UD GK-12 Website Development

Jeff Spraggins: www.udel.edu/GK-12
• **Goals**
  - Enhance Content
  - Develop Written Communication Skills
  - Compliance with UD Branding
  - Upgrade Appearance
  - Develop Web-based Communication Skills
Goals

- Enhance Content
- Student/Leader Profiles
- Materials
- Develop Written Communication Skills
- Compliance with UD Branding
- Upgrade Appearance
- Develop Web-based Communication Skills

The partnership between the University of Delaware and the New Castle County Vocational Technical School District has received funding from the National Science Foundation to institute a Graduate Teaching Fellows Program in K-12 Education (SE-12) . Fellows, who have completed all or most of their coursework, are selected to serve as fellows.

Fellows are paired with high school science teachers and work with the principal investigators (PIs) of this project to form a learning community that has the opportunity to examine and to reflect on current issues in education while specifically addressing critical needs in science education at vocational technical high schools.

By participating in summer workshops, fellows will gain exposure to a number of innovative teaching strategies, including problem-based learning (PBL). During the academic year, fellows engage in co-teaching with their teacher partners in this "teaching by teaching" model. Fellows will have an enhanced understanding of and appreciation for the complexities and nuances of teaching science in vocational technical high schools. Fellow/teacher pairs develop PBL activities, aligned with curricular needs, to allow their students to gain an understanding of problem solving in learning environments.

Fellows receive a twelve-month stipend of $30,000 and are expected to spend twenty hours per week on the project. The time commitment includes ten days of a one-week summer workshop. Fellows are required to spend at least ten hours per week during the academic year in the classroom, and these hours include at least ten hours per month with their regular students. Fellows are selected based upon a review of written applications and an interview process by the project leaders. It is essential that fellows have the support and cooperation of their research advisors to participate.
Goals

- Enhance Content
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The University of Delaware partnership with the New Castle County Vocational Technical School District has received funding from the National Science Foundation to institute a Graduate Teaching Fellows Program in K-12 Education (GK-12) [website]. In each of the three years of this project, nine Fellows, who are candidates for Teacher Certificates, who have completed all or most of their coursework, are selected to serve as fellows.

Fellows are paired with high school mentors who have been identified by the principal investigators (PIs) of this project, form a learning community that has the opportunity to examine and to reflect on current issues in education while specifically addressing critical needs in science education. Fellows with the principal investigator (PI) of this project are part of a larger effort at the University of Delaware to integrate science into the K-12 curriculum. By participating in summer institutes, Fellows are introduced to a number of innovative teaching strategies including problem-based learning (PBL). During the academic year, Fellows engage in a close working relationship with their teacher partners, a "teaching team," in the teaching of science, development of PBL activities, and assessment for its effectiveness and relevance to teaching science in the secondary science classroom.

Fellows receive a twelve-month stipend of $15,000, and are expected to spend twenty hours per week on the project. The time commitment includes ten days in the summer institute and approximately 20 hours per week during the academic year. Fellows are expected to participate in one or more science courses for the degree of Master of Science or permanent residents of the United States. Fellows are selected based upon a review of written applications and an interview process by the project leaders. It is essential that fellows have the support and cooperation of their research advisors to participate.
Goals

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The University of Delaware in partnership with the New Castle County Vocational Technical School District has received funding from the National Science Foundation to institute a Graduate Teaching Fellowship Program in K-12 Education (GK-12) [website]. In each of the three years of this project, nine full-time, postgraduate education Ph.D candidates, who have completed all or most of their coursework, are selected to serve as fellows.

Fellows are paired with high school science and mathematics teachers. Investigators (PIs) of this project, form a learning community that has the opportunity to engage and to reflect on current issues in education while specifically addressing critical needs in the state of Delaware.

By participating in summer workshops and seminars led by the project leaders, the fellows are introduced to a number of innovative teaching strategies including problem-based learning (PBL). During the academic year, fellows engage in co-teaching with their teacher partners in this “teaching by-invitation” model. This model allows the fellows to understand the complexities and nuances of teaching science in educational settings that differ from the university classroom. The fellows then receive feedback on activities designed with curricular needs, to allow them sufficient experience in teaching learning environments.

