

Fundamentals of Emergency Medical Care Lab

Analysis Report

Ideas to improve student assessment skills



EDISON STATE
COLLEGE

EMS Program

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Introduction

In a curriculum meeting on Tuesday, May 14, 2013 at Edison State College, EMS Program faculty representing different campuses voiced a common concern. An opportunity was identified to explore modification of instruction so that students in the *Fundamentals of Emergency Medical Care lab* course (EMS2119L) will gain the ability to consistently:

- a. Display an increased depth of understanding patient assessment techniques, and
- b. Perform a proper, complete, and timely assessment on any patient.

The faculty members in attendance were all paramedics and State of Florida EMS Instructors, having sufficient education and experience to be deemed subject matter experts. The unanimous conclusion of deficit surrounding these fundamentals is rationale for this analysis.

The primary purpose is to identify opportunities for modification of instruction that will improve learning, while simultaneously ensuring that any potential discrepancies between the current National EMS Education Standards (NEMSES) and current curriculum are removed.

Executive Summary

This report provides a comprehensive analysis and recommendations for design, development, implementation, and evaluation of the current and prospective ability of Edison State College students in the *Fundamentals of Emergency Medical Care laboratory* course to understand and be able to perform timely and complete patient assessments, while simultaneously demonstrating proper skills and affective considerations.

Methods of analysis include an exhaustive review of current scholarly literature, combined with feedback from subject matter experts. If applicable, quantitative data references have source(s) clearly identified and are included in the appendices section.

The analysis determines that the course is currently employing a variety of practical methods to stimulate learning, and has an excellent availability of technology resources to augment learning. Unfortunately, many of the available resources are being used improperly or not at all, commonly resulting in a procedural methodology, instead of a constructivist methodology. The latter approach, a goal of higher education, is the target of the synthesis recommendation, which includes:

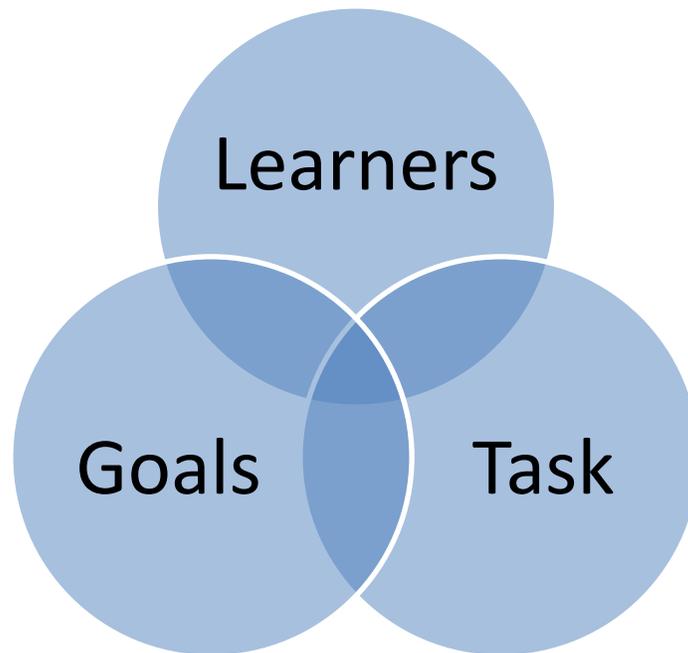
- A focus on affordability and increased value.
- Integration of a learning management system that will serve to provide digital scaffolding.
- A purposeful shift from instructor-led learning to facilitator-monitored learning.
- Development and delivery of instructor training to promote consistency.

The analysis conducted has limitations. Some of the limitations include:

- Good faith estimation of student demographic based on subject matter expertise.
- An absence of financial data analysis due to time constraints.

II. Analysis methodology

This analysis reviews several crucial dimensions affecting students' patient assessment skills. The learners, task, and goals are analyzed individually. While independently deliberated, a significant overlap occurs amongst these three scopes that cumulatively contribute to the synthesis recommendations, along with pedagogical information supported by scholarly and peer-reviewed literature.



Assessment of Learners

Methods, instruments, and procedures

Due to the post-secondary educational setting of this course, precise analysis of specific demographics is futile in many categories. As deemed reasonable, information has been obtained through school records and is confidential in nature. To ensure a representative sample of students, any quantitative information contains data from three campuses over three semesters to determine mean, median, and mode. Industry and environmental data, including statistics, have been collected from scholarly and government sources with appropriate references. Experiential findings of subject matter experts are also included in the following assessment of learners.

General & Academic information

A significant challenge in comprehensive analysis of this learners arises due to the fact that the student composition is extremely diverse. Some students may take EMS2119L while dual-enrolled in high school. Others may take it following retirement from a successful career in an effort to give back to the community. Students of various ages, races, religions, and genders attend EMS2119L, but the typical student is an adolescent or young adult with minimal post-secondary education experience.

Of the many students that attend this course, residency is often a factor in campus selection since procedural knowledge verification requires physical attendance. Lee County residents most commonly attend the Lee campus. In such a scenario, commute times can range from just a few minutes for those living in on-campus dormitories to 30 minutes or more if the student lives in a less proximal location. Limited course offerings and educational scheduling around prior commitments may create the need for students to commute to a campus that is farther from their residence, extending drive time beyond one hour. This is in addition to an, approximately, six hour lab session.

Academic Performance and Technology Skills

Academic performance is evaluated by way of examination. According to Edison State College (2013), EMT applicants must pass the reading and writing portions of the college placement exam, be exempt or have completed all pre-college level course work prior to acceptance into the EMT program. There is a strong possibility of this being an entry level college course for many students.

In regards to technology, we must take student familiarity into consideration. Some students may be digital immigrants, but many students in our primary demographic are digital natives. This reality may be overly presumptuous in revealing one's technology knowledge and skill as medical education continues to evolve quickly with new forms of simulation, mobile learning, and other technology (Hussain, 2013; McCaughtry & Dillon, 2008; McGaghie, Issenberg, Petrusa, & Scalese, 2010; Tunks, 2012). We must also recognize that digital natives also expect more. "Enabled and empowered by technology, they demand that the tools they live by--smartphones, social media, digital content and calendars--be incorporated into their education" (Ahuja, 2013).

Psychological Considerations

Motivation

Students in EMS2119L are motivated by career opportunities. Upon completion of the course, students may attempt to obtain certification as an Emergency Medical Technician for vocational purposes. Most students voice an intrinsic motivation “to help people”. The majority of students pursue a career with an emergency medical service or fire-rescue agency. Some take this course as an initial step toward another healthcare profession since certification following a one semester course permits initial entry into the industry. Prior school experiences may serve as motivation for those who view college as a fresh new start, but detract if viewed as an unwelcome threshold (Elffers & Oort, 2013).

Some degree of extrinsic motivation may come from compensation associated with possible employment. Florida has a relatively low concentration of EMTs and paramedics to residents (Bureau of Labor Statistics, 2012). It is an emotionally and physically demanding job that is accompanied by an average “burn-out” period of 5 years. It is likely that positions will continue to be available. The mean national annual wage of EMTs and paramedics is \$34,370, but regional county employers’ wages remain above the state median (BLS, 2012 & 2013b). Additionally, 24-hour staffing requirements results in scheduled overtime for public safety agency employees. Benefits are another consideration in a career choice and are often liberally provided by public sector employers and healthcare agencies that employ EMTs. Compensation is modest, thus not likely to negate or overshadow one’s primary motivator.

