Analytic Decision Gaming – A Tool to Develop Crisis Response and Clinical Reasoning

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ABSTRACT

Emerging threats provide motivation to develop new methods for preparing the next generation of crisis responders. Bayesian theory shifts reasoning toward a probabilistic, epistemic paradigm, giving rise to Evans' revised heuristic-analytic theory. Researchers at The Pennsylvania State University use scenario-based training and the analytic decision game (ADG) to blend and implement these processes as foundational pedagogy for engaging, educating and training medical students as crisis responders and critical thinkers. The ADG scenarios vary by content and level of expertise, lending themselves readily adaptable to both crisis response preparation and the development of clinical reasoning. The ADG creates a virtual crisis requiring participants to engage in scenario management as role-players. For the past two years, students from the Penn State College of Medicine, in their first year of training, have participated in the ADG Lights Out scenario, testing community preparation and resilience after a wide-spread and months-long power outage.

Keywords

Clinical reasoning, crisis response, medical school, scenario-based training, analytic decision game.

INTRODUCTION

Early studies on human reasoning describe decision-making processes based on past experiences and how those experiences were used to shape actions and outcomes. These previously held beliefs in the study of human reasoning have been challenged at multiple levels (Manktelow et al., 2011). Classical definitions focus on how people "should reason" in order to conform to norms of rationality and utility (Kneale and Kneale, 1962). Bayesian theory shifts this notion away from dichotomous, binary reasoning toward a more probabilistic and epistemic paradigm, eventually giving rise to Evans' revised heuristic-analytic theory of reasoning (Evans, 2006). In the context of applying decision-making to crisis response, the National Incident Management System (NIMS) was developed as a framework for crisis incident response for both natural and man-made disasters. The cornerstone of NIMS is the Incident Command System (ICS), which promotes procedural interoperability across all levels of incident response (Annelli, 2006). Despite this, nuanced emergency situations inevitably dictate that not all exigencies can be adequately addressed. Emergency responders often find themselves developing and deploying improvised, moment-to-moment methodologies to address complex and multidimensional crisis situations (Mendonca et al., 2003). Recent studies evaluating hospital preparedness and adherence to NIMS principles, suggest that medical facilities lack a gold standard for measuring and evaluating readiness. This is particularly true for command, communications and information management (Jenkins et al., 2009). Steady increases in emerging threats provide ample motivation to develop new methods of preparing the next generation of crisis responders (Hall et al., 2015).

Researchers at The Pennsylvania State University have made extensive use of scenario-based training to meet this goal and to extend the use of the analytic decision game (ADG) as pedagogy for engaging, educating and

training medical students as critical thinkers. The ADG is an adapted tactical (war) game. ADG scenarios vary by subject and audience and are readily adaptable to a wide variety of crisis responses. The ADG creates a virtual crisis requiring participants to engage in scenario management as role-players. For the past two years, students from the Penn State College of Medicine have participated in the ADG Lights Out scenario, testing community preparation and resilience after a wide-spread and months-long power outage. The Lights Out scenario was specifically selected to introduce Penn State medical students to the resource infrastructure of the local community as part of their orientation activities. The scenario has a rural setting that is similar to the area surrounding the medical school campus. Recognizing the modern reliance on digital technology and electricity, the exercise commences with a complete failure of the regional power grid following a coronal mass ejection (CME) event. All unshielded digital electronics are inoperable and it is unknown what remains of existing government infrastructure. During the facilitated exercise, participants collaborate to address an ever-expanding set of community, security and health-related issues that force students to engage in decision making processes in the context of crisis response. This process is analogous to clinical reasoning skills students will develop and employ as physicians (Trowbridge & Rencic, 2015). Events arising within the Lights Out scenario are highly modifiable and can be tailored to meet specific learning and engagement objectives, including adaptive reasoning and problem-solving.

