. The majority of students served (54%) are between the ages of 18 through 34, with female students making up 53% of the student body (Northeast State Community College, 2015). The Academic Village serves a total of 1,599 students with RCAM hosting approximately 590 credit seeking students and 390 industry apprentices. While females constitute the student majority campus wide, there is a gender shift at RCAM with male students making up approximately 85% of the student body (J. Frazier, personal communication, October 5, 2015).

Since both industry apprentices from local manufacturing companies and NeSCC students in the Chemical Process Operations program are required to take the online course INTC 1011, I wanted to review the course and assessment to get a better idea of

what and how they were learning. INTC 1011: Introduction to Chemical Manufacturing "introduces [students] to the responsibilities of a chemical operator and the regulatory, safety, and quality issues that are important to working in a chemical manufacturing facility. [Students] will learn about the importance of communication and troubleshooting skills to this job. [Students] will also learn the basics of process control and reading piping and instrumentation diagrams" (Chemical Process). This course, as is all online workforce training at RCAM, is self-paced asynchronous instruction. The online training courses includes video and audio, the use of both still and animated graphics as well as an overview of course objectives (see Figure I & II). Self-assessment options are provided throughout the modules as well as multiple learnings aids such as flash cards, note sheets, and a glossary (see Figure III). Most training material is accessible to hearing and vision impaired students. While the training modules were developed using Adobe Captivate, both training and assessment are delivered via the Northeast State course management system Desire2Learn, or D2L.