Since students attend voluntarily with a predominantly intrinsic motivation, both interest in learning and attention span are adequate. There are extremes of involvement, though. Students often become engrossed in realistic simulations, but lose focus when mastery of a skill has occurred at static skill stations.

Learning Styles and Personalities

Due to the diverse student composition, learning styles are likely to be varied. Wikipedia (2013) offers a decent summary of the multiple learning style models that have been introduced, but two have particular importance in this course: VAK and Grasha-Reichmann.

Neil Fleming’s VAK model distinguishes three categories: Visual, auditory, and kinesthetic. Summarized, people learn through some combination of seeing, listening, and doing. Fleming’s three-legged approach has been employed well in this course.

The Grasha-Reichmann model, designed for post-secondary students, describes six levels of involvement and relates well to practical application. Students are classified as avoidant, participative, competitive, collaborative, dependent, or independent (Learning Styles, 2013).

Constructivism reaches all three types of “Fleming learners” while promoting participation as mentioned by Grasha-Reichmann. An overwhelming amount of literature supporting the efficacy of constructivism is best summed up as,

“Constructivist learning experiences enhance self-actualization by increasing students' autonomy in the learning process. Students become actively involved in the analysis, synthesis, application, and evaluation of new knowledge and skills, and this involvement fosters democratic behaviors and greater responsibility and initiative in the learning processes” (Manus, 1996).

Experiential learning occurs now, though students may have limited previous exposure to this approach. Clear communication of expectations should occur during the student orientation.

Social and Emotional Considerations

Students with social-emotional barriers to learning must also be deliberated. At minimum, behavioral abnormalities are an indicator of impending course withdrawal (Elffers, 2013). A larger concern is that a serious causal condition may exist. The U.S. Department of Health and Human Services (2004) asserts that individuals with mood, anxiety, disruptive, or eating disorders are at increased risk for developing social-emotional problems that affect learning. In such situations, early recognition and intervention is pivotal.

Social Diversities

Fortunately, not all social and emotional barriers have such sobering origins. Students come from various backgrounds. Cultural differences may create a feeling of isolation for some students. Personality variables, such as introversion or conscientiousness, also affect human performance to some degree ((Furnham, Jackson, & Miller, 1999). Acknowledgement of diversity and the need for mutual respect is clearly stated in the student handbook, which is distributed by the first day of class, and enforced.

Despite such directives, peer pressure may be detrimental to learning when students evaluate one another. Instructors should seize opportunities to promote task involvement, instead of ego involvement, to hinder discouragement while participating in group activities.

Students may also have limited physical disabilities, such as hearing or vision deficits, that hinder learning. The *Canadian Journal of Education* reports that up to 15% of students in an integrated classroom may have mild to moderate hearing loss (Dalton, 2013). Students with dual sensory impairment may also be integrated into regular classes (Downing & Eichinger, 2011).

Socioeconomic Status

Socioeconomic status and associated access to learning resources and opportunities is another consideration. The base median wage is relatively low for the desired profession. It is unlikely that someone would transition from an executive level position to pursue a career with this level of compensation unless an involuntary termination forced the individual into a student role. Surprisingly, it has been found that these "...dislocated workers had better academic adjustment and performance than other students" (Schwitzer, Duggan, Laughlin, & Walker, 2011). Whether this is an initial career or an alternative due to a disturbance in employment, a low to moderate socioeconomic status of students in this course is sensible to assume and plan for.

Assessment of Learners Results

Young adults are the common age group and this is likely their first college class. While a primary intrinsic motivation exists, a transition to college may augment or harness this. Commute times may range from minutes up to one hour. Lower socioeconomic status of students is likely.

Basic academic skills are verified. Technology expectations are high, but familiarity is presumed. Students have varied learning styles. The constructivist approach reaches many. With varied educational backgrounds, students may require significant direction in a technology-enhanced constructivist environment.

Social-emotional barriers due to serious disorders requiring intervention may exist. Less serious social considerations may also affect learning. While differences are to be respected, peer pressure may detract from learning in group activities. Physical disabilities may also restrict learning.

Recommendations for Design

Affordability & Value

Considering the probable lower socioeconomic status of students, substantial effort in design should ensue to ensure that required and recommended materials that are affordable, if not available for free. A plethora of reliable information and engaging educational media is available at no cost online. Importing such material into the learning management system is a financially sensible alternative to mandating anachronistic texts, as either can be used to bolster student knowledge.

To express a respect for student time, the curriculum must also amplify productivity and value. A learning management system can be used to permit more in class time for psychomotor activities. The following components, as suggested by the Defense Centers of Excellence (2010) and proven to have pedagogical benefits, should be incorporated into the learning management system:

Pedagogical Considerations

Relating to adult learners specifically, the following empirical aspects must be included:

Organization

Indubitably, organization is also important in design. A preview and synopsis of goals should surround each lesson, as should outlines and summaries. In addition, the serial position curve tells us that the highest amount of recall occurs at the beginning and end of a lesson (Martinez, 2010). Hence, key points should be succinctly reviewed before and after the content of the lesson. Students may also benefit from outlines and summaries, as they can serve as terse study guides.

Small Chunks

Mnemonics or other memory aids that assist with chunking of knowledge should be included as short term memory can only hold, roughly, 7 pieces of information. Therefore, individual lessons should be limited to a maximum of 7 key concepts.

Scaffolding

While the ultimate goal of automaticity exists, we must not overlook a prerequisite basic level of remembering and reproducing the sequence in response to a given indication. Martinez (2010) appropriately likens this to if-then sequencing that computers follow. For example, the instructor will say, "You have a patient who has fallen and has neck and back pain." The student is then expected to recognize the obvious indication (if) and properly apply cervical immobilization equipment per NREMT standards (then). Initial, linear, connections can be relayed digitally to save class time. During simulation, instructors can gradually withhold this assistance based on students' individual knowledge and skills. Bruner termed this reduction in support *scaffolding* (Martinez, 2010). The rudimentary correlations can equivalently be explained online, whereas more complex scenarios can be enacted in the classroom.

Consistency

Rubrics should be associated with all assignments and assessments so that there is uniform methodology for feedback on all assignments and assessments. The Grasha-Reichmann scale would be a valuable addition to student evaluation tools for both online and in class participation.

Communication Channels

Students should have multiple avenues to communicate with instructors and peers during each assignment. A differentiation between assignments and assessments is important. Assignments are didactic lessons and isolated psychomotor skills practice sessions that are designed to facilitate knowledge. Assessments are didactic quizzes and comprehensive psychomotor simulation scenarios that are designed to evaluate individual knowledge, so communication, if allowed, should be limited.

Annotated feedback serves as a form of reinforcement and communication. Transitioning errors to learning opportunities, this should be included when designing assignments.

Human Considerations

Comfort in any class is mandatory. From classroom temperature to breaks for physiologic needs, instructors must strive to ensure that students are physically comfortable. Instructors should also be cognizant of evidence that may suggest that there is a learning barrier due to emotional distress. It is recommended that instructors consult a specialist when faced with a student that may have a learning disability (Downing, 2007). Adopting an awareness course for instructors, such as *Eliminating barriers for learning*, and developing a policy for intervention should be explored (USDHHS, 2004).