CRITICAL THINKING—CRISIS RESPONSE MEETS CLINICAL REASONING

Tversky and Kahneman, (1974) made a distinction between intuitive reasoning and extensional reasoning, citing the former as unstructured and informal (utilizing heuristic-enabled processes) and the latter as structured and controlled. Extensional reasoning was viewed as a measure of control for intuitive reasoning. Evans (1984) developed the heuristic-analytic theory to reconcile demonstrated mismatches in competency across reasoning tasks due to the presence of cognitive bias. Heuristic-analytic theory proposes that two sequential cognitive processes are at work for any given reasoning task. These cognitive processes include: 1) *heuristic* processes, which draw from prior experience and expectations to aid in the formulation of representative models, and 2) *analytic* processes, which draw on sense-making techniques to form judgments on these models. Some theorists view dual-process theory as a pairing of separate cognitive functions, that turn on and off according to the task at hand; however, this notion has not found universal agreement. Heuristic-analytic theory was extended (Evans 2003) to account for the inclusion of hypothetical thinking as a means to broaden the range of possible considerations beyond those represented by known facts. Previously held distinctions between analytic and intuitive reasoning have been challenged suggesting the utility of a single-system framework offering dynamic graded continuum or DGC framework (Osman, 2004), as an alternative approach to consider dual-process theory. The DGC framework proposes that representative reasoning could be viewed as a continuum, where *representative quality* leads to a corresponding progression in learning types – from implicit to explicit and on to automatic, recognizing that each learning type "has a different functional role."

The intent of this paper is not to challenge the tenets of dual-process or any other human reasoning theory. Rather, we propose a practical view in recognizing the benefits of hypothetical reasoning as a tool for teaching clinical reasoning skills in medical education and for dealing with crisis situations. The asymmetric nature of crises demand such attention. Asymmetric threat is loosely defined as an unusual threat to our political, strategic or military culture. Most literature addressing the notion of an asymmetric threat is dedicated to the study of political-military affairs. Doctrinal debates on the use of the term arose almost simultaneously with a rise in popular use, coinciding with the rise of counter-insurgency and counter-terrorist operations and the introduction of asymmetric warfare doctrine. Our paper takes a different slightly different approach to asymmetric threat. We offer the argument that asymmetric threats can be both man-made and natural. Evidence of the unusual (asymmetric) nature of natural disasters are aptly illustrated by events such as, Super-Storm Sandy, Hurricane Katrina, and more recently, Hurricane Irma, the most destructive Atlantic hurricane since Wilma in 2005. The proceedings of the eighth symposium of Asymmetric Threats to National Security, held in October, 2014 in McLean, Virginia, opened with the following question, "What if the United States were suddenly deprived of electricity, water, money, fuel and access to cyberspace?" As of this writing and as a result of Hurricane Irma, which crossed Puerto Rico on 6 September 2017, the U.S. island territory still experiences most all of the deprivations described above. The hurricane season of 2017 is a prime example of an ongoing asymmetric threat. To address such threats requires thought processes that are dynamic, adaptable and tailorable to a wide range of possibilities, much like that found in hypothetical reasoning. In this same vein, clinical reasoning processes in complex medical cases (Custers, 2013) can be viewed as a series of asymmetric threats.

PENN STATE COLLEGE OF MEDICINE: THE PROCESS OF INQUIRY AT A NEW REGIONAL CAMPUS

The Penn State College of Medicine has a long-standing scientifically and clinically rigorous educational tradition with deep foundations in scholarship and humanistic care. Penn State has recently built on this experience to open a regional campus in University Park, PA. This innovative program uses trans-disciplinary educational strategies to create a flexible and integrated program of study. Students learn in an environment that fosters interprofessional team skills, curiosity, and a commitment to the calling of Medicine. The curriculum of the Penn State College of Medicine prepares students for the ongoing practice of evidence-based medicine in the rapidly changing healthcare environment of the 21st century. A number of guiding principles form the basis of this collaborative curriculum. Students are engaged from the first day of medical school to contribute in meaningful ways to the health of patients and populations and to improving the health system. Students are required to address the needs of the local community as a scaffold for transferring cognitive and clinical skills to a national and global context. To support the design and implementation of the new medical program, the curriculum design leadership team agreed upon the following key features:

1. Community Engagement;
2. Inter-professional, team-based care;
3. Advocacy and leadership to promote health of patients and populations;
4. Experientially-driven learning in biomedical science, clinical science and health systems science;
5. Longitudinal learning relationships;
6. Flexible assessment and progression; and
7. A culture of respect and humanistic care.

Educational experiences are designed to emphasize interprofessional collaboration, critical thinking and systems thinking. To do this, the curriculum uses experiential learning and clinical immersion for students to integrate four core educational pillars: biomedical sciences, clinical sciences, health systems sciences, and health humanities. The design of the curriculum is based on best evidence in the science of learning and anchored in a culture of continuous critical reflection, rigorous evaluation, adaptability and innovation. This thoughtful educational design embraces opportunities for interprofessional collaboration with other Penn State educators, a process that gave rise to translating the Analytic Decision Game: *Lights Out* to medical education.