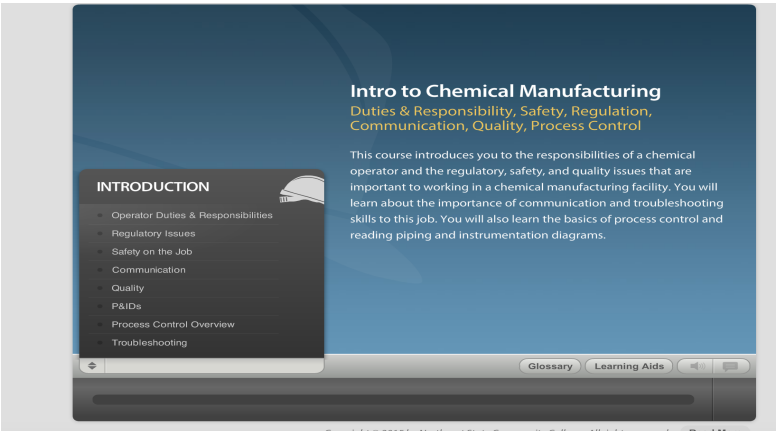

Figure I: Screenshot of course welcome page

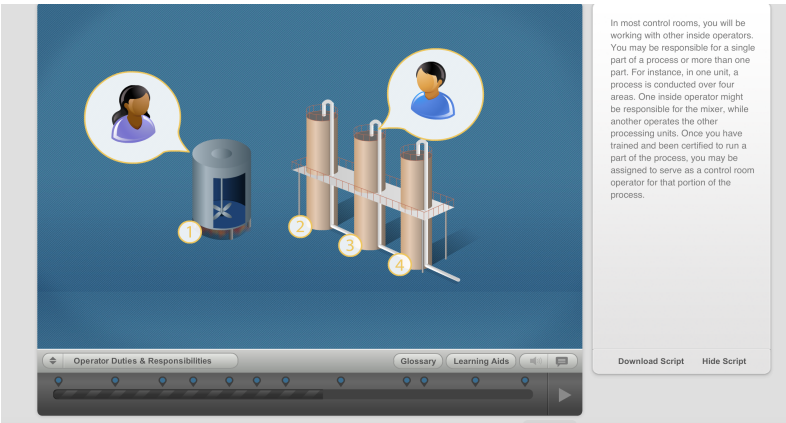

Figure II: screenshot of course training

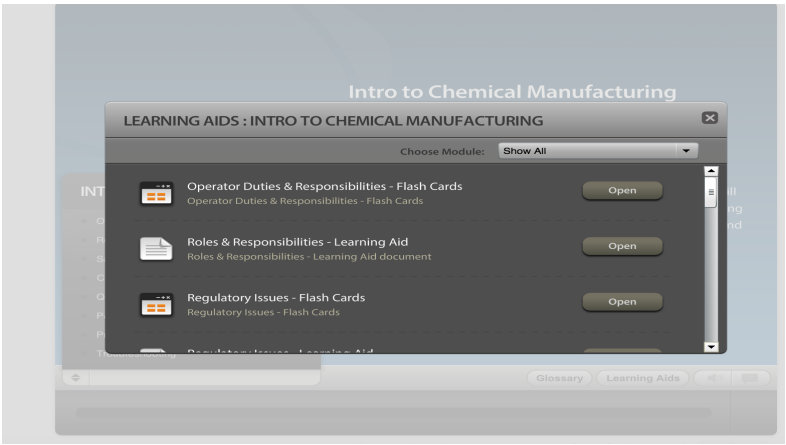

Figure III: screenshot of course training

Analysis & Critique of Assessment Activity

Assessment Description

The summative assessment, or tests, for INTC 1011 Introduction to Chemical Manufacturing is delivered via the Northeast State course management system, D2L. While apprentices and students can access course training, course documents, and practice tests via D2L, they must report to the Testing Center at RCAM to complete proctored tests. Established settings prohibit students and apprentices from accessing the tests from a personal computer or device. They are given two chances to pass the assessment before

being required to participate in a face-to-face tutoring session with RCAM instructors. The assessments are criterion-referenced; according to the posted information on D2L (see Figure IV), apprentices and students must complete "[three] assessment tests for Introduction to Chemical Manufacturing [and] must make a total score of 80% to pass the course" (Chemical Process, 2014).

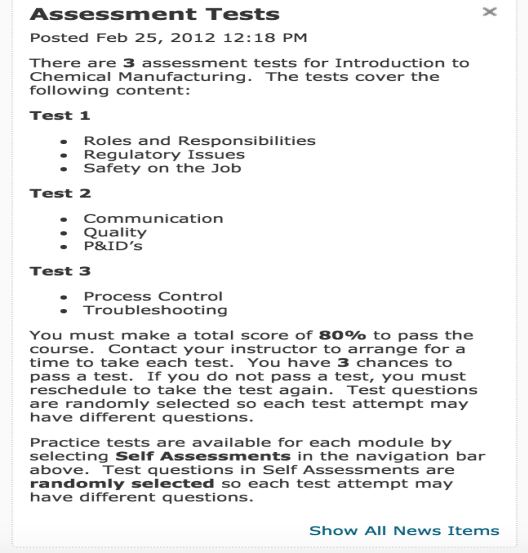

Figure IV: screenshot of assessment description in D2L

Test 1 consists of 30 questions while Test 2 and Test 3 consist of only 22 questions. The information used to develop questions for the tests was pulled directly from the INTC 1011 course training and study material provided to the NeSCC students and apprentices.

The assessments were created using D2L's quiz building features which allow developers the option to randomize questions in a test bank, to establish auto-grading features and testing guidelines as well as to include critical feedback. The tests consist of an 80 question test bank that randomly provides multiple choice, true/false, and matching questions. Currently, all tests are set to auto-grade upon submission. Guidelines for evaluation as well as the instructions for taking the test are provided to learners on the D2L

course homepage and the test page login (see Figure V). Feedback is limited to “correct” or “incorrect” responses that learners can view after submission of test (see Figure VI).