Recommendation for Development

Learning Management System (LMS) Frame

The frame of the learning management system, taking the above design recommendations into consideration, should be continually developed throughout implementation. The content can be modified at any time that superior resources become available. Assessments on the LMS should be limited to simple, linear, connections that serve as a digital scaffolding.

TECE Lesson

A lesson surrounding the technology-enhanced constructivist environment (TECE) can serve to enhance productivity and value. The TECE lesson should eliminate technological deficiencies by providing an explanation specific technology that will be used in the course. Disparate familiarity with constructivism should also be addressed by including information about the student-centered, instructor-facilitated approach to learning.

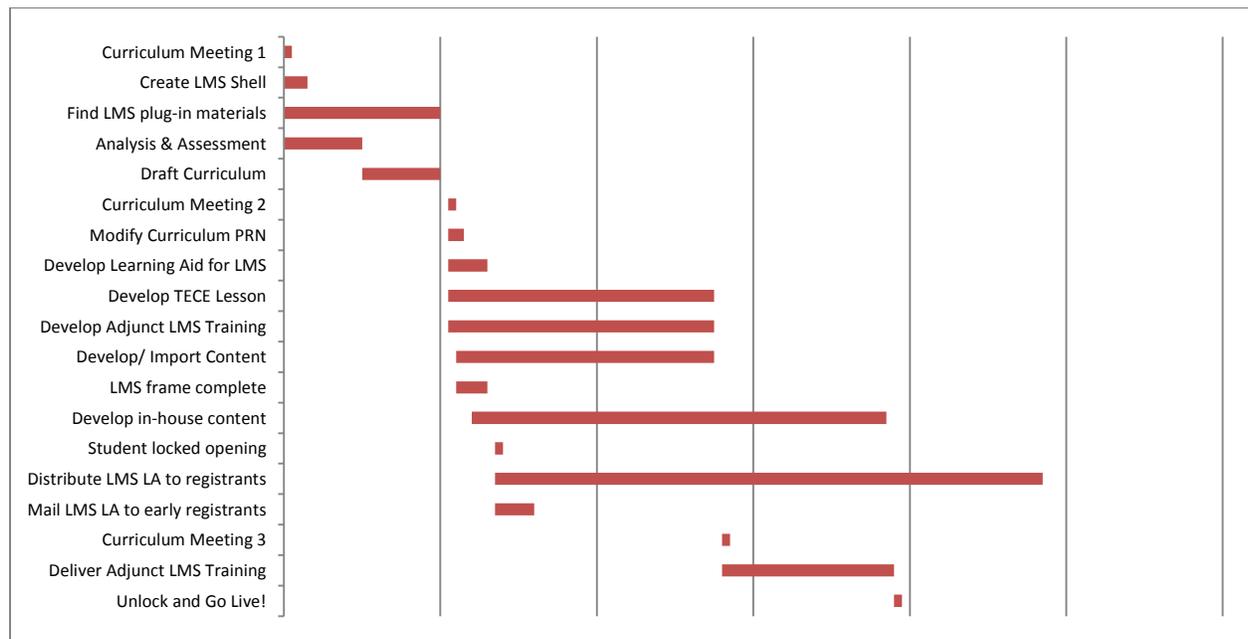
Adjunct Learning Management System (LMS) and TECE Training

An adjunct instructor training course for the learning management system, Canvas, and for understanding the TECE must be developed in 34 days to allow for three weeks of instructor training prior to the course going live on August 1, 2013. It is important to note that in-house and imported content may replace stock content used to create the frame, so training should not focus on specific items, but rather on the design, navigability, and theories that will be utilized.

Learning Management System Learning Aid (LMS LA)

A learning aid to assist new students in accessing the Canvas learning management system should also be developed and ready for distribution during open enrollment, which begins June 10, 2013. Early registrants can receive this instructional material via mail.

Task	Start Date	Days	End Date
Curriculum Meeting 1	5/14/2013	1	5/15/2013
Create LMS Shell	5/14/2013	3	5/17/2013
Find LMS plug-in materials	5/14/2013	20	6/3/2013
Analysis & Assessment	5/14/2013	10	5/24/2013
Draft Curriculum	5/24/2013	10	6/3/2013
Curriculum Meeting 2	6/4/2013	1	6/5/2013
Modify Curriculum PRN	6/4/2013	2	6/6/2013
Develop Learning Aid for LMS	6/4/2013	5	6/9/2013
Develop TECE Lesson	6/4/2013	34	7/8/2013
Develop Adjunct LMS Training	6/4/2013	34	7/8/2013
Develop/ Import Content	6/5/2013	33	7/8/2013
LMS frame complete	6/5/2013	4	6/9/2013
Develop in-house content	6/7/2013	53	7/30/2013
Student locked opening	6/10/2013	1	6/11/2013
Distribute LMS LA to registrants	6/10/2013	70	8/19/2013
Mail LMS LA to early registrants	6/10/2013	5	6/15/2013
Curriculum Meeting 3	7/9/2013	1	7/10/2013
Deliver Adjunct LMS Training	7/9/2013	22	7/31/2013
Unlock and Go Live!	7/31/2013	1	8/1/2013



Recommendation for Implementation

Motivation is imperative during implementation. Instructors must understand and continually display model behaviors. The pedagogical function of emulation has biological, moral, and political origins (Kindeberg, 2013). Kindeberg (2013) clarifies the depth of this, "To change an individual's conduct or character is consequently linked to the change of habits. Here we find further similarities to Aristotle, who says that a habit eventually transforms the will to act, and so gradually becomes a part of the character."

Recommendation for Evaluation

Evaluating the recommended components may occur through any combination of quantitative or qualitative instruments, including combinations thereof. An important factor in the evaluation will be inclusion of all primary stakeholders: Students, instructors, administrators, and preceptors.

The primary source of evaluation information will be derived from students and instructors. Student data may be captured on the SIR II report, and compared against previous comparable data. However, the SIR II may not address questions specific to the design and development changes that have been made.

Administrators can provide information regarding the costs and withdrawal rates due to dissatisfaction, if student exit interviews are standard practice.

It is also recommended to gain additional insight from preceptors, as external subject matter experts, as well as administrative staff, who can weigh the costs and benefits of each modification. To establish a benchmark against the current curriculum, preceptors can be asked to evaluate the students before and after implementation.

EVALUATION	<u>of LMS</u>	<u>of TECE</u>	<u>of Adjunct Training</u>	<u>of Digital Scaffold</u>	<u>of Rubrics</u>	<u>of Communication</u>
Students	Helped in learning?	Prepared you for SimLab?	Prepared instructors?	Good review before class?	Inclusive?	Feedback?
	Effect on your study time?			Ready to apply?	Consistent?	Annotation answers?
Instructors	Help teach?	Engages students?	Help with assessment?			
	Increased student preparedness?	Students prepared for SimLab?	More likely to use TECE?	Students prepared to apply material?		
Admin	Cost-benefit?	Cost-benefit?	Cost-benefit?	Cost-benefit?	Cost-benefit?	Cost-benefit?
Preceptors	Students study more?					
College						

Assessment of Task

Methods, instruments, and procedures

This assessment of task involves subject matter expertise, a review of scholarly literature, and examination of official documents related to the task. This includes the National Registry of Emergency Medical Technicians® evaluation forms for medical and trauma (2011a and 2011b) and current Edison State College lesson plan (2011) for Fundamentals of Emergency Medical Care laboratory.

