

**Preparation Document:
CPATH Distributed Expertise Project – Capstone Colloquium
Villanova University Conference Center June 2,3,4 2013**

This document provides background information for the participants in the Colloquium to read ahead of time. The document contains three major sections:

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Part I: Project Vision and Goals

“The CPATH Distributed Expertise principle investigators, in their 2008 proposal, call for an expanded vision of computing science education. They assert that in the last fifty years, computer science *“has gone from a purely mathematical discipline to a discipline that is now concerned with principals of sociology, psychology, entertainment, biology and many other areas.”* They maintain that we must *“rethink computing education”* and the essence of their message is that computing educators must *“create new curricula that break down barriers among the many sub-disciplines, which will force us to think of curriculum innovations in new ways.”*

The authors of the CPATH Distributed Expertise proposal, a quintet of veteran, well respected computing educators, provide a Vision statement:

“Our Vision: a clarified, comprehensive understanding of the computing disciplines that allows shared experiences and expertise within and across the community. This collective sharing enables computing to collaborate with other disciplines that use computing to enhance group, and to create new cross-disciplinary areas of study and research.”

The three goals of the CPATH Distributed Expertise proposal are:

- 1> Apply distributed expertise to enhance teaching and learning experiences for students of computing and other disciplines in which computational thinking and computing models contribute to a variety of applications.
- 2> Develop resources that support creative exploration of the entirety of the computing and information subject.
- 3> Develop inter and multi-disciplinary partnerships among computing and non-computing programs for the benefit of all.”

Source: Year 1 Evaluation Report, Fall 2009

**Part II: Description of Featured Projects (In Order of Discussion at June 2,3,4 Colloquium)
Excerpted from Prior Evaluation Annual Reports**

The TCNJ Villanova Collaboration	Kim Pearson (TCNJ), Tom Way (Villanova) Ursula Wolz (then TCNJ)
The Virginia School District – Middle School Computational Thinking	Steve Harrison & Deborah Tatar (Virginia Tech)
People & Computers: Writing and Translating Course	Seth Whidden and Tom Way (Villanova)
Knactive	Steven Chappell , Chris Graves, David Shadinger, Carol Spradling, Deb Toomey (NW Missouri State)
Interdisciplinary Directed Study for Journalists & Computer Scientists	Ingrid Sturgis and Todd Shurn (Howard)
Issues in Computer Ethics	Deborah Tatar (Virginia Tech) in collaboration with University of Limerick, Ireland
Music and Computers	Bob Beck and Christine Nass (Villanova)
New Games Course	Kim Pearson (TCNJ)
Computing and the Environment Course	Tom Way (Villanova)

1. The TCNJ Villanova Collaboration

**Kim Pearson (TCNJ), Tom Way
(Villanova), Ursula Wolz (then at TCNJ)**

Last year's evaluation report described in some detail a joint project wherein two TCNJ faculty and their students worked closely with a Villanova faculty member and his class. Both classes taught video game design and development. This course is long standing at TCNJ and the Villanova professor, already familiar with the TCNJ model, was eager to pilot a game course at his institution. The TCNJ course spanned two semesters, Fall/Spring while the Villanova offering was Spring only. The course had mixed success. As noted in last year's evaluation report: "At this point, we can say with confidence that the TCNJ mentorship was essential and effective in motivating Villanova to initiate a successful course in Computer Game Development. However, the jury is still out regarding whether and how much value was added via the inter-institutional student collaboration" (p. 15). The latter was undoubtedly due in large portion to the fact that the Villanova students entered the collaboration a full semester after the TCNJ students had already spent an entire semester together. As a TCNJ

professor noted: *“Our students didn’t know how to invite the other guys in.”* We, the evaluators, recommended *“more frequent and systematic planning sessions among the professors that regularly occur both in advance and during the course.”*

The professors committed to another year of DE collaboration and what a difference it was. They did indeed communicate and plan more and, in extremely creative and effective fashion, overcame several unanticipated occurrences. First, instead of team teaching the games course, the TCNJ professors taught two individual courses – the year long Games Course and a second semester course in Interactive Story Telling. At the Villanova end, the schedule precluded offering the Games Course and instead, the professor was asked to teach Software Engineering. So, instead of a tidy one to one match of a similar course on Computer Game Development, we suddenly had three distinct courses.