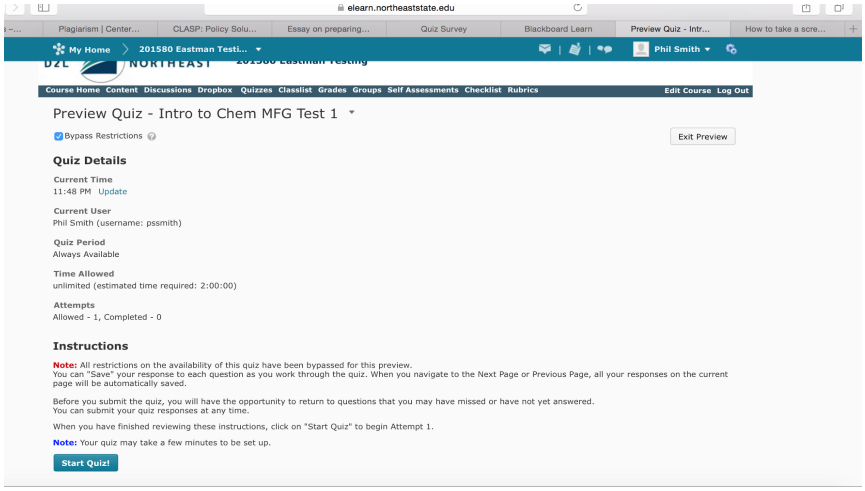

Figure V: screenshot of assessment instructions

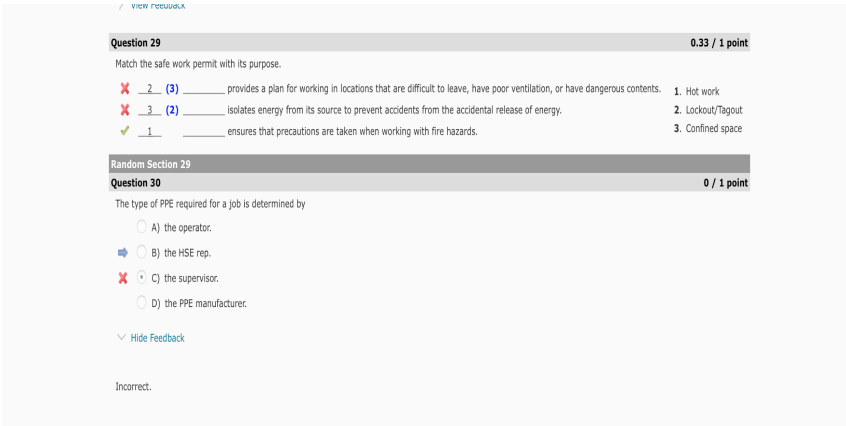

Figure VI: screenshot of active assessment

Based on Bloom’s Taxonomy, questions from the tests fell into the following cognitive process categories: remembering, understanding, applying, and analyzing. Since the questions are randomized, each test offers a varied level of difficulty (see Figure VII). I found no evidence of test questions involving the creating or evaluating categories. There were also no short answer questions, no self-reflection activities, and no peer interaction or feedback. The lack of more complex or interactive assessment could possibly be attributed

to the importance of “cost effectiveness [and] consistent and uniform delivery” (Virpi, 2006) in corporate e-learning. Complex responses require in-depth evaluation, which the auto-grade feature cannot provide.

