Public Administration Emergency Management Pedagogy: Cultivating the Habit of Critical Thinking

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ABSTRACT
There is a dearth of research focusing upon critical thinking skills of practicing local government emergency managers as well as the cultivation of critical thinking skills in public administration emergency management academic curricula. This exploratory research used the Watson-Glaser Critical Thinking Appraisal Form S (WGCTA-S) survey instrument to assess the critical thinking skills of 54 local government emergency managers. Independent sample t-tests were used to compare WGCTA-S scores of the local government emergency managers with a sample of 4,790 peer-level managers drawn from an archival WGCTA-S database. Recommendations are made regarding pedagogical approaches to cultivate the habit of critical thinking in public administration emergency management course curricula.

Local government emergency managers must assume and manage risk to protect the citizenry from harm as well as ameliorate property damage (Comfort, 2007). In the event of a natural or human-made disaster, local government emergency managers must have strong critical thinking skills to identify and anticipate situations, solve problems, and make decisions both effectively and efficiently. Comfort’s (2007) study emphasized the importance of critical thinking and cognition as central to the profession of emergency management. Currently, there is a dearth of research addressing the cultivation of critical thinking skills in public administration emergency management academic curricula. To bridge this gap in the academic literature, this exploratory research used the Watson-Glaser Critical Thinking Appraisal Form S (WGCTA-S) survey.
instrument to assess the critical thinking skills of 54 local government emergency managers. Independent sample t-tests were used to compare the WGCTA-S scores of the local government emergency managers with a sample of 4,790 peer-level managers drawn from an archival WGCTA-S database. The primary purpose of this research was to foment a dialogue regarding the cultivation of critical thinking skills in public administration emergency management curricula to better prepare public administration emergency management students entering the challenging profession of emergency management. In conclusion, recommendations will be made regarding pedagogical approaches to cultivate the habit of critical thinking in public administration emergency management curricula. These recommendations include the integration of case study analysis, academic service-learning projects, internship opportunities with trained Certified Emergency Managers (CEM), and FEMA certificate training in both face-to-face and distance (online) learning environments. This research should provide impetus for future research. Next, the context of local government emergency management is addressed.

**Content**

According to Haddow, Bullock, and Coppola (2008), local government emergency management is an essential function of public administration that broadly deals with risk and risk avoidance. Local government emergency managers play an essential role in the development of collaborative emergency management mitigation, preparedness, response, and recovery policies, plans, and procedures (Col, 2007; Henstra, 2010; Waugh & Streib, 2006). Local government emergency managers are responsible for the safety and well-being of communities (Drabek & Hoetmer, 1990). Since all disasters are local, effective local government emergency managers must have perspicacious critical thinking skills (Perry, 2003). Although several disparate academic fields and disciplines teach emergency management, emergency management curricula in public administration departments are proliferating (Somers & Svara, 2009). Therefore, research addressing practicing local government emergency managers’ critical thinking skills as well as elaboration regarding the cultivation of critical thinking skills among public administration emergency management students entering the profession is warranted. The limitations of this research deserve elaboration.

**Limitations of This Research**

This exploratory research focuses on the 54 \( n = 54 \) local government emergency manager survey respondents from the Commonwealth of Virginia. The researchers conducted a convenience study in the Commonwealth of Virginia due to the proximity of the researchers to the study’s local government emergency manager survey population. Another research limitation is that the methodological scoring is based on mean and standard deviation only, and test
questions are not revealed. Also, since the WGCTA-S survey was conducted anonymously, information on age, gender, educational background, and training of the local government emergency managers surveyed is not provided. Hence, the researchers are not contending that there is any existing correlation with demographic trends, previous education, emergency management training, and the local government emergency managers’ results on the WGCTA-S critical thinking assessment. Finally, the researchers acknowledge that a dearth of trained professional CEMs among the survey population may be an additional research limitation. The research methodology is presented next.