Fellows receive a twelve-month stipend of $30,000 and are expected to spend twenty hours per week on the project. The time commitment includes ten days during the summer devoted to workshop and development activities and a minimum of ten hours per week during the academic year that fellows spend in their teacher partner’s classroom. Fellows must be citizens, nationals, or permanent residents of the United States. Fellows are selected based upon a review of written applications and an interview process by the project leaders. It is essential that fellows have the support and cooperation of their research advisors to participate.
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The University of Delaware in partnership with the New Castle County Vocational Technical School District has received funding from the National Science Foundation to institute a Graduate Teaching Fellows Program in K-12 Education (GK-12) [website]. In each of the three years of this project, nine fellows, two graduate students in the sciences, who have completed all or most of their coursework, are selected to serve as fellows.

Fellows are paired with high school teachers and instructors in science, technology, engineering, and mathematics (STEM) of the project’s school districts to form a learning community that has the opportunity to examine and reflect on current issues in education while specifically addressing critical needs in science, technology, engineering, and mathematics (STEM) education.

By participating in summer workshops led by the project leaders, the fellows are introduced to a number of innovative teaching strategies including problem-based learning (PBL). During the academic year, fellows engage in co-teaching with their teacher partners in this “teaching-as-a-scientist” model. Fellows are expected to help raise awareness of the complexities and challenges in teaching science instruction at national and state levels.

Fellows receive a twelve-month stipend of $30,000 and are expected to spend twenty hours per week on the project. The time commitment includes ten days during the summer devoted to workshop and development activities and a minimum of ten hours per week during the academic year that fellows spend in their teacher partner’s classroom. Fellows must be citizens, nationals, or permanent residents of the United States. Fellows are selected based upon a review of written applications and an interview process by the project leaders. It is essential that fellows have the support and cooperation of their research advisors to participate.
Delaware GK-12
A Partnership between the University of Delaware and
the New Castle County Vocational Technical School District

2008 Press Coverage:

University of Delaware:
6/11/2008, UDaily: “Symposium highlights NSF GK-12 UD fellows’ work” (article pdf, photos: 1, 2)

2007 Press Coverage:

University of Delaware:
5/24/2007, UDaily: “NSF GK-12 conference showcases UD fellows’ work” (article pdf, photos: 1, 2, 3)
2/20/2007, UDaily: “NSF-funded program boosts teachers’ skills” (article pdf, photo)

NSF, March 2007: Delaware GK-12 receives honorable mention for Media Award (photo)

2006 Press Coverage:

4/24/2006 Press Event at Howard High School of Technology:
PowerPoint presentation (3.9 Mb) [Updated Oct 2006 to include all 2006 Teachers and Fellows]

University of Delaware:
4/25/2006, UDaily: “UD, NCC vo-tech district announce NSF project” (article pdf, cover pdf, photo)
8/17/2006, UDaily: “NSF workshops target science education, teaching methods” (article pdf, photo)

The News Journal/delawarnewstimes.com:
4/24/2006 print “School to offer science for real world” (article pdf)
4/24/2006 p.m. newscast (local copy) [play 0:31 to 1:38]

WDEL 1150AM News Talk Radio:
4/24/2006 newscast (local copy)

Conference Presentations:

October 2006, Annual Meeting of Geological Society of America, Philadelphia
poster “Delaware GK-12: Improvement of Science Education in Vocational Technical High Schools through Collaborative Learning and Co-Teaching” (abstract, poster)

March 2007, Seventh Annual NSF GK-12 Project Meeting, Washington, DC
poster “Delaware GK-12: Improvement of Science Education in Vocational Technical High Schools through Collaborative Learning and Co-Teaching” (abstract, poster jpg, poster pdf [71Mb])
2008 Press Coverage:

University of Delaware:

2007 Press Coverage:

University of Delaware:
5/24/2007, UDaily, “NSF GK-12 conference showcases UD fellows’ work” [article pdf, photos: 1, 2, 3]
2/20/2007, UDaily, “NSF-funded program boosts teachers’ skills” [article pdf, photo]