This is a very important moment, not only in this specific collaboration, but in DE in general. Instead of backing off, the professors sifted for points of tangency. They developed the following strategy. The games course, a principle objective of which is the actual development of a computer game, would proceed in normal historical fashion, but would rely upon the other two courses for well defined consultation:

- The TCNJ Story Telling Class would assist the Games class in enhancing the plot of the game. In particular, each of the nine Story Telling students picked a component of the Game story (e.g., evolution of characters, setting, events, motivation of players/sprites, plot holes) and using narrative analysis submitted a written critique.
- The Villanova Software Engineering Class would assist the Games students develop specific software important for running the game.
- The Villanova class would assist the Story Telling Class by evaluating codes and commands and suggesting improvements (e.g., faster, easier approaches).

The operant concept here is “specific.” All three professors, in interviews with the evaluators, noted that generating “specific” expectations and deliverables (as opposed to the more open-ended approach last year) was the key to effective delivery. This corrected for the ‘ownership’ issue evident last year among TCNJ Games students because the use of consultants (i.e., the two other classes) was embedded from the beginning in defined fashion.

Findings: The evaluators conducted focus groups with each of the three classes late in the semester, namely April 2010. Unfortunately the TCNJ students had not received the Villanova input so the actual value of the feedback could not be discussed.

In addition, the evaluators revised a survey that had been created last year to measure students' perceptions. The main focus of both methods was the inter-class collaborations.

There are a variety of ways to present the findings and here we, the evaluators, use the following 2-step approach:

1. To report on the discussion groups the evaluators held with each of the three classes, a dyadic method was selected which individually discusses each pair of collaborations:
 - TCNJ Games Course and the Villanova Software Engineering Class
 - TCNJ Interactive Story Class and Villanova Software Engineering Class
 - The TCNJ Interactive Story Class and the TCNJ Games Course
2. Following that, results of the student surveys are presented and areas of congruence and contradiction with the discussion data are noted.

The Dyads

The TCNJ Games Course and the Villanova Software Engineering Class: As noted, the TCNJ Games Course, with its twenty-plus students, is a two semester offering and the Fall 2009 semester had been completed when the other two courses commenced in January 2010. During the Fall semester, a game theme was selected and design work begun. Implementation occurs in semester two. This year's game was based on Greek mythology and took place in both the present day and ancient Greece. It is a 2-player game with split screen where the two work together to defeat the villains. While the entire class had input, subteams of three to four members shouldered most of the interaction with the Villanova class

- The Art Team wrote the specs for the Villanovans, relating in the planning to two liaison members of the Villanova class. There was a miscommunication of sorts as the TCNJers wanted the VU students to work on a sprite cutter but the VUers worked on a sprite assembler. This was not a major problem, in fact both groups learned a lesson in "*writing specs*" or as a TCNJ student put it, "*in telling someone what you really want.*"
- A second small team, the Story Telling Group, led the interface with the Story Telling Class.

In the group discussion with the two evaluators, the TCNJ students were in accord about the Villanova collaboration seeing it as a "*good learning experience*" especially in:

- learning how to work with a consumer

- simulating the real world of business
- learning how to write specs and the importance of clarifying details
- developing project management skills

Similarly, in a showing of hands, the great majority of Villanova students (18 of 22 and 4 neutral) felt the exchange *“added value in that it was a real project, not just a made up problem.”* *“Critiquing someone else’s code and specs was a positive learning experience.”* The Villanovans felt that the TCNJ students would appreciate their feedback and that pleased them. Working with *“something you haven’t seen before builds your skills and helps the person on the other end.”*

The TCNJ Interactive Story Class and the Villanova Software Engineering Class:

There were nine students in the TCNJ Interactive Story class and it was optional that they submit their individual stories to the Villanova class with the idea that the Villanovans would offer enhanced ways to do programming that would make the interactive stories *“easier and faster.”* Eight of the nine voluntarily did so.

In the TCNJ student focus group there was unanimous comment that:

- They worked harder in this course because they were handing their work over for review from other students, the Villanovans, who were *“strangers.”*

“It definitely added a little extra pressure – we wanted to provide [the Villanovans] with a product with more polish and fewer bugs.”

- The Villanova students were a resource where they could get constructive input *“without the pressure of being graded.”*

A few students were nervous about handing over their work, but were *“excited to get the feedback.”* Others agreed that it was a good experience, mirroring the use of consultants in the world of work.