Task description

The student must possess the following skills and knowledge to perform this task:

- Body substance isolation.
- Scene Size-Up.
- Primary survey and resuscitation skills.
- History taking.
- Secondary assessment.
- Vital signs.
- Reassessment.

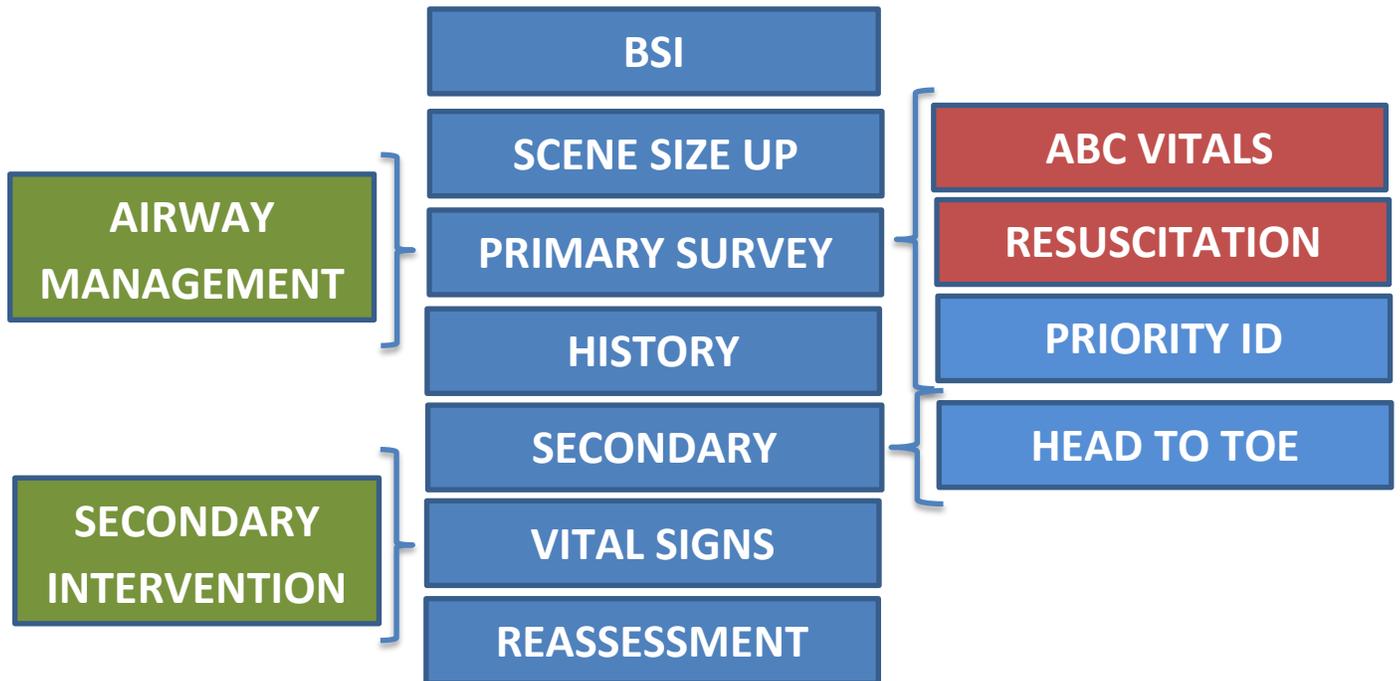
The procedure for this task requires a generally linear progression in the above order. The seven core areas identified appeal to the limitations of short term memory. While there is sometimes a need to revisit a previous area due to change in patient condition, basic scenarios for EMTs are not likely to include such dynamics until later in the course. Alternative approaches to assessment would likely prove to induce confusion amongst students, but a concept map may prove beneficial in allowing earlier introduction of assessment that only requires partial progression down this linear path, this permitting more psychomotor practice.

Task conditions are variable. Sometimes assessments are to be performed on cohorts. Other times, assessments procedures are to be verbalized. In many instances, instructors will use static manikins laying on a stretcher or medical bed. The instructor then interacts with the student, transitioning between the role of instructor and patient, to provide guidance as necessary for each individual student.

The EMS laboratory has one interactive patient simulator, METIman, which is used occasionally. While a training aid has been created to assist instructors, this device requires set-up and troubleshooting prior to use. Good intentions are sometimes upset by equipment that is locked in a supply room or technical difficulties. METIman is supposed to be a wireless interactive simulator that is ideal for prehospital providers. However, when unplugged it deactivates. The capabilities are also limited because it is controlled by a laptop computer that limits portability. Fortunately, a simulation laboratory is available for use in an adjacent building, pending availability. These patient simulators are SimMan 3G, arranged in a monitored environment that allows facilitator observation from another location. Following the scenario, the facilitator and students may participate in a debriefing session.

Evaluation occurs according to the appropriate NREMT® “skill sheet” during practice sessions and the final assessment. During untimed practice sessions, verbal feedback provided by instructors may occur during or after the scenario and is typically qualitative. Minimal, if any, documentation or quantitative feedback occurs during practice sessions. During the final assessment, the instructor provides no verbal feedback during the scenario. All feedback is provided at the end of the timed session and complimented with the associated quantitative representation of performance.

Assessment of Task Results



In examining the concept map above to establish a possibility of introducing the assessment task earlier, I learn that assessment cannot realistically occur earlier than lab 5. Four core concepts that contribute to the primary assessment exist. Of most significance is airway management knowledge and skills. This is a significant amount of material that requires corresponding didactic instruction in lecture and is not practiced until lab 4. Students' resuscitation and ABC vitals abilities should be at least minimally developed, as they are components of CPR certification.

What comes to light, however, is a need for priority patient identification knowledge. This is a critical criteria that the NREMT® has established. Considering the significance and management focus of lab 4, the assignments and assessments in lab 3 should purposefully be design to stimulate higher order thinking related to priority patient identification.

One interactive patient simulator in the EMS laboratory without debriefing capabilities is not sufficient for the class size. Logistical support for METIman, or prearranged scheduling for SimMan 3G, is necessary to make interactive patient simulation available during every class.

A consistent method of presentation and evaluation for both practice sessions and assessments seems logical. This would make the transition from practice session to assessment less dramatic, while increasing realism and learning through constructivist techniques. Instructors should provide little, if any, feedback until the simulation is complete. Instead, alteration of physiologic status could serve to represent errors.

Recommendation for Design

Value

If a transition between buildings must occur, this reduces the productivity and value of the class. Attempts should be made to design the class so that transitions to another building occur during breaks. Otherwise, scenario transitions should occur within the same building.

Correlation

There should be a connection to the student's current knowledge base. This makes sense as we ponder the concepts of assimilation and schema theory. The mind desires node-link structures to enhance recall (Martinez, 2010). Therefore, initial inquiry as to the students' current level of knowledge should be followed with correlation of existing knowledge to new information.