NSF, March 2007: Delaware GK-12 receives honorable mention for Media Award [photo]

2006 Press Coverage:

4/24/2006 Press Event at Howard High School of Technology:
PowerPoint presentation [8.9 Mb] [Updated Oct 2006 to include all 2006 Teachers and Fellows]

University of Delaware:

The News Journal (delewareonline.com):
4/24/2006 print, “Schools offer science for real world” [article pdf]
4/24/2006 p.m. newscast [local copy] (play: 0.51 to 1:58)

WDEL 1500 AM News Talk Radio:
4/24/2006 newscast [local copy]
• **Goals**
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The University of Delaware partnership with the New Castle County Vocational Technical School District has received funding from the National Science Foundation to institute a Graduate Teaching Fellows Program in K-12 Education (GK-12) [website]. In each of the three years of this project, nine full-time PhD graduate students in the sciences, who have completed all or most of their coursework, are selected to serve as fellows.

Fellows are paired with high school science teachers at one of the district’s 15 secondary schools. Each team consists of a project leader (PI) and one or more graduate students. Fellows work closely with project leaders and participating teachers to enhance their understanding of science content and the teaching and learning process. The PI and teachers, along with the students, work to develop innovative teaching strategies, including project-based learning (PBL). During the academic year, fellows engage in co-teaching with their teacher partners, in this "teaching within a teaching" model. The PI and teachers collaborate on activities designed to address curricular needs, to allow teachers to experience the benefits of guided-inquiry learning environments.

Fellows receive a twelve-month stipend of $30,000 and are expected to spend twenty hours per week on the project. The time commitment includes ten days during the summer devoted to workshop and development activities and a minimum of ten hours per week during the academic year that fellows spend in their teacher partner’s classroom. Fellows must be citizens, nationals, or permanent residents of the United States. Fellows are selected based upon a review of written applications and an interview process by the project leaders. It is essential that fellows have the support and cooperation of their research advisors to participate.
Delaware GK-12
A partnership between the University of Delaware and the New Castle County Vocational Technical School District

The University of Delaware, in partnership with the New Castle County Vocational Technical School District, has received funding from the National Science Foundation to institute a Graduate Teaching Fellows Program in K-12 Education (GK-12) [website]. In each of the three years of this project, nine full time UD graduate students in the sciences, who have completed all or most of their coursework, are selected to serve as fellows.

Fellows are paired with high school science teachers from NCVCotTech. These pairs, along with the principal investigators (PIs) of this project, form a learning community that has the opportunity to examine and to reflect on current issues in education while specifically addressing critical needs in science education in vocational technical high schools.

By participating in summer workshops and follow-up meetings facilitated by the project leaders, the fellows are introduced to a number of innovative teaching strategies including problem-based learning (PBL). During the academic year, fellows engage in coteaching with their teacher partner. In this "teaching at the elbow of another", fellows gain a better understanding of and appreciation for the complexities and nuances of teaching science in vocational technical high schools. Fellow/teacher pairs develop PBL activities, aligned with curricular needs, to allow their students to experience the benefits of guided-inquiry learning environments.

Fellows receive a twelve-month stipend of $30,000 and are expected to spend twenty hours per week on the project. The time commitment includes ten days during the summer devoted to workshop and development activities and a minimum of ten hours per week during the academic year that fellows spend in their teacher partner's classroom. Fellows must be citizens, nationals, or permanent residents of the United States. Fellows are selected based upon a review of written applications and an interview process by the project leaders. It is essential that fellows have the support and cooperation of their research advisors to participate.
The University of Delaware, in partnership with the National Science Foundation to institute a GK-12 program, has received funding from the National Science Foundation Program in K-12 Education (GK-12) [website]. In each of the three school years of this project, nine full time UD graduate students are selected to serve as fellows.

Fellows are paired with high school science and math teachers in the New Castle County Vocational Technical School District. Each fellow works with a teacher for one year and form a learning community that has regular meetings to discuss teaching and learning challenges. By participating in summer workshops and fellowships, they learn innovative teaching strategies including problem-based learning (PBL) and authentic assessment methods.

voTech. These pairs, along with the principal investigators (PIs) of this project, examine and reflect on current issues in education while specifically addressing critical needs in science education.

