

# Applying Student-Centered Learning Concepts to a Doctoral, Introductory, Interdisciplinary Public Affairs Course

Gerald-Mark Breen  
Jonathan Matusitz  
Thomas T. H. Wan,  
University of Central Florida

## ABSTRACT

Public Affairs is a rapidly growing field and continues to be taught using a variety of pedagogical approaches. To improve methods of enhancing pedagogy in diverse, introductory-level, Public Affairs doctoral classrooms, instructors must recognize the diversity of students' interests and the abilities of students to share ideas with one another, in order to achieve optimal learning and productivity as rising scholars. Student-centered learning offers a sound methodology and framework by which both the instructor and students can collaborate, in an effort to maximize learning and scholarly output. As such, this study aims to reveal the capacity for student-centered learning, a pedagogical theory that can be put into practice in order to attain a high degree of Public Affairs education in the academic environment.

For those teaching an introductory course in Public Affairs that aims to integrate or implement specific interdisciplinary content – such as criminal justice (CJ), health affairs (HA), public administration (PA), or social work (SW) – the instructor's pedagogical approach, using concepts of student-centered learning (SCL) to achieve an optimal educational protocol for doctoral-level students, represents a potential method for advancing the teaching and learning of Public Affairs coursework and its selected subject matter. To this end, the purpose and goal of this essay is to pose relevant theoretical, exploratory, and rhetorical contentions on how to frame and conduct a course of this description.

This analysis is framed in the following format. First, a rationale is provided to justify the value of this research and the important results that may be extrapolated and/or deemed practical in Public Affairs' courses, and in the collegiate applications relating to this unique field of study. What follows, given the theo-

*Applying Student-Centered Learning Concepts  
to a Doctoral, Introductory, Interdisciplinary Public Affairs Course*

retical nature of this study, is an in-depth discussion of SCL, encompassing its definitions and history, as well as its past and current implications. This theoretical foundation serves to drive the rhetorical and analytical components of this study, and aims to enhance and advance teaching and learning within the realm of Public Affairs academic coursework.

In doing so, Public Affairs, as commonly understood throughout the academic domain (by comparing and reaching common ground on available, introductory-level, Public Affairs syllabi for doctoral students) (Adams, 2006), is the target of pedagogical re-examination and refinement – via the lens of SCL. This generates a series of commentaries that aim to influence Public Affairs researchers and professors who dedicate their careers to regularly teaching and polishing their practice. Enhancing SCL teaching and learning also should improve occupational competence for graduates who work in sectors that require employees to be knowledgeable, and to be trained in this broad-spectrum field.

#### RATIONALE

Public Affairs as an academic discipline has struggled to achieve consensus regarding its identity. This is due to the wide variety of sub-disciplines that typically comprise the subject, as well as the diverse ideologies set forth by leading scholars in the field (Hewins-Mahoney & Williams, 2007). Wan (2006) established a definition of the field as it relates to the academic, scholarly, and public environments. His definition will serve as the overarching description of what encapsulates the essence of the Public Affairs discipline in this study:

Public Affairs is an interdisciplinary field of education and research training on the administration and management of the complex relationship between public services organizations and their external environments. Practitioners have been trained for the tasks of intelligence gathering and analysis, internal communication and developing external action programs that interact with government, communities and the general public (p. 338).

In addition, Public Affairs is a “young discipline that has experienced considerable growth in a short time” (Adams, 2006, p. 355). Because of the ever-changing teaching environment and the diverse methods of pedagogy that are applied in the classroom (Denhardt & Campbell, 2005; Estes, 2004; Iyoshi, Hannafin, & Wang, 2005; Piaget, 1976), it is important to investigate the options to improve learning, as they relate to Public Affairs courses. This is particularly applicable to interdisciplinary programs that encompass and integrate CJ, HA, PA, and SW, and to introductory-level coursework for new doctoral students in the field of Public Affairs.