Individualized contextualization has been identified as a key factor that augments professional learning (Carter & Fewster, 2013). This requires inquiry and impromptu adaptation of scenarios without alteration of learning goals. For example, if the student a firefighter, instructors should use that student as a firefighter in the scenario. If the student currently works at an assisted living care facility (ALCF), the scenario should be contextualized in an ALCF.

Assessment

Assessment of linear correlation related to procedural knowledge can occur via simple observation. However, in class assessment of didactic, psychomotor, and affective mastery using the NREMT® tool should be applied consistently during practice sessions and assessments by limiting scenario times and providing feedback after the scenario in debriefing. Brevity of individual simulation scenarios is pragmatic. A recent study confirms the correlation of contextualization to retention, but the statistical significance was skewed toward groups that had short study times (Isarida, Isarida, & Sakai, 2012). The benefits of a well-facilitated debriefing session are immense (Kriz, 2010; Rodriguez-Sedano & Zunzarren, 2011). Thus, the design should include a fixed simulation period, followed by an appropriate length of time for reflection.

Recommendation for Development

Priority Patient Identification Lesson

A specific lesson, along with others within the same and subsequent modules, should be designed to address priority patient identification.

SimLab Reservation

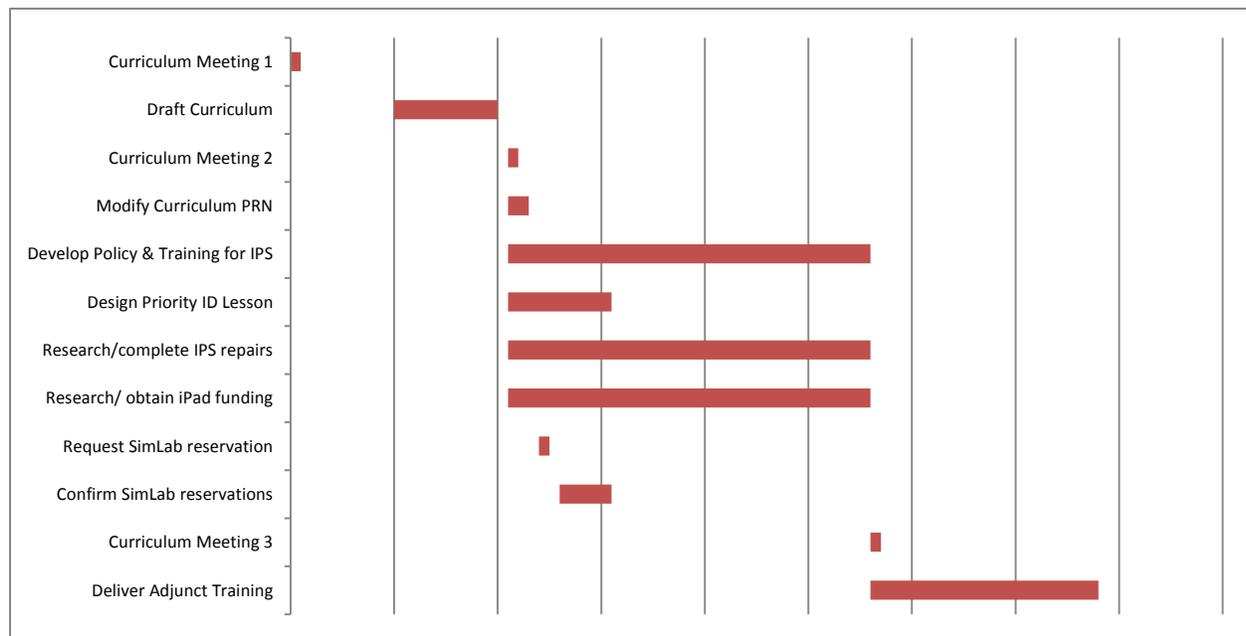
Scheduled use of the SimMan 3G simulators in the nearby building is a viable alternative until the required resources to make METIman functional are in place. Investigation should ensue to determine the financial feasibility of repairs and addition of at least one more interactive simulator.

IPS Policy & Training

Considering the importance of facilitation and debriefing in simulation, a consistent approach should be adopted. A 6-phase systemic-constructivist method suggested by Kriz (2010) includes reflection on emotions, observations, correlations, conclusions, speculations, and aspirations. This should be agreed upon during curriculum meeting 2 and included in the adjunct training course.

The development schedule related to the task is as follows:

Task	Start Date	Days	End Date
Curriculum Meeting 1	5/14/2013	1	5/15/2013
Draft Curriculum	5/24/2013	10	6/3/2013
Curriculum Meeting 2	6/4/2013	1	6/5/2013
Modify Curriculum PRN	6/4/2013	2	6/6/2013
Develop Policy & Training for IPS	6/4/2013	35	7/9/2013
Design Priority ID Lesson	6/4/2013	10	6/14/2013
Research/complete IPS repairs	6/4/2013	35	7/9/2013
Research/ obtain iPad funding	6/4/2013	35	7/9/2013
Request SimLab reservation	6/7/2013	1	6/8/2013
Confirm SimLab reservations	6/9/2013	5	6/14/2013
Curriculum Meeting 3	7/9/2013	1	7/10/2013
Deliver Adjunct Training	7/9/2013	22	7/31/2013



Recommendations for Evaluation

After completing lab 5, students and instructors may complete a survey that inquires as to:

1. Whether the lesson in priority patient identification assisted them with primary assessment skills. Instructors can also comment about the performance in lab 5 as compared to previous experiences, prior to the priority patient identification lesson.
2. Whether interactive patient simulator mobility aided in the realism of simulation. Instructors may also be asked if the training and mobility increased their desire to use simulation.

Assessment of Goals

Methods, Instruments, and Procedures

This assessment of goals involves subject matter expertise, a review of scholarly literature, and examination of official documents related to the goals.

Program Goals

According to Edison State College (2013a), “The Emergency Medical Services Technology Program is designed to prepare the student to become a competent entry-level Emergency Medical Technician (EMT) and/or Paramedic.” This goal is accurate and apposite, but subjective. The definition of ‘competent’ is subjective, especially with multiple preponderant parameters. Additionally, there is no mention of the technology component of this program within the mission statement.

“The mission of Edison State College is to inspire learning; prepare a diverse population for creative and responsible participation in a global society; and serve as a leader for intellectual, economic, and cultural awareness in the community” (Edison State College, 2010). This mission statement has some depth and provides direction in two areas that have direct impact on instruction.

First, stimulation of learning is necessary. This is expected at an educational institution, so perhaps we have to look deeper. Kim et al. (2013) quote the National Educational Goals Panel (1991), revealing, “A primary educational goal of colleges and universities is to help students develop the ability to think critically, to communicate effectively, and to solve problems (National Education Goals Panel 1991)”.

Second, we must address the order for creativity and responsibility. Creativity can still occur while adhering to strict regulations. As mentioned before, while core content and goals remain static, contexts and media can be diversified. Attendance and timely completion of assignments may be viewed as a rudimentary evidence of responsibility, but responsibility also encompasses moral, legal, and mental accountability. Mental accountability takes us a step further by suggesting that metacognition is necessary.