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By participating in summer workshops and fellowships, they learn innovative teaching strategies including problem-based learning (PBL) and authentic assessment methods.

During the academic year, fellows engage in co-teaching with their teacher partner. In this "teaching at the elbow of another", fellows gain a better understanding of and appreciation for the complexities and nuances of teaching science in vocational technical high schools. Fellow/teacher pairs develop PBL activities, aligned with curricular needs, to allow their students to experience the benefits of guided-inquiry learning environments.

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Delaware GK-12
[2008-2009 Graduate Teaching Fellows]

Adam Aguilar
Biology & Sciences
acaugur@udel.edu
5-min Presentations
Research: PPT, PDF
Teaching: PPT, PDF

Christy Beatt
Entomology and Wildlife Ecology
nbitte@udel.edu
5-min Presentations
Research: PPT, PDF
Teaching: PPT, PDF

Mary Boggs
Biology & Sciences
mboggs@udel.edu
5-min Presentations
Research: PPT, PDF
Teaching: PPT, PDF
My name is [Student Name], and I am a 25-year-old student at the University of Delaware. I am pursuing a Bachelor of Science degree in [Major]. My research focuses on [Research Area]. I have been involved in several projects related to [Research Area], and I have published my findings in [Journals/Publications]. My current research interests include [Specific Areas].

In the future, I plan to attend graduate school and pursue a career in [Career Path]. I believe that my passion for [Research Area] and dedication to academic excellence will enable me to make significant contributions to the field of [Research Area].

I am excited to be a part of the [Program Name] community, and I look forward to collaborating with [Professors/Faculty Members]. My ultimate goal is to [Long-Term Objective] and contribute to [Field/Community].
In Delaware: At Saint Georges Vocational Technical High School I taught the 10th grade. I had never taught before but I enjoyed the experience. It was a challenging job, and I was able to help the students to become better individuals.

In the Classroom: I taught physics and chemistry. I enjoyed teaching because it allowed me to share my knowledge with others.

In the Community: I have been active in my community by volunteering at local events.

In the Future: I plan to continue teaching and possibly pursue a career in research.

Goals:
- Develop a curriculum for teaching physics
- Conduct research in the field of physics
- Participate in community service projects

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Big Picture
Research: My research focuses on the use of FT-ICR mass spectrometry for the analysis of environmentally significant samples. A Fourier Transform Ion Cyclotron Resonance Mass Spectrometer (FT-ICR Mass Spec) is an instrument that measures the masses of individual molecules that have been electrically charged to form ions. Although measuring the mass of something is not all that impressive, the ability of this instrument to measure individual ions with extreme accuracy and resolution merits such an intimidating name. In addition, the design of the instrument allows it to be used as a gas phase beaker where reactions can be observed between ions and molecules in real time.

One example of how we use this powerful technique is our study of the environmentally important reactions between metal clusters and hydrogen sulfide. By monitoring these reactions within the mass spectrometer we have been able to understand more completely the reaction pathways and rates of reaction for cadmium clusters. Currently we are working on systems with iron and zinc metals. Reactions between metal clusters and hydrogen sulfide are important for understanding both the chemistry taking place near hydrothermal vents (geysers on our ocean floors) and the fate of metal pollutants in our natural waterways.

In the classroom: Although I enjoy research, teaching is my true passion. I have a couple fundamental beliefs that drive my teaching philosophy. I believe that (1) any student, if motivated, can learn (and enjoy) science and (2) there should be no separation between what is taught in the classroom and the research that we, as scientists, focus so much of our time and effort working on.