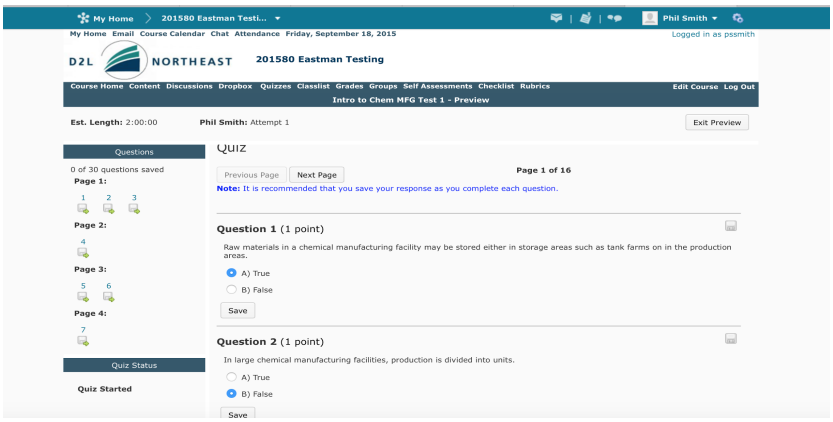

Figure VII: screenshot of active assesment

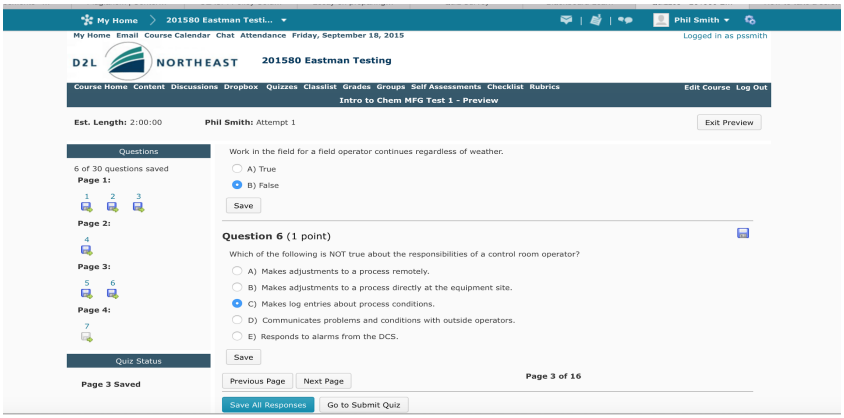

Figure VIII: screenshot of active assessment

Advantages & Disadvantages of Self-Paced Online Workforce Training Assessment

There are many advantages to the use of self-paced online workforce training. For the apprentices and students who participate in the online training at RCAM, convenience is a major factor as the majority have family and work obligations that prevent face-to-face classroom training. For the industries RCAM serves, self-paced online training provides “an

attractive [affordable] alternative to expensive instructor led learning" (Magill, 2008). Besides the cost savings, there is virtually no physical space required, and learners can access training information whenever it is convenient to them.

Despite the advantages to the eLearning being provided, there are some serious drawbacks; in particular, with a lack of interaction (with instructors or classmates) and with assessment. One of the most influential factors of eLearning is interactivity, whether it's "learner-learner, learner-instructor, or learner-learning materials" (Park, 2007), but for the apprentices and students enrolled in INTC 1011 the only aspect of interactivity is with the type of technology being used or with the test proctor. According to Palloff and Pratt (2009), the guiding principles for effective online assessment encourage learner-centered design, include self-reflection and collaboration, incorporate learner feedback, and use techniques that align with context and objectives. While the questions in the test bank did correspond with the content in the training, there was little evidence that these principles were put into use when designing the assessment. Although the apprentices and students are provided quality training, they have no opportunity to reflect on what they have learned, to share their thoughts with their virtual classmates or instructor, or to develop an ownership of the material.

Recommendations for Improvement

While it is important that best practices in online assessment design are followed, it is also important to remember the constraints (or limitations) that you are laboring under during design. With those constraints in mind, I have developed three recommendations for assessment improvement for INTC 1011. The recommendations would also serve to add some of the critical missing components in online assessment design - collaboration,

self-assessment, and peer feedback - while incorporating higher order thinking questions into the existing test data bank. It would be possible to implement these changes with a fairly minimal cost.

- **Recommendation 1:**

  In order to promote higher level thinking, I would suggest adding short answer and essay response questions to the existing summative assessment question bank. While the bulk of the responses could not be auto-scored, there would be long term benefits for apprentices and students in the field. These questions could correlate specifically to the course objectives that require apprentices and students to "explain, discuss, or relate" (Rowell, 2015) (see Appendix A). This will require altered settings in the LMS auto-grade feature and an individual to score essay responses.

- **Recommendation 2:**

  In order to promote student engagement and collaboration, I would suggest the design and implementation of an online discussion assignment and grading rubric that requires both self-reflection and peer feedback. This type of formative assessment would be helpful in identifying apprentices and students who are struggling with the content as well as give students time to reflect on what has been learned and a genuine ownership of that knowledge. This will require discussion forum set-up in the LMS as well as an individual to score responses and provide guidance or feedback.

- **Recommendation 3:**

  In order to provide authentic tasks that give learners opportunities to apply their knowledge, I would suggest the design and implementation of case study activities to that require students to use the knowledge gained from the module content to solve problems or explain correct/incorrect procedures used during field responses. In chemical manufacturing, it's essential that employees are capable of both troubleshooting and quick responses; with this form of authentic assessment, apprentices and students would be better prepared for field work. This will require an individual to score responses and might also include a discussion forum set-up in the LMS (depending on submission requirements).