Metacognition, as a component of self-regulation, increases learning ability and efficiency (Cohen, 2012). Higher order thinking is advantageous in undergraduate introductory science courses, such as EMS2119L, but inclusion in instructional design to promote critical thinking is uncommon (Kim, Sharma, Land, & Furlong, 2013). Since the requirements for entry into the EMT Certificate Program are primarily designed to measure language skills, metacognition may be underdeveloped. Effective strategies to promote higher level learning include digitally-augmented scaffolding (Wu & Pedersen, 2011), small group collaboration, and transition from procedural to constructivist methodology (Manus, 1996).

While these overarching goals are certainly of importance in planning, we must also consider interests to other stakeholders. This program touches many within the community, but the preceptor sites that may employ our students one day are additional primary stakeholders.

Lee Memorial Health Systems serves as a preceptor site for students. They have established a training program for our students that provides information related to the goals that they have.

Public safety agencies from Lee, Collier, and Charlotte Counties also serve as preceptor sites for students in this program. While such agencies likely have goals that are similar to those of Edison State College and the EMS Technology Program, such similarity is only presumed. No training or orientation program has been developed by these public safety agencies.

Feasibilities

Resources & Technology

Resources continue to improve. While the quality and quantity of some resources is less than desirable, the overall inventory is excellent in terms of technology. Stationary and interactive manikins, cosmetics and props for creating realism during simulation, automated external defibrillator trainers, cardiopulmonary resuscitation trainers that evaluate and provide feedback to the user, and more are available for use. Recently, an operational ambulance was also added so that training may become mobile and appropriately contextualized.

Some repairs are needed, the quantity of some items needs evaluation, and a preventative maintenance schedule and capital improvement plan is not apparent.

Financial

I cannot reliably speak to the financial situation of the EMS Technology Program at Edison State College. The courses continue to remain full during all three semesters, though. This is encouraging.

Personnel and Subject Matter Experts

Full time and adjunct faculty members are both educated and experienced in EMS Technology. However, pedagogical knowledge may be limited to a brief course that is taken prior to recognition as a State of Florida EMS Instructor.

Time frame

The development schedule is highly suggestive that conceptual improvements can be ready for implementation starting with the Fall 2013 semester, pending team commitment. Specific content inclusion will depend on the availability of funding for additional resources.

Organizational Environment

Professional development is optional and unpaid. This is not uncommon for instructors in career and training education courses. Von Below et al (2008) found "...course facilitators often experienced a heavy workload and lack of support, despite thorough preparatory education." While recent improvements are noted, more can be done to stimulate professional development and communication by including all team members through teleconferencing.

More concerning, adjunct instructors are scheduled only during the time that the course is in session, allowing no time for preparation or collaboration amongst teams. An instructional assistant is available, but currently vague and sometimes anachronistic descriptions of resource requirements often result in the need for further preparation, which reduces time available for instruction.

Assessment of Goals Results

The included goal statement of the EMS Program may be revisited for clarification of competency and inclusion of the technological aspects of the course that will continue to be developed. Recognizing the College's Mission, creativity and metacognition are important considerations for inclusion. Collaboration with public safety preceptor sites, as primary stakeholders, may result in the determination of additional goals that should attempt to be met.

Financial support of capital improvement and professional development seems less than ideal.

Recommendations for Design

Relevance

Considering the goals of the EMS Technology Program and Edison State College, real world relevance should be included in both the clinical practices and learning contexts.

Dynamic changes in clinical practices occur regularly in healthcare. Unfortunately, a lag period exists between acceptance into the medical community and accompanying modification of directives by the agencies that establish education standards and publish certification examinations. This presents a difficult situation. If we adhere to the latest (but outdated) education standards, students fail to receive training required for success during clinical rotations and, later, during employment. If we teach the latest methods, it may not parallel the certification examination. It seems logical to design a curriculum around national EMS educational standards that establish time to review new trends.

Of the many contexts of learning, the physical environment significantly affects recall due to encoding specificity (Martinez, 2010). Student interest and efficacy associated with simulation is evident (Carrier, Rab, Rosen, Vasquez, & Cheever, 2012; Girod & Girod, 2008; McGaghie et al., 2010; Schlairet & Fenster, 2012). Establishing realistic scenarios using interactive simulators and an operational ambulance create a physical context that will augment recall when placed in similar circumstances.

Creativity through Digital Stories

Another effective strategy for incorporating realism is storytelling. An overwhelming amount of evidence highlights the value of storytelling in education (Kettel, 1994). Our instructors are veterans and many regularly make use of illustrative stories to engage students. While effective, a more pragmatic approach could create consistency and promote multiple-domain higher order thinking.

In Robert McKee's *Story*, he talks about crafting an effective story and asserts a necessary change of polarity for emotional effect (2003). Lessons can speak to the affective domain while simultaneously building declarative knowledge. Purposeful stories can be recorded, improved with reenactments, and delivered online. The initial delivery should allow for pauses, reflection, and discussion amongst participants. The narrative and student agency stirred by this interactive digital storytelling is ideal when coupled with Socratic questioning or problem based learning (Lindgren & McDaniel, 2012). Prerecording the stories ensures consistency in the delivery and accessibility.

Related, and equally effective in education, is the construction of digital narratives by students (Hsieh, 2012). After seeing the procedures demonstrated by instructors, students can be asked to record and submit videos of practical procedures while verbalizing rationale. This moves the procedural approach scaffolding to a digital environment, permitting class time to be used for technology enhanced constructivism through facilitation of higher order thinking.

Documented Preparation and Preventative Maintenance

A more accurate description of resource requirements and preparatory steps should be included to ensure that class time is devoted to higher order thinking. Incorporation of necessary activities before and after class that support a preventative maintenance schedule or capital improvement plan can serve to extend the useful life of costly technological resources.

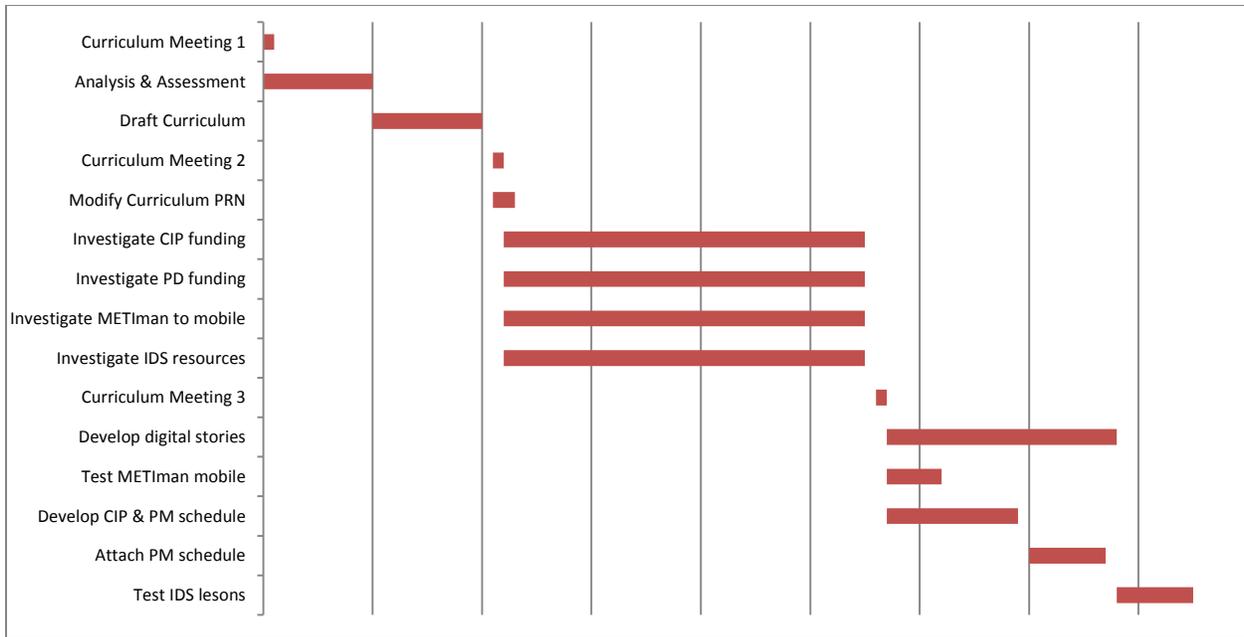
Recommendations for Development*Research Funding for Capital Improvement and Professional Development*