Working with Terry Blanch at St. Georges (2000-2009) and Kevin Madieu at Delaware (2010-2012)

Developed Class Material
Research: PPT, PDF
Teaching: PPT, PDF
Hydrothermal Vent Activity 1: Underwater volcanoes
Hydrothermal Vent Activity 2: Discovery of a New Ecosystem
Hydrothermal Vent Activity 3: Discovery of a New Ecosystem 2
Presentations
The University of Delaware, in partnership with the New Castle County Vocational Technical School District, has received funding from the National Science Foundation to institute a Graduate Teaching Fellows Program in K-12 Education (GK-12) [website]. In each of the three years of this project, nine full time UD graduate students in the sciences, who have completed all or most of their coursework, are selected to serve as fellows.

Fellows are paired with high school science teachers from NCCoVoTech. These pairs, along with the principal investigators (PIs) of this project, form a learning community that has the opportunity to examine and to reflect on current issues in education while specifically addressing critical needs in science education in vocational technical high schools.

By participating in summer workshops and follow-up meetings facilitated by the project leaders, the fellows are introduced to a number of innovative teaching strategies including problem-based learning (PBL). During the academic year, fellows engage in coteaching with their teacher partner. In this “teaching at the elbow of another”, fellows gain a better understanding of and appreciation for the complexities and nuances of teaching science in vocational technical high schools. Fellow/teacher pairs develop PBL activities, aligned with curricular needs, to allow their students to experience the benefits of guided-inquiry learning environments.

Fellows receive a twelve-month stipend of $30,000 and are expected to spend twenty hours per week on the project. The time commitment includes ten days during the summer devoted to workshop and development activities and a minimum of ten hours per week during the academic year that fellows spend in their teacher partner’s classroom. Fellows must be citizens, nationals, or permanent residents of the United States. Fellows are selected based upon a review of written applications and an interview process by the project leaders. It is essential that fellows have the support and cooperation of their research advisors to participate.
## 2008-2009 Advisor Recommendation Form:

<table>
<thead>
<tr>
<th>Advisors</th>
<th>Department</th>
<th>email</th>
<th>Fellows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robert Sikes</td>
<td>Biological Sciences</td>
<td><a href="mailto:RASIKES@udel.edu">RASIKES@udel.edu</a></td>
<td>Adam Aguiar</td>
</tr>
<tr>
<td>Jamie Holder</td>
<td>Physics &amp; Astronomy</td>
<td><a href="mailto:iholder@physics.udel.edu">iholder@physics.udel.edu</a></td>
<td>Dana Boltuch</td>
</tr>
<tr>
<td>Randy Duncan</td>
<td>Biological Sciences</td>
<td><a href="mailto:RLDUNCAN@udel.edu">RLDUNCAN@udel.edu</a></td>
<td>Patricia Jones</td>
</tr>
<tr>
<td>Doug Tallamy</td>
<td>Entomology &amp; Wildlife Ecology</td>
<td><a href="mailto:DTALLAMY@udel.edu">DTALLAMY@udel.edu</a></td>
<td>Christy Beal</td>
</tr>
<tr>
<td>Tom Beebe</td>
<td>Chemistry &amp; Biochemistry</td>
<td><a href="mailto:BEEBE@udel.edu">BEEBE@udel.edu</a></td>
<td>Mary Boggs</td>
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<td></td>
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<td>Kristy Longsdorf</td>
</tr>
<tr>
<td>Doug Ridge</td>
<td>Chemistry &amp; Biochemistry</td>
<td><a href="mailto:DOUGR@udel.edu">DOUGR@udel.edu</a></td>
<td>Jeffrey Spraggins</td>
</tr>
</tbody>
</table>
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Delaware GK-12
A partnership between the University and the New Castle Technical School District

The University of Delaware, in partnership with the New Castle County National Science Foundation to institute a Graduate Teaching Fellows project, has received funding from the National Science Foundation. In each of the three years of this project, graduate students in the program are selected to serve as fellows.

Fellows are paired with high school science teachers from NCCoVoT project, form a learning community that has the opportunity to examine and address critical needs in science education in vocational technical high schools.

By participating in summer workshops and follow-up meetings facilitated by the project leaders, the fellows are introduced to a number of innovative teaching strategies including problem-based learning (PBL). During the academic year, fellows engage in coteaching with their teacher partner. In this “teaching at the elbow of another”, fellows gain a better understanding of and appreciation for the complexities and nuances of teaching science in vocational technical high schools. Fellow/teacher pairs develop PBL activities, aligned with curricular needs, to allow their students to experience the benefits of guided-inquiry learning environments.