Conclusion

As I am accustomed to a strictly academic environment in the field of online teaching and learning, this critique afforded me the opportunity to get to know the workforce training aspect. There were some startling differences in the online assessment I am used to versus the assessment being delivered to the apprentices and students enrolled in INTC 1011: Introduction to Chemical Manufacturing. I think what surprised me most was the lack of interaction; the learners had no contact with each other, had no assigned instructor, and had limited contact with proctors and tutors. Another concern I had was the assessment itself; while the questions were varied and pulled directly from the content, there were no questions designed to enable students to accomplish several of the course objectives listed on the syllabus. The test bank questions were all multiple-choice or true/false even though the objectives clearly required students to "describe, discuss, and

explain" (Rowell, 2015) various concepts relating to chemical manufacturing (see Appendix A).

I feel like this critique forced me to look at the design from a non-school oriented point of view. While I know it is essential to follow the principles of effective online assessment discussed in Pallof and Pratt (2009), I had to think about how the designers were able to deliver what the client ordered; in the case of INTC 1011, local industry (the client) was interested in standardized, efficient delivery of online instruction and assessment compatible with shiftwork schedules at minimal cost. On top of these considerations are the limitations of the learning management system used by the educational institution delivering the training - Desire2Learn (or D2L). Because of the design tension between client needs and LMS limitations, I had to really reflect on my recommendations for improvement while using the design principles I know make for an optimal online learning experience. It was a valuable experience for me as I have been contemplating working in the corporate sector.

References

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Appendix A

INTC 1011: Introduction to Chemical Manufacturing Syllabus

NORTHEAST STATE COMMUNITY COLLEGE
COURSE SYLLABUS

COURSE # & NAME: INTC 1011: Introduction to Chemical Manufacturing

CREDIT HOURS: 1

CATALOG DESCRIPTION: This course introduces you to the responsibilities of a chemical operator and the regulatory, safety, and quality issues that are important to working in a chemical manufacturing facility. You will learn about the importance of communication and troubleshooting skills to this job. You will also learn the basics of process control and reading piping and instrumentation diagrams. Course not designed for transfer.

PREREQUISITES: None.

COREQUISITES: None.

REQUIRED TEXT & MATERIALS:

- On-line material:
  - Operator Duties & Responsibilities
  - Regulatory Issues
  - Safety on the Job
  - Communication
  - Quality
  - P&IDs
  - Process Control Overview
  - Troubleshooting

LIBRARY LEARNING RESOURCES: Students are encouraged to familiarize themselves with the Library and other learning/information resources and services. In addition to traditional books, monographs, and periodicals, the Library provides access to databases and to other electronic resources in a variety of subject areas. Reference librarians are available for individual assistance in person, by telephone, or through the Library's website (http://www.northeaststate.edu/library/).

INSTRUCTIONAL METHODS: This course is a web enhanced course of study at the Regional Center for Advanced Manufacturing (RCAM) at the Kingsport teaching site of NeSCC.

EVALUATION METHODS: The final grade will be determined as follows: The average of all test scores will be weighed equally. Specific grading policies of each area and the exam schedule will be announced by the instructor.

GRADING SCALE:

90 - 100	= A
80 - 89	= B
70 - 79	= C
65 - 69	= D
Below 65	= F

ATTENDANCE POLICY: The attendance policy for the Division of Advanced Technologies is designed to foster student success. Prompt and regular attendance is the responsibility of each student. The student is responsible for all material covered and all assignments made in class. Any time a student is absent from a class, laboratory or other scheduled event, it is the student's responsibility to make satisfactory arrangements for any make-up work permitted by the instructor. An absence is defined as nonattendance for any reason, including illness, emergency or official leave. A student is considered to have accumulated **excessive absences** when he/she has been absent more than the number of times a class meets in one (1) week. The instructor **may** define a number of tardies to be equal to an absence. The instructor **may** impose a penalty for excessive absence from class.

