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# INCREASING PSYCHOLOGICAL AND PHYSICAL FIDELITY IN PATIENT SIMULATION

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and Lisa M. Newton RN, MSN

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**ETHICAL LEADERSHIP IN EMS: A ROAD MAP TO  
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## Increasing Psychological and Physical Fidelity in Patient Simulation: A Creative Cross-Disciplinary Approach to Utilizing Community College Resources

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### ABSTRACT

Mesa Community College Department of EMS / Fire Science has developed a creative Immersive Total Patient Management Experience (ITPME) through an innovative use of resources commonly available in most community college environments. Although there is a gap in literature related specifically to paramedic education, research conducted from other healthcare disciplines such as nursing and pharmacy provide evidence that immersive simulation is a highly effective tool that can be utilized to provide education and evaluation of the affective domain in healthcare education. National EMS leadership groups strongly encourage paramedic educators to strengthen curricular experiences with patient simulation, and this paper describes how ITPME aligns with current National Association of EMS Educators (NAMSE) competency goals and recommendations, allowing for an effective method for inclusion within the paramedic curricular experience.

### INTRODUCTION

There is an increasing emphasis on providing real-world simulation in paramedic education. Incorporating immersive simulation into the curriculum has many benefits including scenario standardization, stress inoculation, consistent realistic replication of patient conditions, and development of skill and patient management competencies for the entry level healthcare provider. Paramedic Educators are challenged by limitations in resources including budget constraints, availability of high fidelity simulation manikins, faculty competency in programming scenario development, and available programmatic hours. Resources to increase the realism of the simulation experience do not need to be costly, and can often be found by collaborating with other departments within your own college community.

This paper will share a unique approach to cross-disciplinary, interprofessional medical simulation known as the Immersive Total Patient Management Experience (ITPME) uniquely developed at Mesa Community College in Mesa, Arizona.

The ITPME event serves as a capstone assessment prior to the paramedic student being authorized to begin the field internship phase of their educational program. Comprised of twenty immersive, hyper-realistic scenarios delivered over a two-day period, this multi-disciplinary approach to medical patient simulation includes the departments of EMT, Fire Science and Paramedicine, Theatre and Film Arts, Psychology, Public Safety, Nursing, and Medical Students from Midwestern University -- Arizona College of Osteopathic Medicine. The Theatre and Film Arts Department participation is a foundational resource in ITPME, providing dramatic real-life representation of patient-based scenarios as well as realistic scripting, moulage of the actors, and the setting of the scene. Cross-disciplinary interaction with nursing, psychology and medical students further increases the physical and psychological fidelity, by accurately simulating both pre-hospital and in-hospital environments where the assessed paramedic student must demonstrate various competencies for successful completion. Mesa Community College also utilizes a Virtual Incident Command Center, which simulates emergency response and communication technology, allowing the student to be realistically dispatched and experience the stressors of high fidelity simulated response to each immersive incident.

### USING IMMERSIVE SIMULATION TO EVALUATE AFFECTIVE DOMAIN

There is a paucity of literature available specific to simulation in paramedic education. The Society for Simulation in Healthcare (SSIH) defines simulation as “a technique that creates a situation or environment to allow persons to experience a representation of a real event for the purpose of practice, learning, evaluation, testing, or to gain understanding of a systems or human actions” (Lopreiato et al., 2016, p. 33). Educators commonly acknowledge three domains of learning: cognitive, affective and psychomotor. The assessment of the affective learning domain is of paramount importance. Immersive Simulation is an excellent activity to evaluate the affective domain in paramedic education by providing paramedic students with reproducible targeted learning experiences (Batt, 2015). Through its enhanced psychological and physical fidelity, ITPME allows faculty members to effectively evaluate situational awareness, leadership characteristics, communication, teamwork, and critical thinking aptitude of the healthcare student. The ability to critically think is an integral component of a student’s effective transition into clinical practice.

ITPME scenarios mirror the student's respective clinical environments, creating an opportunity for an engaged commitment of their specific provider-level role. The immersion into these specific roles facilitates a comprehensive assessment of the associated cognitive, psychomotor, and affective aspects of the learning process.

## **PSYCHOLOGICAL FIDELITY**

The National Association of EMS Educators (NAMSE) has released a vision paper on simulation in EMS Education, challenging EMS educators to seek simulation best practice by combining faculty training and resources to enhance the delivery of safe and effective prehospital care ("Simulation in EMS Education," 2015). An important educational component is psychological fidelity. This concept is defined as the extent to which the simulated environment evokes the underlying psychological processes necessary in the real-world setting to include the degree of perceived realism or fidelity. This includes psychological factors such as emotion, beliefs, and self-awareness of participants ("Simulation in EMS Education," 2015, p. 6). Theatre and Film Arts provides method acting, expert moulage techniques, and realistic scene settings, which augment reality to deliver enhanced simulation dynamics and psychologic fidelity. This is a mutually beneficial collaboration which enables Theatre and Film Arts students to further develop and practice their respective trade crafts and adhere to established objectives under the observation and guidance of faculty members. Utilizing standardized grading rubrics, paramedic and nursing students are provided direct feedback on their communication skills, patient and crew interactions, transfer of care, and integrated treatment plans for each simulated patient.