**Methodology**

In this exploratory quantitative study, 141 local government emergency managers were eligible to participate. Approximately 141 participants were solicited by e-mail and phone; 70 local government emergency managers registered to participate in the survey assessment. Although 70 local government emergency managers agreed to participate, 63 began the assessment and 54 completed the assessment (38.29%). The final sample size was 54 participants (n = 54). After a careful review of a number of critical thinking tests, including the California Critical Thinking Skills test, Cornell Critical Thinking Skills test, Ennis-Weir Critical Thinking Skills test, the James Madison Critical Thinking Skills test, and the Watson-Glaser Critical Thinking Appraisal, the Watson-Glaser Critical Thinking Appraisal was selected as the instrument for this study. The Watson-Glaser Critical Thinking Appraisal (WGCTA) is a well-validated critical thinking skills appraisal. In addition, the WGCTA met a number of administration requirements such as suitability of the intended testing audience, availability to administer over a wide geographic area while maintaining security, time for participants to complete, costs for administration, and the researcher’s professional qualifications to administer the WGCTA. The Watson-Glaser Critical Thinking Appraisal–Short Form (WGCTA-S) was used to measure the critical thinking ability of local government emergency manager testing participants. The WGCTA-S measures an overall cumulative score and five areas of critical thinking: (a) inference, (b) recognition of assumptions, (c) deductive reasoning, (d) interpretation, and (e) interpretation. Three reasons supporting the generalizability of this study to other areas of the United States are presented.

**Generalizability of Findings**

The researchers contend that this exploratory study is generalizable to other areas of the United States, for three reasons. First, the target population for this study included all local government emergency managers working in the 39,598 square land miles in each of the seven emergency management regions in the Commonwealth of Virginia. Each of the seven Commonwealth of Virginia emergency management regions is comprised of a combination of county,
city, and town emergency management programs. Secondly, the geographical differences from the Southwest Virginia Appalachian Mountain region to the Chesapeake Bay and Atlantic Ocean Coastal region represent geographical challenges for emergency management in the Commonwealth of Virginia. The disparate geography of the Commonwealth of Virginia includes beaches and mountains resulting in an increased vulnerability within the state to natural disasters such as thunderstorms, winter storms, hurricanes, and landslides. A third reason for generalizability is that the Commonwealth of Virginia is home to the United States Navy Atlantic Fleet. Additionally, the Commonwealth of Virginia's close proximity to the nation's capital, Washington, D.C., increases the state's vulnerability to a terrorist-related incident, as evidenced by the 9/11 attack on the Pentagon. Given that this study included Commonwealth of Virginia local government emergency managers from all seven emergency management regions, the disparate geography of the Commonwealth of Virginia, and the proximity of the Commonwealth of Virginia to the nation's capital and military presence, the results of this survey could be generalized to other areas of the United States. Next, a summary of the research findings is provided.

**Summary of Findings**

The 54 local government emergency managers' scores on the WGCTA-S were completed automatically by the test publisher. Raw data was extracted by the publisher to enable the researchers to conduct statistical analysis. The WGCTA-S measured the participants' overall performance scores and their scores in five specific critical thinking skills: (a) inferences, (b) recognition of assumptions, (c) deductive reasoning, (d) interpretation, and (e) evaluation of arguments. The mean scores of the study's local government emergency manager participants were as follows: composite = 28.0185, inference = 4.2963, recognition of assumptions = 5.7407, deductive reasoning = 6.1481, interpretation = 4.9074, and evaluation of arguments = 6.9259. Three statistical measures were used to analyze the results of this study: (a) mean, (b) standard deviation, and (c) t-test. Data was analyzed using Statistical Package for the Social Sciences (SPSS) version 14.0. A mean score was used to measure central tendency by calculating the sum of all scores and dividing by the total number of scores. The mean scores, in this study, are important because the mean scores provide insight into the critical thinking skills of the local emergency managers as tested by the WGCTA-S. The researchers analyzed the scores for the composite and five subcategories of the WGCTA-S and then calculated the associated mean scores. The cumulative mean score in this study is 28.0185, and the raw composite scores range from 18 to 39. The local government emergency managers' cumulative mean score was lower than the cumulative mean score derived from archival management cases within the WGCTA-S database (30.6338). This local government managers' cumulative mean score suggests
a lower level of ability in recognizing assumptions among local government emergency managers as compared to management cases in the WGCTA-S archival database.

The standard deviation (SD) of scores is the average deviation from the mean. The standard deviation describes how a set of scores relates to the mean of a sample. While the standard deviation for the cumulative score of local government emergency managers in the Commonwealth of Virginia was 4.84667, the managers’ cases in the WGCTA-S archival database demonstrated a standard deviation of 5.45273. Table 1 summarizes the means and standard deviations of the cumulative and subtest scores among the local government emergency managers and the WGCTA-S manager database.