Student-centered learning (SCL) is an educational strategy that for genera-

*Applying Student-Centered Learning Concepts  
to a Doctoral, Introductory, Interdisciplinary Public Affairs Course*

tions has been acclaimed and embraced by scholars of pedagogy and everyday teachers (Pedersen & Liu, 2003). More recently, SCL is increasingly accepted in the classroom environment as a way to enhance and advance student learning (Motschnig-Pitrik & Holzinger, 2002; Pedersen & Williams, 2004). Although similar studies have been conducted to devise strategies for teaching a large, student-centered, lecture-style course in Public Affairs (Hansen & Rubin, 1997), no identifiable publications contained research that focused on the broader, interdisciplinary scope of Public Affairs. The course described in Hansen and Rubin (1997) did not directly engage policy analysis, public management, and public policy as part of its core emphasis — a common thread that runs through many Public Affairs courses (Adams, 2006).

The purpose of this study is to speculate and propose sound suggestions and commentary on how to integrate pedagogical strategies that use SCL, into a specific interdisciplinary course in Public Affairs: Criminal Justice (CJ), Health Affairs (HA), Public Administration (PA), and Social Work (SW).

STUDENT-CENTERED LEARNING: DEFINITIONS, HISTORY, AND STIPULATIONS  
*SCL Defined*

Student-centered learning (SCL) is defined as an approach to pedagogy that concentrates on the needs of students, as opposed to anybody or anything else involved in the institution or the instructional process (e.g., other educators, staff) (Iyoshi, Hannafin, & Wang, 2005). Because of this emphasis on the student, the SCL style of teaching and learning importantly influences the planning of the syllabus, and of course material to be taught. SCL targets and is tailored to the special needs, abilities, interests, and learning preferences of the student (Pedersen & Williams, 2004). In this case, the teacher – or professor in the context of the university setting – acts as a learning facilitator. By the same token, student voices are central to the learning experience of SCL (Estes, 2004); SCL demands that students be actively involved in and accountable for ensuring individual learning and knowledge-acquisition. In this study, the examples and suggestions provided by the authors will focus only on stipulation – i.e., work in collaboration with other learners (Estes, 2004).

*SCL History: Theorists and Development*

Behind every theory is an inventor — a creator — so to speak. In the case of SCL, several theorists were responsible for the advent and continual renewal of understanding on this theory, its implications, and its tenets: John Dewey (Dewey, 1916), Jean Piaget (Piaget, 1976), Carl Rogers (Rogers, 1969), and Lev Vygotsky (Vygotsky, 1978). These four behavioral, social, and educational theorists concentrated their works and efforts on how students learn (von Glasersfeld, 1993). They were also most directly responsible for advocating the notion and practice of SCL (Brooks & Brooks, 1993).

*Applying Student-Centered Learning Concepts  
to a Doctoral, Introductory, Interdisciplinary Public Affairs Course*

Historically, and at the inception of pedagogy research, instructors were at the focal point or center of learning, while students' roles in the educational process were strictly receptive (Bruner, 1961). Constructivism – a pedagogical paradigm shift and a key theory in educational research (Brooks & Brooks, 1993) – jolted theorists at the time, and spawned the idea that humans, including students, can cognitively receive and apprehend information via an active construction of their own learning. Dewey, Piaget, and Vygotsky had a common theme in their research, which was that students learn in a student-centered fashion. SCL signified a direct rotation of the earlier, long-established teacher-centered process, because it switched or evolved into a more effective method of placing students at the core of the knowledge-acquisition process.

*SCL Stipulations*

Enumerated features of SCL require itemization, which provides an accurate assessment and comprehension of the pedagogical approach and learning style to be achieved.

In essence, students

- (a) Actively participate in their learning;
- (b) Make decisions about what and how they will learn;
- (c) Construct new knowledge and skills by building on their current knowledge and skills;
- (d) Understand expectations and are encouraged to use self-assessment measures; and
- (e) Work in collaboration with other learners (Estes, 2004).

When teachers apply this style of learning, they often facilitate student-learning by helping their pupils work through complicated tasks, and by posing open-ended questions to steer and direct them toward a conclusion that conforms to the model of SCL (Iyoshi, Hannafin, & Wang, 2005). Because this manner of learning instructs students to engage in an active quest for meaning, the goal is to construct knowledge rather than to receive it passively. Similarly, the learner, or student, should be shaped by the activities and experiences being taught by the instructor.

EXAMPLES OF INTEGRATION OF SCL  
IN PUBLIC AFFAIRS INTERDISCIPLINARY COURSEWORK

In this section, each interdisciplinary component of the previously described Public Affairs class is examined. Embedded and highlighted within each disciplinary subsection — one for each of the four individual disciplines (CJ, HA, PA, SW) in the interdisciplinary field of Public Affairs — are techniques designed for applying tenets or general practices derived from SCL, which helps achieve optimal results for students and teachers, in terms of pedagogical effectiveness and real-life application.