Fellows receive a twelve-month stipend of $30,000 and are expected to spend twenty hours per week on the project. The time commitment includes ten days during the summer devoted to workshop and development activities and a minimum of ten hours per week during the academic year that fellows spend in their teacher partner’s classroom. Fellows must be citizens, nationals, or permanent residents of the United States. Fellows are selected based upon a review of their applications and an interview process by the project leaders. It is essential that fellows have the support and cooperation of their research advisors to participate.
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Delaware GK-12

[George Watson]
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[Amy Quillen]
Science Specialist
NCC Vo-Tech School District
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George H. Watson holds a Ph.D. in Physics and is the Unidel Professor of Physics at the University of Delaware; he is currently the Deputy Dean of the College of Arts and Sciences at UD. He serves as the principal investigator of the National Science Foundation GK-12 Project "Improvement of Science Education in Vocational Technical High Schools through Collaborative Learning and Coteaching".

George is director and founding member of the Institute for Transforming Undergraduate Education, created by UD to promote reform of undergraduate education through faculty development and course design. He has been a member of several organizing committees for international problem-based learning conferences, including PBL2002, hosted by the University of Delaware; PBL2006; PBL2008; and PBL2010. He has been supported by a NSF DUE grant for development of PBL curricula for introductory physics and an ALO/USAID grant for a project on science education reform in Peru through PBL.

George's physics research has been in experimental condensed matter physics and laser spectroscopy, funded by NSF in the areas of optically-disordered random media, photon localization, and photonic band structure measurements, particularly in colloidal crystals.

See George Watson's Home Page for more information.
Contact: ghw@udel.edu
The University of Delaware, in partnership with the New Castle County Vocational Technical School District, has received funding from the National Science Foundation to institute a Graduate Teaching Fellows Program in K-12 Education (GK-12) [website]. In each of the three years of this project, nine full-time UD graduate students in the sciences, who have completed all or most of their coursework, are selected to serve as fellows.

Fellows are paired with high school science teachers from NCCoVoTech. These pairs, along with the principal investigators (PIs) of this project, form a learning community that has the opportunity to examine and reflect on current issues in education while specifically addressing critical needs in science education in vocational technical high schools.

By participating in summer workshops and follow-up meetings facilitated by the project leaders, the fellows are introduced to a number of innovative teaching strategies including problem-based learning (PBL). During the academic year, fellows engage in coteaching with their teacher partner. In this “teaching at the elbow of another”, fellows gain a better understanding of and appreciation for the complexities and nuances of teaching science in vocational technical high schools. Fellow/teacher pairs develop PBL activities, aligned with curricular needs, to allow their students to experience the benefits of guided-inquiry learning environments.

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Teacher Pair: Brian Heeney
Developed Materials
Research Presentation: PPT, PDF
Activities
Mutation and Cancer
Mutation and Cancer Presentation: PPT, PDF
Baciera-Tobacco Mutalton Lab: DOC, PDF
Baciera-UV Mutalton Lab: DOC, PDF
Lorenzo’s Oil
Lorenzo’s Oil Presentation: PPT, PDF
Lorenzo’s Oil Guiding Questions: PPT, PDF
Paperclip/Fatty Acid Modeling Activity: DOC, PDF
Subject: Biological Sciences
Teaching Presentation: PPT, PDF
Natural Selection at Work
Bacterial Resistance Presentation: PPT, PDF
Serratia Ampicillin Resistance Lab: DOC, PDF
TB Simulation Activity: DOC, PDF
Owl Pellet for Integrated Sciences
Owl Pellet Presentation: PPT, PDF
Barn Owl Worksheet: DOC, PDF
Erin Foster
Biological Sciences
ecc@udel.edu
The Big Picture

- New GK-12 Website
  - Enhanced Web-presence for UD GK-12
  - Educational Resource
  - Written Communication Skills
  - Web-based Communication Skills