Table 1. 
Means and Standard Deviations of 54 Local Emergency Managers in Virginia versus WGCTA-S Managers Database

<table>
<thead>
<tr>
<th>Assessment Categories</th>
<th>Local Government Emergency Managers in Virginia</th>
<th>WGCTA-S in Virginia Managers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N M SD</td>
<td>N M SD</td>
</tr>
<tr>
<td>Cumulative Score</td>
<td>54 28.0185 4.84667</td>
<td>4790 30.6338 5.45273</td>
</tr>
<tr>
<td>Inference</td>
<td>54 4.2963 1.25337</td>
<td>4790 4.8768 1.59133</td>
</tr>
<tr>
<td>Rec. Assumptions</td>
<td>54 5.7407 1.92486</td>
<td>4790 5.9273 2.11146</td>
</tr>
<tr>
<td>Deduction</td>
<td>54 6.1481 1.75271</td>
<td>4790 7.0388 1.67242</td>
</tr>
<tr>
<td>Interpretation</td>
<td>54 4.9074 1.34961</td>
<td>4790 5.3616 1.40605</td>
</tr>
<tr>
<td>Eval. Arguments</td>
<td>54 6.9259 1.39881</td>
<td>4790 7.4292 1.32025</td>
</tr>
</tbody>
</table>

An independent t-test used to compare the means between the local government emergency management sample population and the archival management group in the WGCTA-S database determined the two means were significantly different at a confidence level of 95%. The t-test for equality of means found $t = 3.5085$ with a df of 4,842 (99.95 confidence level). The t-test for equality of means found $t = –1.852$ with a df of 46 and P-value of 0.05. This score indicates that the means existing between the two groups is significantly different at the selected confidence level. In each of the five WGCTA-S critical thinking skill assessment areas, the local government emergency managers’ scores fell below the scores taken from the archival WGCTA-S management database. The research findings are presented in the following section.
Discussion of the Findings

Cumulative

The cumulative scores of local government emergency managers’ ability to think critically demonstrated a mean score of 28.0185 (SD = 4.84667). This score fell below the mean management score of 30.6338 in the WGCTA-S management archival database. Managers in the WGCTA-S archival database were comprised of a number of professional disciplines to include those managers in advertising, education, financial services, government/public service/defense, health care, information technology, manufacturing, professional business services, and retail/wholesale. Scoring below the mean management score suggested that local government emergency managers in the Commonwealth of Virginia would be more likely than other management peers in the WGCTA-S archival database to perhaps misinterpret situations and issues often, miss opportunities to gain information valuable for decision making or problem solving, erroneously apply logic or reasoning when analyzing information, and draw unwarranted conclusions that are not able to be verified. The local emergency managers’ WGCTA-S scores on the five critical thinking areas compared to the mean scores from the archival WGCTA-S database are delineated.

Inductive and Deductive Reasoning

The measurement for the concept of inductive reasoning, the ability of the local government emergency managers to make decisions based on what they already knew about a series of actual statements, demonstrated a mean score of 4.2963 (SD = 1.25337). This score fell below the mean management score of 4.8768 in the WGCTA-S database. The measurement for the concept of deductive reasoning, the ability of local government emergency managers to make decisions based on the information given within specific statements or premises, demonstrated a mean score of 6.1481 (SD = 1.75271). This score fell below the mean management score of 7.4292 in the WGCTA-S database. Scoring below the mean indicated that local government emergency managers in the Commonwealth of Virginia scored less than 40% as compared to the individuals in the management group in the WGCTA-From S database and in comparison might be less likely to be skilled in conducting effective analysis and decision making. In addition, scoring below the mean in inductive and deductive reasoning suggests that local emergency managers in the Commonwealth of Virginia may be challenged to gather sufficient information, weigh information appropriately, and make sound decisions. Local government emergency managers may improve their inductive and deductive thinking skills by gathering and incorporating additional information before making a decision. Local government emergency managers may also improve their inductive and deductive reasoning skills by ensuring that the information being reviewed is relevant and significant to the problem being analyzed and by ensuring that the decisions are based on supporting evidence.
Interpretation

The measurement for the concept of interpretation, the ability of the local government emergency managers to weigh the evidence of given data and determine appropriate generalizations, demonstrated a mean score of 4.9074 (SD = 1.34961). This score too fell below the mean management score of 5.3616 in the WGCTA-S database. This finding suggests that the local government emergency managers may have difficulty with interpretation of evidence without generalizing to unwarranted conclusions as compared to other managers in the WGCTA-S database. Scoring below the mean indicated that the local government emergency managers scored lower than 40% of the individuals in the management WGCTA-S database and in comparison might be less likely to be skilled in interpretation as compared to management peers. Local government emergency managers may improve their data interpretation skills by being mindful of the evidence necessary to support and reject arguments. By doing so, local government emergency managers may be better able to remain objective when interpreting information. Local government emergency managers may also want to take into consideration emotions as they relate to decision making to ensure that emotional responses do not diminish effective critical thinking skills.