## **PHYSICAL FIDELITY**

The SSIH defines physical fidelity as a level of realism associated with a particular simulation activity, and the degree to which the simulation looks, sounds, and feels like the actual task (Lopreiato et al., 2016, p. 26). Utilizing the Virtual Incident Command Center, students are directly immersed into realism by simulated dispatch and response activities to the incident. These include flashing lights, sirens, mobile computer terminals, radio communications, and high definition video response footage. ITPME utilizes different physical locations for each patient simulation location such as parking garages, restrooms, office spaces and stairwells, to increase the physical fidelity of each scenario. Theatre and Film Arts provides props such as weapons, blood, tissues, odors, textures, and costumes, to increase the level of realism with each given scenario.

Detailed scripting and character development that is inclusive of the patient scenario (i.e. family members, lay person bystanders, and additional public safety professionals), further enhance the physical fidelity aspects of each immersive scenario. The transition from realistic on-scene interactions, to performing psychomotor skills and assessments in the back of a moving full-size operational type III ambulance, allows students to encounter a variety of real-world working environments.

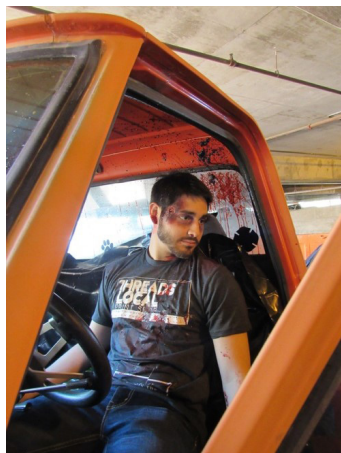
## **CROSS-DISCIPLINARY INTERACTION**

Healthcare leaders and educators have long advocated for interprofessional education to enhance collaborative practice and promote interdisciplinary communication. Despite this, less than half of accredited paramedic education programs report that they participate in simulation-related activities with other disciplines (McKenna, Carhart, Bercher, Spain, & Torado, 2016). Educators involved in the early development of ITPME recognized the importance of cross-disciplinary simulation training, and networked with leaders in theatre and film arts, nursing, public safety, psychology and a local medical school. This cross-disciplinary collaboration further emphasizes the paramount importance of a comprehensive healthcare team approach to effective patient management. Theatre and Film Arts students bear the largest burden of creating realistic, interactive, patient simulations. This requires many hours of disease/injury research, rehearsal, and scenario revisions, in order to accurately replicate the diverse situations encountered by pre-hospital professionals. The ability to have Paramedic and EMT students directly interacting with nursing and medical students in a simulated hospital-receiving environment, incorporates the ability to effectively communicate, understand, and execute effective transitions of care. Nursing students continue the management of the patient in the simulated hospital emergency department environment -- under the direction of an attending physician and nursing department faculty member. Students from the Department of Psychology interact with the healthcare professionals in the management of each patient/scene encounter. The ability to identify, address, and react to a variety of stressors related to different mental health-related scenarios, allows for a much more comprehensive experience for the entire healthcare team.

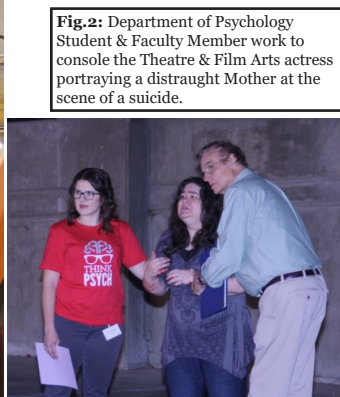
## **ROAD TO ITPME IMPLEMENTATION**

A survey of accredited paramedic programs revealed that although 91% of programs have access to advanced, fully-programmable manikins, only 71% utilize them (McKenna et al., 2015).

Simulation scenarios ideally are an avenue to rehearse essential skills for patient safety, and barriers to using resources available need to be further defined. Initial steps would include networking with leaders in Theatre and Film Arts, as well as local nursing and medical programs. ITPME mutually benefits these departments by providing opportunities for students to apply their knowledge and skills. Organizing an ITPME experience may sound time-consuming, although effective interdisciplinary collaboration will divide the workload responsibilities. Trends in patient simulation and clear direction from national leadership should encourage paramedic educators to invest time and effort in the development of an ITPME within their own individual programs.



**Fig.1:** Makeup simulated GSW to head



**Fig.2:** Department of Psychology Student & Faculty Member work to console the Theatre & Film Arts actress portraying a distraught Mother at the scene of a suicide.



**Fig.3:** EMT & Paramedic Student crews work to stabilize and transport a critical patient to a trauma center. MCC has manufactured special equipment to enable our students to effectively ventilate simulated live patients. This adds to the realism.

## OVERARCHING GOALS OF THE ITPME

The Mesa Community College Immersive Total Patient Management Experience (ITPME) is a multi-college, cross-disciplinary educational event held each Spring semester since 2015. Initially designed to serve as a capstone assessment event prior to Paramedic students being released for the field internship phase of their study, this event now exposes entry-level EMTs, Paramedic, Nursing, Psychology and Theatre/Film Arts students to career advancement opportunities within their respective areas of study.