*Criminal Justice*

A primary component of the Public Affairs field is the study and domain of criminal justice (CJ) administration. CJ, as a field of study, represents an integration of national, state, and local governments — including their systems, organizations, and practices to maintain social control, to prevent, deter, and control criminal activity, and to enforce penalties against those who infringe on existing laws and rules (Hanes & Hanes, 2005). For example, local police departments, the Federal Bureau of Investigation (FBI), the Central Intelligence Agency (CIA), and the U.S. Dept. of Homeland Security, are a few elements that encompass the vast array of CJ topics and organizations taught in the classroom, and that are researched by those studying the CJ realm in general, and the Public Affairs interdisciplinary field in particular.

Clearly, each student may have unique areas of study within CJ, as it relates to Public Affairs. Yet the goal is to carefully and relevantly draw select topics related to CJ, from various, interdisciplinary components of Public Affairs. Because SCL places the student at the center of learning (Hansen & Rubin, 1997) as an active participant in the acquisition of knowledge, and while other students (both inside and outside the CJ field) may lend valuable ideas to build upon each other's topics — not to mention that the professor should serve as a learning facilitator (Hansen & Rubin, 1997) — there are several potential methods of integrating the interdisciplinary domains of Public Affairs into topics primarily germane to CJ.

For example, suppose a hypothetical student is interested in how to minimize or prevent terrorist attacks on U.S. soil by generally increasing the overall spectrum of security in airports, on and around coastal areas, at U.S. border sites, and in areas using regular “open-eye” security methods (i.e., neighborhood watch). Knowing that this topic requires a sophisticated understanding of an array of elements that include more than just security or CJ, the instructor can advise the student – via actively engaging SCL concepts – on the complexity and interrelation of these numerous facets.

Possible external disciplinary issues that should be suggested by others with knowledge or interest in these areas include

- (a) Hospital preparedness (Matusitz, 2007) (if attacks occur and render wounded casualties);
- (b) Telemedicine (for health communication across a distance) (Matusitz & Breen, 2007a, 2007b);
- (c) Knowledge of public policy, government regulations, and public administration for enabling government officials to enforce higher levels of security (Smith, 2006); and
- (d) The psychological effects of terrorism on people (Breen, 2008; Matusitz & Breen, 2006), which require the understanding and possible implementation of social workers (Netting, Kettner, & McMurtry, 2007)

*Applying Student-Centered Learning Concepts  
to a Doctoral, Introductory, Interdisciplinary Public Affairs Course*

to consult with those directly and indirectly involved in the forefront of terrorism and terrorist attacks.

Generating an array of relevant ideas is generally difficult for an individual to assemble without the insight of others (Rogers, 1969) from different disciplines, the professor, and the student's active engagement to seek and understand this additional, pertinent information. Hence, the professor of the class, other professors with more specialized interests in these areas, other students from inside and outside these specific areas, and the active engagement of students toward this concept, are all necessary for enhanced learning and increased knowledge on the breadth and depth of such topics. With regard to the goal expressed earlier about SCL, the eventual unification of all segments of Public Affairs topics should be attained and addressed in this type of study.

*Health Affairs*

An important discipline that may fall into a Public Affairs course is health, or health affairs (HA). In general terms, HA might encompass all facets of the U.S. Healthcare System, which ranges from Medicaid and Medicare, to hospitals, nursing homes, and practitioners' diagnostic and treatment decisions (Lin, Leu, Breen, & Lin, 2008; Mackenzie & Lowit, 2007; Matusitz & Breen, 2005; Matusitz & Breen, 2007a, 2007b; Zhang, Unruh, Liu, & Wan, 2006). Given that this field encapsulates a wide variety of subjects, it appears to be a matter of common sense to recognize the necessary integration of knowledge and analytic skills that draw from policy (e.g., HIPAA [the Health Insurance Portability and Accountability Act], NHRA [the Nursing Home Reform Act] of 1987), governmental organizations (e.g., FDA [the Food and Drug Administration], CDC [the Centers for Disease Control and Prevention], AMA [the American Medical Association]), psychological and social-work implications and contributions (i.e., social workers dealing with families of dying relatives, or psychiatric and psychological experts designing treatments), as well as other areas relevant to Public Affairs.