Financial information is unavailable at the time of this analysis, but sources should be sought for funding of capital improvement plan (CIP) and professional development (PD). A preventative maintenance (PM) schedule and capital improvement plan can be simultaneously developed to determine HR needs. Resources and funding should also be sought to allow for interactive digital storytelling (IDS).

Attempt to Make METIman Mobile

Investigation of methods to transition the METIman interactive patient simulator into a mobile device than can be used in the operational ambulance serves as a potential means to further augment realism and recall through encoding specificity.

Task	Start Date	Days	End Date
Curriculum Meeting 1	5/14/2013	1	5/15/2013
Analysis & Assessment	5/14/2013	10	5/24/2013
Draft Curriculum	5/24/2013	10	6/3/2013
Curriculum Meeting 2	6/4/2013	1	6/5/2013
Modify Curriculum PRN	6/4/2013	2	6/6/2013
Investigate CIP funding	6/5/2013	33	7/8/2013
Investigate PD funding	6/5/2013	33	7/8/2013
Investigate METIman to mobile	6/5/2013	33	7/8/2013
Investigate IDS resources	6/5/2013	33	7/8/2013
Curriculum Meeting 3	7/9/2013	1	7/10/2013
Develop digital stories	7/10/2013	21	7/31/2013
Test METIman mobile	7/10/2013	5	7/15/2013
Develop CIP & PM schedule	7/10/2013	12	7/22/2013
Attach PM schedule	7/23/2013	7	7/30/2013
Test IDS lessons	7/31/2013	7	8/7/2013



Recommendation for Implementation

Many of the recommendations related to the analysis of goals are dependent upon resources and funding availability. Furthermore, testing may bring to light issues that are not apparent at this point. Therefore, the frame of the curriculum and associated modules on the learning management system will be arranged in a manner that will allow integration of these recommendations at any time, as funding and more resources become available.

Recommendation for Evaluation

Students and instructors can provide opinions as to whether the transition between buildings served as a barrier to learning or not.

Synthesis Recommendation

Opportunities for improvement have been identified with respect to the learners, specific task, and goals that contribute to patient assessment skills in the *Fundamentals of Emergency Medical Care laboratory* course. Many of these improvements complement one another, but we must remain cognizant of financial and resource limitations that exist in establishing modifications. In consideration of these factors, we arrive at the following synthesis recommendations.

Synthesized Recommendations for Design

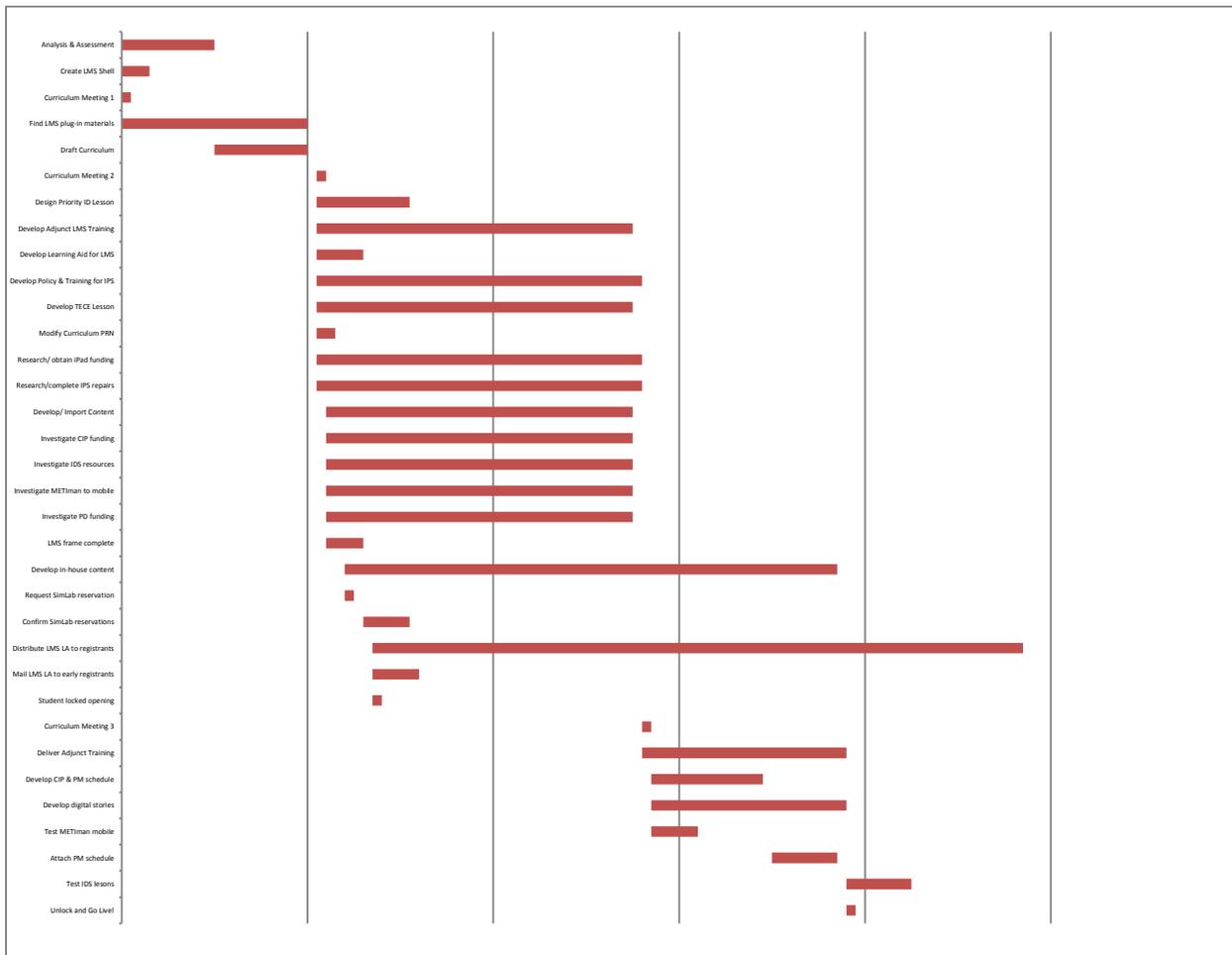
- I. **Affordability and Value:** Affordability and value will be achieved through integration of a learning management system (LMS), which is currently available through the College.
- II. **Empirical considerations** relating to a pedagogically effective curriculum for the LMS will include:
 - a. **Organization.** An outline and summary, and goals, will surround each lesson.
 - b. **Small chunks.** Lessons will have a maximum of 7 core ideas or be subdivided.
 - c. **Mastery.** Progression to the next lesson will require comprehension of the previous one.
 - d. **Scaffolding.** Lower order cognition and linear psychomotor correlations, as a prerequisite to advanced multiple-domain learning in class, will be provided digitally. Class time will be dedicated to stimulation of higher-order thinking.
 - e. **Multimedia.** Appealing to multiple types of learners, the frame will be designed to allow inclusion of multimedia, such as interactive digital storytelling sessions, though the initial implementation may be limited due to financial and resource availability.
 - f. **Communication channels.** Appealing to the mobile and instantaneous expectations of young adults, various methods of asking questions and receiving responses during assignments, as well as annotated feedback will be included.
 - g. **Consistency.** Rubrics will be established for each assignment to assist the computer or instructors in providing consistent feedback.
- III. **Human Considerations:** In all assignments and practice sessions, there will be cognizance of the need for physical, social, and emotional comfort. Breaks will be scheduled intermittently.
- IV. **Realism:** Through proper preparation and training, instructors will facilitate time-limited simulation with purposeful physical contextualization. Following the simulation, students will participate in debriefing sessions facilitated by instructors to induce metacognition.