The collaborative aspect of ITPME combines the strengths and skill sets present in both normatively parallel occupational programs and those less commonly associative to create the most comprehensive student learning and workforce experience possible. In addition to providing workforce training, the event encourages a larger dialogue among educators about the nature of innovative collaboration needed to create the most comprehensive student learning experience possible.

Fully equipped engine and rescue companies as well as crisis response teams consisting of EMT/Paramedic and psychology students are dispatched to scenarios via the Virtual Incident Command Center (VICC). The VICC immerses the students in a “response mode” with the realistic sights and sounds of an emergency response. Upon arrival at the simulated scene, students are led to a pre-determined location by their Faculty Evaluator and continue to coordinate and communicate activities with dispatch/VICC. Students conduct patient interviews, interact with family members, other public safety professionals and bystanders. They also perform assessments, determine differential diagnosis, establish treatment plans and make definitive transport decisions. Once stabilized, the patients are placed on EMS gurneys and secured in the back of an actual operational ambulance unit in order to simulate the physicality and rigors of working in the confines of a moving ambulance. The Paramedic students are required to establish communication with medical control and perform either a patch or a courtesy notification directly to a physician or nurse intermediary while enroute to the simulated hospital. The patient is transported to a simulated emergency room where Nursing students receive a report from the Paramedic students and take over the care of the patient with oversight from a volunteer Attending Physician. Nursing students are evaluated and coached by Nursing Faculty while Paramedic students proceed to the rehab room to complete their patient care forms and re-stock/rehab their EMS equipment as they become available for the next emergency response.

Ten scenarios are reenacted simultaneously each day during morning and afternoon sessions with each immersive scenario lasting 30-45 minutes from dispatch to patient transfer in the simulated hospital emergency department. The assigned student teams receive crew performance critiques and debriefs following each scenario. Listed below are the scenarios as developed or expanded over the last three years:

1. Self-inflicted gunshot wound to the head, hysterical mother at the scene, bystanders with phones recording the incident and being disruptive to crews (PD & Crisis Response Team on scene)
2. Heart attack of a middle-aged man during exercise session, personal trainer on scene with patient



3. Anaphylactic reaction in a teenager with teacher present
4. Behavioral emergency – woman hearing voices and acting strangely in a grocery store with bystanders (PD & Crisis Response Team on scene)
5. Pediatric near-drowning victim, unresponsive with hysterical mother and step-mother on scene (PD & Crisis Response Team on scene)
6. Seizure of a college student with a professor and students as bystanders in a classroom (college public safety on scene)
7. Abdominal emergency in young female, spontaneous abortion with hemorrhage in a small confined restroom area (Spanish speaking only)
8. Blunt trauma assault, attempted car-jacking victim no witnesses (PD & Crisis Response Team on scene)
9. Stroke victim with co-worker as a witness
10. Burn victim – aerosol can explosion (PD on scene)
11. Upper GI bleed in a middle-aged man hx of ETOH abuse
12. Unresponsive heroin/fentanyl OD with female partner agitated (located in small confined exterior stairwell landing) (PD & Crisis Response Team on scene)
13. Sexual Assault – transgender male to female pre-op victim (PD & Crisis Response Team on scene)
14. Cardiac arrest 901H (rigor dependent lividity) with very upset family members-elderly male (PD & Crisis Response Team on scene)
15. EMS provider down—stabbed while loading a psych patient for inter-facility transfer (PD & Crisis Response Team on scene)
16. Mental health/Veteran suffering a PTSD episode (PD & Crisis Response Team on scene)
17. Ground-level fall elderly with possible hip fx (incontinent to feces and urine) foul smelling unknown down time, Pt. found after PD performed a welfare check (PD on scene)
18. Generalized illness with flu-like symptoms
19. Choking with cleared airway prior to arrival (homeless person) (PD on scene)
20. Elderly sepsis patient in a care facility with in dwelling foley catheter, nursing staff w/limited knowledge of patient

## CONCLUSION

This paper illustrates the ability to effectively develop and incorporate a multidisciplinary approach to paramedic education, with the inclusion of a unique and creative Immersive Total Patient Management Experience (ITPME) within a paramedic curricular program. This cost-effective approach to provide curricular delivery has enabled the ability to deliver high-quality education while evaluating core competencies and allowing for interprofessional training across the continuum. The inclusion of ITPME has provided a unique and effective delivery of high-quality education within our paramedic training program. Mesa Community College faculty leadership would highly suggest including it in all programs across the country.



**Fig. 4:** EMT & Paramedic Students load a critical patient into the awaiting ambulance to practice skills in a moving vehicle. \*Ambulance use courtesy of Boeing Mesa Fire Department.



**Fig. 5:** A Theatre & Film Arts student portrays a patient with a mental illness



**Fig. 6:** MCC Nursing Students continue the treatment of the simulated patient following the Paramedics transfer of care, under the direction of a fourth-year Medical Student. This occurs in one of our simulated ED rooms. Attending Physicians and Nursing Faculty are on site to facilitate and evaluate these students.

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