As part of the curriculum design process, specific foundational teaching and learning processes have been incorporated as cultural norms. As one example, training in observation and field notes is used to support critical reflection on workplace experiences. Education in the science of learning includes mentored development of higher order questioning to develop specific learning objectives based on student experiences in their clinical spaces. These immersive patient and system-based experiences provide the triggers for inquiry and discovery in medical, clinical, and systems sciences and also promote personal and professional growth as humanistic caregivers. Following these immersive patient-based experiences, student learning incorporates principles of inquiry, critical thinking, and systems thinking to discuss targeted learning objectives mapped to the School of Medicine requirements. Finally, students are developing a multi-layered geographic and public health "map" of the local area to facilitate patient-centered care, health systems science learning, and community engagement. It is this last objective that further facilitated the collaboration with the Red Cell Analytics Lab at Penn State and the partnership of crisis response and clinical reasoning.

TRAINING MEDICAL STUDENTS FOR CRISIS RESPONSE AS A WINDOW TO CLINICAL REASONING

Clinical reasoning is the process by which health care providers solicit and collect cues, process information, assess available data to arrive at a diagnosis, plan and implement strategies to overcome the problem, evaluate the results in terms of patient outcomes and reflect on their action to learn from the process to better inform future practice. In this context, there is keen interest in how people make decisions under high-stakes, time-constrained, dynamic conditions. Recognition Primed Decision (RPD) and naturalistic decision making (NDM) are two lanes of research that describe how experience enables practitioners to solve complex problems. Klein (2008) cites NDM as valuable for understanding "how people didn't make decisions." NDM research revealed that decision-makers failed to adequately develop and compare alternate options or conduct probability estimates against alternative courses of action. In contrast to laboratory-based experiments, RPD and NDM researchers took to the field to better understand how real decisions are made. RPD recognizes the value of intuition-enabled analysis in decision making, especially when applied by seasoned practitioners - doctors, military personnel, and emergency responders who often operate in high-stakes situations. Whereas intuition, gained through experience, can help recognize patterns and construct potential response strategies, research also

indicates that **intuition-based strategies** are often appropriate to a specific situation. This begets the question, however, "How do we train future practitioners, who currently lack experience, to construct intuitive strategies?" One such method is through gaming and simulation.

RED TEAM ANALYTICS

The ongoing discourse on the role of hypothetical thinking is expandable well beyond the bounds of academic writings on human reasoning theory. Problem solving techniques such as: alternate futures analysis, devil's advocacy, inside-outside thinking and hypothesis mapping, among others, each include some form of hypothetical reasoning and have gained prominence across the analytic community. The use of hypothetical thinking in problem solving is not new – *Red Team Analysis*, a form of alternative analysis - has been in use by military planners since the Cold War (Zenko, 2015). In the 1960s, early military red teamers utilized game-theory techniques to evaluate strategic decisions, including those governing the use of nuclear weapons. Red team analytics models the behavior of individuals or groups by emulating their thought processes in order to anticipate probable (adversary) actions. Military red teams, acting as the counter-force, perform operational and feasibility checks on military plans and related strategic policies. The Red Cell Analytics Lab (RCAL), a group of aspiring analysts, on the campus of The Pennsylvania State University, has combined the tenets of red teaming with the ADG to prepare the next generation analyst. RCAL members have taken on a wide variety of security problems, including the research of tomorrow's disruptive technologies and the ever-expanding social media phenomena. Utilizing red cell techniques, RCAL members seek to uncover potential threats and aid in the development of mitigating strategies. Whether emulating an adversary, or adopting the persona of an emergency manager, the benefit of using a red cell analytics approach to problem solving is in the generation of alternative solutions, hypotheses, courses of action or engagement strategies. Red cell teaming develops new strategies, exposes biases emerging from group think; identifies gaps and vulnerabilities that are overlooked because of over familiarity with the operation and/or security environment, highlights areas for improved inter-organizational cooperation in preparedness, response, and mitigation; and provides recommendations for insuring unchecked assumptions do not become threats. Kretz, et al., (2012) used the SYNCOIN (Synthetic Counter-Insurgency) ADG to test for analytic bias in investigators of improvised explosive device (IED) incidents. Leveraging the inherent capabilities of the digital native - those, who have come of age during the proliferation of open source information, the Internet, mobile technologies and social media, further enhances the red cell process. This emerging group of analysts is comfortable with technology; they are masters of "the search engine," and possess the analytic skills required to envision the future threat. They are comfortable accessing "the hive mind" for collaborative analysis.