COURSE OBJECTIVES: Upon completion of this course, the student should be able to:

- List the four main areas of a chemical manufacturing facility.
- Define unit.
- Describe different working schedules for chemical operators.
- Describe the working conditions in the control room.
- Describe the working conditions in the field.
- Describe the responsibilities of a control room operator.
- Describe the responsibilities of a field operator.
- Explain how practices related to safety, health, environment, and security benefit a business, employees, and the community.
- Explain the circumstances and conditions that lead to the creation of workplace safety regulatory agencies.
- List the regulatory agencies that oversee the chemical manufacturing industry and describe their areas of responsibility.
- Discuss the impact on chemical manufacturing of key health and safety legislation.
- Describe the employee's responsibilities for maintaining a safe workplace.
- Describe the company's responsibility for maintaining a safe workplace.
- List typical engineering controls and describe their function in workplace safety.

- List typical administrative controls and describe their function in workplace safety.
- Describe the types of personal protective equipment and the hazards they address.
- Discuss the importance of effective communication in chemical manufacturing.
- Describe the roles of the sender and receiver to ensuring effective communication.
- List the practices for effectively communicating over a two-way radio.
- Identify types of written communication used in a manufacturing facility.
- List the practices for communicating effectively in team meetings
- Explain why strong communication skills are an important factor in career advancement.
- Define quality.
- Describe key developments in the movement toward quality manufacturing.
- Identify some of the quality processes used in chemical manufacturing.
- Describe the operator's role in ensuring quality.
- Describe the purpose of a Process and Instrumentation Diagram (P&ID).
- Identify the parts of a P&ID.
- Identify symbols and abbreviations commonly used in a P&ID.
- Interpret specific symbols and abbreviations for line names and instrumentation.
- Trace and interpret a process line on a P&ID.
- Define a process.
- Distinguish between a batch process and a continuous process.
- Define process variable.
- Define process control.
- Explain the operation of a simple closed control loop, including its key components.
- List the benefits of feedback control.
- Describe the difference between local/field and remote control
- Relate target values, control limits, operating parameters and set points to process control.
- Explain the purpose of a distributed control system (DCS).
- List the elements that are incorporated in process design.
- Define troubleshooting.
- Describe how operators develop troubleshooting skills.
- Describe the troubleshooting process.

COURSE CONTENT: (3 comprehensive tests)

- Operator Duties & Responsibilities
- Regulatory Issues
- Safety on the Job

- Communication
- Quality
- P&IDs
- Process Control Overview
- Troubleshooting

INSTITUTIONAL POLICY STATEMENTS:

- **Classroom Management Policy:** The instructor has the primary responsibility for the control over classroom/laboratory behavior and maintenance of academic integrity and can order the temporary removal or exclusion from the classroom/laboratory of any student engaged in disruptive conduct or conduct violating the general rules and regulations of the College. Extended or permanent exclusion from the classroom/laboratory or further disciplinary action can be affected only through appropriate procedures of the College. Any electronic communication device such as pagers, cellular phones, etc. must either be turned off or set so it will not interrupt the class.

- **Plagiarism Statement:** Plagiarism, cheating, and other forms of academic dishonesty are prohibited.

- **Accommodations for Students with Disabilities Statement:** In order for the College to make reasonable accommodations for students with disabilities, the student must contact the Center for Students with Disabilities and present a Faculty Accommodation Form to each instructor. Accommodations include, but are not limited to the following: extended time on tests, alternative test location or format, interpreter services, and note taking services. When possible, students should request accommodations prior to the beginning of each semester. Testing accommodations must be arranged prior to the scheduled test date. *No accommodations will be provided without approval from the Center for Students with Disabilities.*

- **Statement of Policy Regarding Children on Campus:** Campus policy prohibits bringing children to classrooms or labs.

- **General Attendance Statement:** Students are expected to follow the attendance policy as described by each instructor.

- **Emergency Evacuation Statement:** In case of any building evacuation, students are to proceed under the direction of their instructor to the nearest exit in an orderly manner. The nearest exit for this classroom location is _____. To ensure your safety, everyone will move to _____ (each instructor is to identify the nearest exit for each classroom and the designated safe area). No one is allowed to re-enter the building until official notification is given.