Using a concrete, yet hypothetical, example, suppose an HA student is interested in minimizing nursing home deficiencies – issues relating to quality of care and incidence rates (Breen & Zhang, 2008) – by designing a policy to reduce deficiencies. As such, a wide scope of interdisciplinary incorporation becomes essential. The professor can identify how this topic immediately relates to the NHRA (a law enacted by the government to enhance resident care) (Zhang, Unruh, Liu, & Wan, 2006). Immersing the student in the NHRA prompts a basic understanding of the original law that was created to enforce proper treatment and care of nursing home residents. Other students involved in SW can easily recognize and suggest to the HA student that the utilization of social workers and psychologists in conjunction with speech therapists is common practice in nursing homes for residents suffering from cerebral stroke effects (Mackenzie and

*Applying Student-Centered Learning Concepts  
to a Doctoral, Introductory, Interdisciplinary Public Affairs Course*

Lowit, 2007), and also for preserving the mental health or psychological integrity of residents. Students who are interested in PA then can address the steps necessary to propose and enact a policy that would achieve its fully intended effect in Congress, and in the Judicial and Executive branches of U.S. government. As such, the critical factors of engaging all individuals — mainly the student — plus further influence and pressure from the professor and other students, create the forces behind achieving an effective SCL outcome.

*Public Administration*

Public Administration (PA) is a prominent discipline in Public Affairs curriculum and research. PA is roughly defined as the sector that comprises federal, state, and local government agencies (Adams, 2006; Denhardt & Campbell, 2005; Smith, 2006). The purpose of these agencies is to administer, monitor, and maintain public programs. They also typically hold legislative, judicial, and executive superiority over other organizations, within specific and clearly marked vicinities (Raadschelders & Douglas, 2003; Smith, 2006).

Although *prima facie* there may be no apparent association between PA and HA, a student whose interests lie in PA, and who also serves as an assistant to a state representative, could consider the idea of proposing a new healthcare plan designed to improve clinical access for indigent, disadvantaged residents who live within a clearly marked socioeconomic, sociogeographic location. The PA student, who may believe that this region lacks providers and has few resources to cover medical care expenses, must now think beyond a purely governmental arena and enter into the interdisciplinary realms of Public Affairs.

In this regard, SW becomes an important element to understand the psychosocial conditions of a given population that needs improved healthcare services (Netting, Kettner, & McMurtry, 2007). The instructor can point this out to the PA student, and engender the SCL process by having other students actively engage in a group discussion with that student on the SW element of the topic. Because HA students also need to be alerted to this topic, the professor, as a facilitator of learning, should instruct the PA student to investigate HA information and consult with other HA students for assistance and advice. HA involvement is important for integration in this occupational and academic quest by the PA student, because the population's health conditions, preexisting conditions, health outcomes, trends in disease rates, and predispositions to disease risks become compelling material for consideration, as derived from the HA sector of Public Affairs.

Risk factors such as drug use and criminal activity (Hanes & Hanes, 2005) could also affect the hypothetical situation that this PA student faces. Hence, CJ students, via SCL tenets that include active participation of students when learning, and construction of new knowledge and skills by building on their (students') current knowledge and skills, should lend their input, as should the

*Applying Student-Centered Learning Concepts  
to a Doctoral, Introductory, Interdisciplinary Public Affairs Course*

professor, on the CJ factors that may contribute to this problem. It is clear to see how student-centered learning can tremendously facilitate the said PA student toward the goal of amending legislation, as previously described.

*Social Work*

Social work (SW) – and often social services and social policy – tie into the Public Affairs discipline as an important segment of this interdisciplinary field. SW, within the context of Public Affairs, as well as the practices associated with SW, consists of activity designed to promote and enhance the social conditions of a given community or communities — particularly those groups who fall into disadvantaged categories via social services and psychological counseling (Clare & Mevik, 2008).