THE ANALYTIC DECISION GAME (ADG)

The Analytic Decision Game was developed as pedagogy to bridge theory to practice in the college classroom and to promote and teach the application of structured and unstructured analytic techniques to solve problems of security and risk, including natural and mad-made crises. (Graham, 2012). Adapted from the tactical (war) game, the ADG has been integral to the study of Security and Risk Analysis (SRA), in the College of Information Sciences and Technology (IST) at The Pennsylvania State University, for the past ten years. The SRA curriculum was expressly developed around problem-based learning (PBL) and experiential learning strategies. The ADG combines the tenets of PBL and experiential learning with analytic techniques, thus allowing students to witness the relevance of academic content while simultaneously developing skills in problem-solving, critical thinking, communication, collaboration, and creativity.

To date, some eight different ADGs have been developed for such use. ADG scenarios vary by subject and audience and are readily adaptable across a wide area of interest, from intelligence analysis to crisis response. In the case of the virtual crisis, participants are thrust into crisis management as role-players and decision-makers. The military has long understood the value of testing and evaluation of operational concepts. More recently, large sectors of the public safety community have come to adopt reality or decision-based models for training and the evaluation of contingency plans, command and control procedures and incident management strategies. Properly designed, simulations can also expose bias emerging from group-think, or the over-reliance on outdated, but ingrained procedures. When used in combination with standing operating procedures, simulations can expose procedural gaps and intra-organizational planning and logistical shortfalls. Similarly, simulations such as the ADG that emulates realistic command and control procedures may reveal interoperability issues and cross-sector communication conflicts. While any well-oiled simulation benefits from the participation of subject matter expertise, innovations often emerge from novice participants who are not blinded by preconceived notions or embedded bias.

Lights Out in Weaver County--IMPLEMENTATION

Over the past several years, we have used the Lights Out ADG to implement the blend of crisis response and clinical reasoning in a small cohort of students at the regional campus of the Penn State College of Medicine. Lights Out is notionally set in idyllic Weaver County; a fictionalized grouping of communities molded to emulate the topography and ethnography of Central Pennsylvania. Various synthetic products were created to provide a comprehensive description of its terrain, people, traditions and histories to form the backdrop of Weaver County. These products include a complete set of topographical county and community maps, a by-community demographic study, a countywide Strengths-Weaknesses-Opportunities-Threat (SWOT) analysis and a 200-year oral history. The polymorphic nature of Weaver County makes it suitable for employing various types of disasters - both natural and man-made. To date, Weaver County has been seen multiple crises including: power failure, pandemic, and an industrial disaster. Each crisis is tailored to meet specific learning objectives and drive specific individual and team-based cognitive and decision-making processes.

The Weaver County backdrop was originally created to support the Capstone course for Security and Risk Analysis students in the Penn State College of Information Sciences and Technology. The exercise causes students to consider life in a post-cyber society. In this iteration, the scenario is played out over nine weeks of the 15-week semester, in three parts: Part-1: *Taking Stock*, begins as soon as the lights go out. In this initial phase, community leaders identify immediate threats, conduct risk assessments and identify high-risk populations. Part-2: *Governance*, begins 30 days after lights out. In this phase community leaders have resolved that they must prepare for life in a post-cyber society. Issues such as governance and the identification of public and private property are at the forefront. Part-3: *Circle the Wagons*, is set some 6 months after lights-out. In this last phase community leaders must decide on one of three courses of action: 1) Cooperate, 2) Declare Independence, or 3) Conquer.