Recognition of Assumptions

When thinking critically, individuals often alternate between recognizing assumptions and evaluating arguments. An individual who is able to recognize faulty assumptions and/or weak arguments is more likely to arrive at appropriate conclusions. The measurement for recognition of assumptions, the local government emergency managers’ ability to recognize assumptions and presumptions based on a number of assertive statements, demonstrated a mean score of 5.7407 (SD = 1.92486). The mean score for local government emergency managers was below the mean score of 5.9273 of the WGCTA-S database. Scoring below the mean suggests that those local government emergency managers are perhaps less likely to be skilled in recognizing assumptions. The research findings suggests that local government emergency managers may have more difficulty identifying what is expected or assumed to be true in some situations. The local government emergency managers surveyed may also have difficulty defining and redefining issues and exploring alternative points of view as compared to other managers in the WGCTA-S database. Local government emergency managers may have more difficulty than their management peers in the WGCTA-S database to make logical conclusions that clearly and objectively define complex problems and situations. Local government emergency managers may improve their ability to recognize assumptions by considering different perspectives and digging deeper into the details of an issue. By asking or framing questions differently, local government emergency managers may create new assumptions. Engaging stakeholders in
discussions such as emergency planning sessions may enable and encourage local emergency managers to challenge their own assumptions and gain a new understanding of an issue or aid in the development of a new and unique perspective. Local emergency managers may improve critical thinking by identifying scenarios and associated underlying assumptions. While ranking the likeliness of each assumption related to the situation is important, it is also essential to consider the implications and the consequences if a major decision is made on the basis of an erroneous assumption.

**Evaluation of Arguments**

The measurement for the evaluation of arguments, the ability to decide whether arguments are strong and relevant given a particular question, demonstrated a mean score of 6.9259 (SD = 1.39881) among local government emergency managers in the Commonwealth of Virginia. This score too fell below the mean management score in the WGCTA-S database of 7.4292. Scoring below the mean indicated that local government emergency managers in the Commonwealth of Virginia scored less than 40% of the individuals in the management WGCTA-S database and in comparison might be less skilled in evaluating arguments. This finding suggests that local emergency managers surveyed in this research may have more difficulty than their management peers not only in evaluating arguments based on the relevance and strength of evidence but also in analyzing information objectively as compared to other managers. Local emergency managers may improve their ability to evaluate arguments by taking the time to identify the criteria that are essential to evaluate information. For example, local government emergency managers may want to examine information for clarity, relevance, credibility, logic, accuracy, consistency, comprehensiveness, timeliness, and fairness. Local government emergency managers may also want to search for additional information to differentiate between reasons that appear to be correct and evidence that provides strong support for the reason. Justification of proposed pedagogical recommendations is presented next.

**JUSTIFICATION OF PROPOSED PEDAGOGICAL RECOMMENDATIONS**

The WGCTA-S measured the local government emergency management study participants’ overall performance scores and their scores in five specific critical thinking skills: (a) inferences, (b) recognition of assumptions, (c) deductive reasoning, (d) interpretation, and (e) evaluation of arguments. This exploratory quantitative research suggests that the mean WGCTA-S scores of the practicing local government emergency managers fell below the WGCTA-S scores taken from the WGCTA-S management archival database in all five aforementioned critical thinking assessment categories. Therefore, pedagogical recommendations regarding the cultivation of critical thinking skills among public administration emergency management students entering the profession are warranted.
Given the proliferation of emergency management course curricula in departments of public administration, it is clearly incumbent on the field of public administration to begin to determine how to cultivate stronger critical thinking skills among public administration students entering the profession of emergency management. The researchers have several recommendations for public administration emergency management pedagogical improvement that may enhance critical thinking skills among public administration students entering the challenging field of emergency management. To enhance student critical thinking abilities in all five WGCTA-S areas of critical thinking skill development, to include (a) inferences, (b) recognition of assumptions, (c) deductive reasoning, (d) interpretation, and (e) evaluation of arguments, the researchers recommend the use of case study analysis, service-learning projects, internship opportunities, and the free-of-cost FEMA certificate courses. These pedagogical recommendations for public administration emergency management course curricula could be used in both face-to-face and the burgeoning distance (online) course curricula development in public administration emergency management. Depending on the public administration emergency management course design, all four pedagogical recommendations could be used separately or in conjunction to enhance public administration emergency management student critical thinking skill development. In conclusion, each of the four pedagogical recommendations is discussed.