Synthesized Recommendations for Development

- I. Development of a needs-based lesson, or lessons, for orientation that explains the technology enhanced constructivist environment (TECE). The **TECE Lesson** should include:
 - a. Tips for metacognition.
 - b. Specific technologies to be used in the course.
 - c. Student-centered, instructor-facilitated learning approach.
- II. Development of **Adjunct Instructor Training Course**.
This should include:
 - a. The TECE Lesson.
 - b. A lesson on facilitation vs. instruction
 - c. A lesson in the importance of debriefing and the adopted approach.
- III. Development of a **Priority Patient Identification Lesson**.
This lesson should be integrated with others in the same and subsequent modules.

The development schedule is as follows:

Task	Start Date	Days
Analysis & Assessment	5/14/2013	10
Create LMS Shell	5/14/2013	3
Curriculum Meeting 1	5/14/2013	1
Find LMS plug-in materials	5/14/2013	20
Draft Curriculum	5/24/2013	10
Curriculum Meeting 2	6/4/2013	1
Design Priority ID Lesson	6/4/2013	10
Develop Adjunct LMS Training	6/4/2013	34
Develop Learning Aid for LMS	6/4/2013	5
Develop Policy & Training for IPS	6/4/2013	35
Develop TECE Lesson	6/4/2013	34
Modify Curriculum PRN	6/4/2013	2
Research/ obtain iPad funding	6/4/2013	35
Research/complete IPS repairs	6/4/2013	35
Develop/ Import Content	6/5/2013	33
Investigate CIP funding	6/5/2013	33
Investigate IDS resources	6/5/2013	33
Investigate METIman to mobile	6/5/2013	33
Investigate PD funding	6/5/2013	33
LMS frame complete	6/5/2013	4
Develop in-house content	6/7/2013	53
Request SimLab reservation	6/7/2013	1
Confirm SimLab reservations	6/9/2013	5
Distribute LMS LA to registrants	6/10/2013	70
Mail LMS LA to early registrants	6/10/2013	5
Student locked opening	6/10/2013	1
Curriculum Meeting 3	7/9/2013	1
Deliver Adjunct Training	7/9/2013	22
Develop CIP & PM schedule	7/10/2013	12
Develop digital stories	7/10/2013	21
Test METIman mobile	7/10/2013	5
Attach PM schedule	7/23/2013	7
Test IDS lessons	7/31/2013	7
Unlock and Go Live!	7/31/2013	1



Synthesized Recommendations for Implementation

Instructors must understand, in advance, the significance and theory of transitioning from didactic and procedural instruction to facilitation within a technology enhanced constructivism environment.

Then, it is imperative that they clearly communicate expectations and model desired behaviors, both in digital and face-to-face communication with students.

Synthesized Recommendations for Evaluation

Some team discussion is warranted to determine the most effective instruments for evaluation, including factoring in evaluations that are already in place. It is important to obtain multidimensional feedback from each of the primary stakeholders to ensure that there are not any negative impacts associated with these modifications. As a starting point for discussion, I include the table on the following page.

EVALUATION		of LMS	of TECE	of Adjunct Training	of Digital Scaffold	of Rubrics	of Commication
Students	Helped in learning?	Prepared you for SimLab?	Prepared instructors?	Good review before class?	Ready to apply?	Inclusive?	Feedback?
	Effect on your study time?			Consistent?		Annotated answers?	
Instructors	Help teach?	Engages students?	Help assessment?				
	Increased student preparedness?	Students prepared for SimLab?	More likely to use TECE?	Students prepared to apply material?			
Admin	Cost-benefit?	Cost-benefit?	Cost-benefit?	Cost-benefit?	Cost-benefit?	Cost-benefit?	Cost-benefit?
Preceptors	Students study more?						
College							
EVALUATION		of Pri ID Leson	of Simulation	-	-	-	-
Students	Helped understand this component of assessment?	Added realism?					
		Aided in patient assessment?					
Instructors	Prepared students better for assessment?	Mobility affects decision to simulate?					
		Increased student skills?					
Admin	Cost-benefit?	Cost-benefit?					
EVALUATION		of Transition	of Context	of Stories told	of Stories created	-	-
Students	Barrier to learning?	Added realism?	Aided in patient assessment?	Reinforced concepts?	Reinforced concepts?		
		Aided recall?		Aided recall?			
Instructors	Barrier to learning?	Mobility affects decision to simulate?	Increased student skills?	Reinforced concepts?	Reinforced concepts?		
		Increased student skills?		Increased student skills?	Increased student skills?		
Admin	Cost-benefit?	Cost-benefit?	Cost-benefit?	Cost-benefit?	Cost-benefit?		

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Appendix

Nicholas S. Favazzo is a State of Florida EMT and paramedic. He started his career with Lee County Emergency Medical Services in 2001, providing both basic and advanced life support care during 9-1-1 responses and interfacility transfers. During this time, he has had the opportunity to become certified in critical care (CCEMT-P), and was previously a nationally registered EMT-Paramedic (NREMT-P) and field training officer.

In 2011, Nicholas became a State of Florida EMS Instructor and joined the EMS Program at Edison State College. He is also an American Heart Association instructor for basic life support and advanced cardiac life support, as well as a facilitator for ECG & Pharmacology. In 2012, he attended the University of Miami to become a certified instructor in Emergency Care of Acute Coronary Syndromes. He is currently expanding his knowledge of andragogy in the Educational Technology Master of the Arts Program at Florida Gulf Coast University. This analysis was conducted as a component of EME6607 at in Summer 2013 in response to a need identified at Edison State College.