A truncated version of Lights Out was adopted for the medical school use and is conducted over four days. The attending scenario for both iterations includes a complete failure of the U.S. power grid; followed by a series of localized emergencies and compounding countywide failures. Teams are formed by community, with exercise participants taking on leadership roles to guide their respective neighbors through the ever-devolving crisis. As the scenario progresses (for both versions), it becomes obvious that identified issues cannot be fully resolved during the span of the exercise (a situation often found in the context of clinical decision making in real-life patient care). There are some notable differences in the execution of the two versions. For the longer (Capstone) version, participants have the luxury of time to contemplate many of the deontological issues that might arise over the span of such a crisis and to integrate these notions into problem solving and course of action development strategies. The time-constrained nature of the medical school version fosters a sense of priority and focus, which better emulates conditions under stress as may be found in a real crisis event. The differences between versions have exposed potential weaknesses in both cases; and have set the stage for the development of strategies to ensure future iterations include both long-range (contemplative) and time-constrained (crisis-focused) problems.

Even the best laid plans--LESSONS LEARNED

True to the red-team process, a comprehensive after-action (AA) review was conducted at conclusion of the medical school offering of the Lights Out ADG. The AA review was held in open discourse with all participants, facilitation and support staff present. All were encouraged to share their thoughts, insights, individual and team strategies and to ask unfiltered questions. Overall, the exercise was deemed a success, but not without issues. Several notable findings for process improvement were identified. One of the most important findings was the central role of participant personality. Throughout the exercise, it was clear that personality drives team goals and strategies. This can be for the good of the team and the exercise. It can also detract from learning and teamwork. Second, for medical students early in their training, policy issues seemed to be a distraction from their perceived primary focus—to learn medicine. As a result, there was a consistent plea to focus more on medical issues. This led to the next concern, which was a need to better define overall exercise purpose and goals in the context of both crisis response and how this relates to clinical reasoning and medical decision-making.

Finally, there was an identified need to address how best to induce and maintain a healthy level of stress and competition in the context of ethical decision making around medical issues. Without a sharp focus on the medical elements of the exercise, participants noted that they had difficulty embracing the exercise emotionally.

Ways forward

The beauty of the ADG is that it is highly adaptable. In order to maximize the ADG as an instrument to help train future medical students in crisis response and to augment their experience in developing clinical reasoning skills, the following discussion & recommendations are offered:

1) *"Personality drives team (community) goals and strategies."*
    a. Discussion: Teams tended to adopt the problem-solving style of the most prominent (or vocal) member(s). Two dominant models emerged in our scenario—a rules-based, equity model and a fairness-based model. Clausewitz describes the role personality plays in making command decisions. Personality has less influence on decisions by a commander implementing collective actions than in those cases where the commander is the chief decision-maker (Ferris 2005).
    b. Recommendation: Designate specific role-players/personalities for specific tasks. Doing so may encourage students to act out/think through problems that conflict with or run counter to their natural tendencies.
2) *"Some exercise elements detracted from primary mission focus."*
    a. Discussion: Issues of governance may be better addressed as part of the scenario, rather than as "items for resolution" by medical students whose (perceived) primary focus is to identify and resolve medical needs/requirements. Given the complexity of crisis situations, there will always arise those situations where there is no designated subject matter expert at hand, yet the issue must be dealt with.
    b. Recommendation: Add enough variety in the individual exercise injects to challenge participants to conduct problem solving, while not losing focus of the overall exercise objectives. Many of these issues, once contemplated, can addressed by down-range policy/course of action add-ons to the exercise.
3) *"Focus more on medical issues."*
    a. Discussion: The exercise includes many issues that are best addressed through a body of community policy-makers. This requires some simple but easily achieved redesign. Instead of having medical students act as overall community leaders, assigning them to medical advisory roles would free them up to address pressing medical issues. Community-wide policy decisions could be accounted for as exercise injects as the scenario roles out. The adaptive nature of the ADG allows for rapid changes to address this concern.
    b. Recommendation: Maintain the current Weaver County backdrop, and redesign the exercise scene setter and supporting exercise injects to focus on a specific medical crisis or associated medical aspects within a given crisis. The redesign of the exercise elements should be conducted in concert with the medical school faculty to identify specific learning outcomes, strategies and objectives.
4) *"Need to better define overall exercise purpose and goals."*
    a. Discussion: Many of the underlying purposes/goals are implied but go unstated over the course of the exercise. Some of this is intentional to allow participants to determine team priorities and goals; but much is due to the nature of the exercise design, where the shortened ramp-up time to the exercise causes medical student participants to concentrate on the information elements of the scenario; where their SRA counterparts have a 6-week lead-time to understand exercise purpose and goals.
    b. Recommendation: This concern can be addressed along with number 3 above.
5) *Need to induce and maintain stress & competition throughout."*
    a. Discussion: Several factors contributed to this concern, including the fact that the exercise was conducted in medical school classroom, interrupted by a weekend break, and the overall scenario focused mostly on long-term objectives, vice intermediate short-duration problems. On competition: earlier iterations of the exercise were dominated by game-theory prompted

competition, whereas the most recent iteration tended toward less overall competition and higher degrees of cooperation.

b. Recommendation: This concern can be addressed along with number 3 above.