CONCLUSION
In this section, the researchers elaborate on how the pedagogical recommendations of the case study analysis, service-learning projects, internship opportunities, and the free-of-cost FEMA certificate courses may enhance public administration emergency management student critical thinking skill development. According to Kiltz (2009), professors in public administration emergency management programs should design and implement emergency management courses that enable students to learn through problem solving, questioning, and discussing issues focusing on both lectures and texts (p. 20). Kiltz (2009) stated that public administration emergency management students may develop stronger critical thinking skills by use of case study analysis. Many scholars agree that case study analysis is an excellent method of cultivating critical thinking skills among students in public administration (Abel, 2009; Shields, 2003; Yeung, 2008). Through case study analysis, public administration emergency management students are able to discuss the successes of strong critical thinking by examining emergency management scenarios through analysis of the decisions that were made by incident command and then interpreting the subsequent results of those decisions. Case study analysis also has the benefit of allowing public administration emergency management students to understand the results of transgressing against the rules of strong critical thinking in emergency management scenarios. Public administration emergency management students are able to read about the deleterious consequences of
poor critical thinking and subsequent poor decisions without having to endure the horror of witnessing the loss of life and property damage firsthand.

In addition, academic service-learning projects among public administration emergency management students working with county-, city-, and town-trained CEMs may also help cultivate the habit of student critical thinking by exposing the emergency management students to real-world projects that require real-world solutions (Imperial et al., 2007; Lambright & Lu, 2009, Reinke, 2003). Through academic service-learning projects, public administration emergency management students could develop a county, city, or town emergency management plan or university critical incident management plan. Academic service-learning projects would benefit the public administration emergency management students as well as the county, city, town, or university for which the students would be working. Academic service-learning projects expose public administration students to the real-world work of trained CEMs and may help cultivate the habit of critical thinking as the public administration emergency management students integrate theory and practice.

Internship opportunities among students of emergency management and emergency management agencies and departments may also help cultivate the critical thinking skills of emergency management students in public administration. Working alongside practicing trained CEMs would expose the public administration emergency management students to the day-to-day emergency management activities that take place at the federal, state, county, city, or town level. The public administration emergency management students could then compare theory and practice under the tutelage of a trained CEM. Public administration emergency management university faculty could also facilitate course discussion around both service-learning projects and the public administration emergency management students’ practical field internship experiences (Cross & Grant, 2006; Harris & Emerson, 2001; Wheeland & Palus, 2010).

Furthermore, public administration curricula in both face-to-face as well as distance learning courses (online) could use the free-of-cost FEMA independent certificate studies offered on the FEMA education website. The integration of the FEMA certificate studies would enable students of public administration to earn FEMA course certificates. Completing the free-of-cost FEMA online training and then passing the online certificate test would result in a FEMA certificate of training being e-mailed to the public administration emergency management students. Inclusion of the FEMA certificate in public administration emergency management curricula may cultivate student critical thinking skills and interest in the profession of emergency management. In addition, allowing students to earn FEMA certificates while in public administration undergraduate and MPA programs would enhance student resumes and assist with student employment upon graduation. The final section of this paper addresses recommendations for future research.
RECOMMENDATIONS FOR FUTURE RESEARCH

Future research should begin to focus on further examination of practicing local government emergency managers’ critical thinking skills with regard to the demographic, training, and educational backgrounds of the practicing local government emergency managers. In addition, future research should assess the myriad approaches by which emergency management is currently taught in public administration departments across the United States both face-to-face and through distance learning (online). Pedagogical best practices should be benchmarked by other institutions of higher education to cultivate the habit of critical thinking among public administration emergency management students. Additional peer-reviewed research in public administration journals building from this exploratory research would be helpful for the public administration emergency management academic community. Furthermore, the area of public administration emergency management pedagogy is an interesting topic for future doctoral dissertations in the field of public administration. As regards face-to-face academic and practitioner conference presentations, public administration academics and practitioners alike should engage in conference presentations about public administration emergency management pedagogy. These conference presentations should be held at local as well as national American Society of Public Administration (ASPA) conferences. Finally, future research should be conducted on cultivating the habit of critical thinking among students in public administration emergency management curricula in terms of using new and emerging technologies such as critical incident command simulators that are currently used for training by the United States military, fire departments, and police departments across the United States.

REFERENCES


Matthew Collins earned his PhD at the Center for Public Administration and Policy (CPAP) at Virginia Tech in 2003. Dr. Collins has been published in peer-reviewed journals such as Administration and Society, Journal of Homeland Security and Emergency Management, Journal of Social Change, Disaster Prevention and Management, Disasters: Journal of Disaster Studies, Policy, and Management, and Journal of Emergency Management. Dr. Collins can be reached at matthew.collins@email.waldenu.edu.

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