The following example clarifies how a SW student can benefit from a support system that is based on SCL and includes an interdisciplinary team of Public Affairs scholars. Some SW practitioners work in the community and help organize campaigns to combat specific social issues that occur in their environments (Netting, Kettner, & McMurtry, 2007). One major issue is the high teenage pregnancy rate in inner-cities (Farber, 2003). An SW student may be interested in working closely with community members and speaking with individuals in the population about what may be contributing to high teen pregnancy rates, and how to develop solutions or support mechanisms to ameliorate the situation. In this circumstance, advice from others and guidance from the instructor — in line with SCL — become crucial. For instance, HA students can address the said SW student about the involved healthcare aspects, which include medical resources, education, targeted areas of risk-assessment, and the socio-environmental elements of teenage pregnancy in an inner-city environment (Farber, 2003). The CJ side can demonstrate its interest, and thus project and instill knowledge vis-à-vis the said SW student, by raising awareness of criminal (drug abuse) or domestic problems (spousal or child abuse) that could contribute to this social issue (Hanes & Hanes, 2005). PA students can jump in and address the policies, legal demographics, and current community projects (Smith, 2006) on how to handle teenage pregnancy. The professor also can reinforce this interaction and advise the SW student to more actively engage in an interdisciplinary quest for knowledge on the topic, in order to more fully understand and appreciate the situation's complexity. This kind of pedagogical system to help an SW student reach maximum learning and understanding of the topic can be enabled through this collective, effortful SCL approach.

DISCUSSION

This essay has urged the importance of student-centered learning as a pedagogical strategy to optimize Public Affairs education. Because the students' vast array of interests involve sub-disciplines in the field of Public Affairs, and because

*Applying Student-Centered Learning Concepts  
to a Doctoral, Introductory, Interdisciplinary Public Affairs Course*

Public Affairs instructors carry a major responsibility to ensure optimal learning and productivity by their students, it is crucial to have in place a functioning, sound method for maximizing pedagogy and yielding excellent student performance. Student-centered learning — a form of pedagogy that emphasizes students as active participants in their learning process, and advises that they should work in collaboration with other learners — can be an effective technique to reach this end. The series of vignettes and examples described in this study show how this type of interactive learning environment can facilitate more holistic and thorough outcomes for Public Affairs education. Academics, researchers, practitioners, and students can reflect on the aforementioned illustrations and comprehend the value of applying a pedagogical model in the classroom.

REFERENCES

- Adams, K. (2006). Divergences and convergences in public affairs education and research. *International Journal of Public Policy*, 1(4), 355-366.
- Breen, G. M. (2008). Examining existing counter-terrorism tactics and applying social network theory to fight cyberterrorism: An interpersonal communication perspective. *Journal of Applied Security Research*, 3(2), 1-15.
- Breen, G. M., & Zhang, N. J. (2008). "Introducing e-health to nursing homes: Theoretical analysis of improving resident care. *Journal of Medical Systems*, 32(2), 187-192.
- Brooks, J. G., & Brooks, M. G. (1993). *The Case for Constructivist Classrooms*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Bruner, J. S. (1961). The act of discovery. *Harvard Educational Review*, 31(1), 21-32.
- Clare, B., & Mevik, K. (2008). Inclusive education: Teaching social work students to work with children. *Journal of Social Work*, 8(1), 28-44.
- Denhardt, J. V., & Campbell, K. B. (2005). Leadership education in public administration: Finding the fit between purpose and approach. *Journal of Public Affairs Education*, 11(3), 169-179.
- Dewey, J. (1916). *Democracy and Education*. New York, NY: Macmillan.
- Estes, C. (2004). Promoting student-centered learning in experiential education. *Journal of Experiential Education*, 27(2), 141-161.
- Farber, N. (2003). *Adolescent Pregnancy: Policy and Prevention Services*. New York, NY: Springer.
- Glaserfeld, E. von (1993). Learning and adaptation in the theory of constructivism. *Communication and Cognition*, 26(3), 393-402.
- Hanes, R. C., & Hanes, S. M. (2005). *Crime and Punishment in America*. Farmington Hills, MI: Thomas Gale.
- Hansen, E. J., & Rubin, R. S. (1997). Strategies for teaching a student-centered large lecture course in public affairs. *Journal of Public Administration Education*, 3(3), 329-344.
- Hewins-Mahoney, B., & Williams, E. (2007). Teaching diversity in public administration: A missing component. *Journal of Public Affairs Education*, 13(1), 29-40.
- Iyoshi, T., Hannafin, M., & Wang, F. (2005). Cognitive tools and student-centered learning: Rethinking tools, functions and applications. *Educational Media International*, 42(4), 281-296.
- Lin, Y., Breen, G. M., Leu, W., & Lin, W. (2008). Servicescape: Physical environment of hospital pharmacies and hospital pharmacists' work outcomes." *Health Care Management Review*, 33(2), 1-13.
- Mackenzie, C., & Lowit A. (2007). Behavioral intervention effects in dysarthria following stroke: Communication effectiveness, intelligibility and dysarthria Impact. *International Journal of Language & Communication Disorders*, 42(2), 131-153.
- Matusitz, J. (2007). Terrorism preparedness for hospitals: Towards better interorganizational communication. *The International Journal of Strategic Communication*, 1(3), 169-189.
- Matusitz, J., & Breen, G. M. (2005). Prevention of sexual harassment in the medical setting: Applying inoculation theory." *Journal of Health and Social Policy*, 21(2), 53-71.
- Matusitz, J., & Breen, G. M. (2006). Negotiation tactics in organizations applied to hostage