6) *"Ethical discussions around medical issues are an important aspect of the exercise."*

a. Discussion: Many of the decisions/strategies adopted by the teams were made along demonological lines; but in retrospect, may not have aligned with the greater community needs.

b. Recommendation: This concern can be addressed along with number 3 above, with sufficient time set aside for larger group discussion, and should consider including medical faculty and outside experts in the mix.

7) *"Participants didn't/couldn't embrace the exercise emotionally."*

a. Discussion: The phenomena can be traced back to two primary factors: 1) Inability to associate with the scenario; and 2) The lack of vested interest. In the former, participants simply could not relate, either because they felt the problem was unrealistic or they simply, "fought the scenario." In the latter, absent a formal assessment component to the exercise, the participants considered the scenario as "fun to do activity," and not a component of medical school learning.

b. Recommendation: Along with item 3 above, formally integrate the ADG into the curriculum, with similar expectations borne of other medical school requirements, including scheduling, assessments and expectations.

6) *"There was a general lack of knowledge transfer from one exercise part to the next."*

a. Discussion: Students tended to approach the exercise as a series of sequential problems rather than a set of contiguous, related issues.

b. Recommendation: This concern can be addressed along with number 3 above. Construct a set of "bridging injects" between exercise parts to induce the notion of the crisis continuum such that they cause participants to consider the impact of past decisions/outcomes on future courses of action/outcomes.

7) *"Need for more analytic rigor."*

a. Discussion: Much of the focus was too "in-close," offering localized (based on individual cases) rather than more strategic (community-based) solutions.

b. Recommendation: This concern can be addressed along with number 3 above. During the design review process, identify the desired "analytic touchpoints" throughout the exercise where specific items are addressed and emphasis placed on the exercise as a corollary to the clinical reasoning process.

8) *"Failure to acknowledge people-to-people or community-to-community conflict not a realistic approach."*

a. Discussion: Some exercise participants chose to not address conflict-related issues such as, crime, lawlessness, corruption, etc., introduced across the scenario as they felt these concerns detracted from their ability to concentrate on more pressing medical issues. Conflict is a natural component of crisis and should be considered part and parcel to the pathology of most all disaster scenarios. Harris, et al (2013) address the convergence of natural disaster and conflict-affected states and the difficulty that exists in managing risk across this space. The role of conflict in the Lights Out scenario, or any other ADG for that matter, is meant to highlight the connectedness of the human dilemma with the crisis environment. It is not intended to be the overarching theme or principal analytic focus; but the issues surrounding conflict are worthy of consideration – how much attention need to paid across the scenario can be controlled through design.

b. Recommendation: During the design review process, identify the "conflict touchpoints" appearing throughout the exercise and the attention that should be placed on each.

CONCLUSION

The asymmetric nature of crisis, whether by mother nature or man-made, requires thought processes and analytic strategies that are dynamic, adaptable and tailorable to a wide range of possibilities. The analytic decision game is an effective pedagogical strategy to promote critical thinking in the context of developing clinical reasoning skills. The Penn State College of Medicine has developed a new and innovative approach to medical school education at its new regional campus. By employing trans-disciplinary educational strategies to create a flexible and integrated program of study, the program fosters the development of interprofessional team skills, curiosity, and commitment to the calling of Medicine. The new curriculum prepares students for the ongoing practice of evidence-based medicine in the rapidly changing healthcare environment of the 21st century.

The use of the Weaver County ADG is the perfect backdrop for medical students to develop the clinical reasoning skills required to address the needs of the local community and build a foundation for transferring these skills to a national and global context. Further adaptation of the ADG with a focus on long/intermediate objectives to build problems that focus on healthcare issues will likely strengthen the program and serve to augment current experiential learning and clinical immersion methodologies. The modular nature of the ADG also lends to transportability to other learning environments and situations.

ACKNOWLEDGMENTS

We thank all administrators, faculty and staff of the Penn State College of Medicine and those students who, thus far, have become members of the Weaver County community.

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