*Applying Student-Centered Learning Concepts  
to a Doctoral, Introductory, Interdisciplinary Public Affairs Course*

- negotiation. *Journal of Security Education*, 2(1), 55 - 73.
- Matusitz, J., & Breen, G. M. (2007a). Telemedicine: Its effects on health communication. *Health Communication*, 21(1), 73-83.
- Matusitz, J., & Breen, G. M. (2007b). E-health: A new kind of telemedicine. *Social Work in Public Health*, 23(1), 95-113.
- Motschnig-Pitrik, R., & Holzinger, A. (2002). Student-centered teaching meets new media: Concept and case study. *Educational Technology & Society*, 5(4), 160-172.
- Netting, F. E., Kettner, P. M., & McMurtry, S. (2007). *Social Work Macro Practice*. Los Angeles, CA: Allyn & Bacon.
- Pedersen, S., & Liu, M. (2003). Teachers' beliefs about issues in the implementation of a student-centered learning environment. *Educational Technology, Research and Development*, 51(2), 57-74.
- Pedersen, S., & Williams, D. (2004). A comparison of assessment practices and their effects on learning and motivation in a student-centered learning environment. *Journal of Educational Multimedia and Hypermedia*, 13(3), 283-307.
- Piaget, J. (1976). *To Understand Is to Invent: The Future of the Education*. New York, NY: Penguin Books.
- Raadschelders, J.C.N., & Douglas, J.W. (2003). The doctoral graduate in public administration: Apprentice or master?" *Journal of Public Affairs Education*, 9(4), 229-243.
- Rogers, C. (1969). *Freedom to Learn: A View of What Education Might Become*. Columbus, OH: Charles Merrill.
- Smith, K. B. (2006). *Public Administration: Power and Politics in the Fourth Branch of Government*. Los Angeles, CA: Roxbury.
- Vygotsky, L. S. (1978). *Mind in Society*. Cambridge, MA: Harvard University Press.
- Wan, T. T. (2006). Public affairs informatics research: Introduction. *International Journal of Public Policy*, 1(4), 333-342.
- Zhang, N. J., Liu, R., Unruh, L., & Wan, T. T. (2006). Minimum nurse staffing ratios for nursing homes. *Nursing Economics*, 24(2), 78-85.

Gerald-Mark Breen, MA, is a graduate research associate and doctoral student in the Department of Public Affairs at the University of Central Florida. He may be contacted at [gbreen@mail.ucf.edu](mailto:gbreen@mail.ucf.edu).

Jonathan Matusitz, Ph.D., is an Assistant Professor at the Nicholson School of Communication at the University of Central Florida. He may be contacted at [jmatusit@mail.ucf.edu](mailto:jmatusit@mail.ucf.edu).

Thomas T.H. Wan, Ph.D., is Professor and Director of the Doctoral Program in Public Affairs, College of Health and Public Affairs, University of Central Florida. He serves as an associate dean for research at the college. His research interests are centered in health-care informatics research, health services evaluation and gerontological health.

Please address all correspondence to Gerald-Mark Breen:  
3280 Progress Drive, Orlando, FL 32826,  
Phone 262-344-2619; [gbreen@mail.ucf.edu](mailto:gbreen@mail.ucf.edu).