The Villanova students also judged the collaboration to be worthwhile. They echoed their TCNJ partners’ thoughts that doing a real project with real people at the other end with real deadlines heightened the learning.

The TCNJ Interactive Story Class and the TCNJ Games Course: With respect to the two TCNJ classes, the Story Telling students found the experience to be *“one of class’ more interesting projects.”* They seemed to very much enjoy and be engaged in applying narrative analysis to their fellow TCNJers work. The assignments were substantial with each Story Telling student authoring an individual critique of a dimension of the game, posting their written analyses on a wiki and discussing them in class. A summary report was developed which synthesized all their critiques and sent to the games class. The students reported to the evaluators that the individual critiques,

although offering more detail and concrete feedback, were not shared with their colleagues in the Games class. When they asked “Why?” they were told it was for confidentiality purposes.

The Games students, as a class, discussed the report from the Story Telling students with special attention to which elements and features should be refined and carried forward. They noted that the partnership helped them become aware of important components that otherwise may not have surfaced, such as deeper looks at character involvement and how users would experience the characters. While the class as a whole recognized the value of this input, many felt it drew them away from other demands of the course. Conversely, the small group that worked more closely with the Story class was especially pleased with the experience and described the feedback as “*phenomenal!!*”

Ideas for Improvement Coming from the Discussions: Among all three classes, there was little cross-class student-to-student communication. For example, the product pathway for the Story Telling/Villanova classes was:

TCNJ student > TCNJ professor > Villanova Professor > Villanova Students > Villanova Professor > TCNJ Professor > TCNJ Students

Across all groups, the students felt that direct and increased dialogue between student clients and student consultants would have paid great learning dividends. Such peer interface would have permitted the students to interact directly “*if there were questions and not be shooting in the dark.*” Students proffered that this could have been done via “*board, email, facebook*” or other means.

Within groups, there were a number of observations. The Villanovans suggested more in-class time “*for example discussing the pros/cons offered to the Story Telling class*” among the fourteen or so Villanovans who made unilateral recommendations “*as some of our comments may have been contradictory.*” The Villanova students also would have appreciated more time to work on projects and more complex projects.

The Story Telling class desired more feedback in the consultation they offered the Games course. The Games students, in several cases, found the work of the Story Telling students to be a full-fledged part of the class whereas the Villanova collaboration was less integrated and more intermittent.

Effects of the Classes on Computational Thinking: A final question posed to the TCNJ students was: “Did the class in any way alter your computational thinking?”

The Games Class

- Realized the great degree of planning that is required
- Developed more artistic ways of thinking

- Gained much more respect for what goes into a game
- Improved programming skills

The Story Telling Students

- Broadened perspectives of interactive story telling
- Developed new respect for gaming and how challenging it is
- Gained appreciation for writers

The Software Engineering Class did not discuss this topic with the evaluators due to time constraints.

The Student Survey

A concerted effort was made this year to survey the students in both the Villanova University (VU) Software Engineering class and the two classes of The College of New Jersey (TCNJ). The primary purpose of the survey was to measure students' experiences with the collaboration and their perceptions of the collaborative approach.

It is important to note that the administration of the surveys differed between the VU students and the TCNJ students. Focus groups were first convened at TCNJ with both classes on the same day. The intent was for the evaluators to administer the survey at the end of each focus group. However, in the initial meetings with faculty we learned that the collaborative activities with Villanova were in early stages and the TCNJ students had received no feedback from VU students at that time. Furthermore, changes needed to be made to the survey to reflect better the nature of the work done at TCNJ with their two courses. Consequently, the revised survey was sent to the respective TCNJ faculty for them to administer at the end of the semester.

The focus group with the Villanova students was conducted several weeks later and the survey was administered by the evaluators at the conclusion of that session. It is not known the extent to which the different timing of the surveys may have affected the students' perceptions and responses.

The number of students engaged in the collaborative activities and the response rates differed by institution.

- 22 students from Villanova University responded to the Collaborative Experiences Survey for the Villanova University students.
- 19 Students from The College of New Jersey (TCNJ) completed the Collaborative Experiences Survey for TCNJ students. (6 in the Storytelling Course and 13 in the

Games Course.) Due to the smaller N sizes, the numbers for The College of New Jersey have been combined for the two classes.

The respondents at VU were predominantly male (86%); upperclass students (55% juniors; 41% seniors); Computer Science majors (82%). Two respondents majored in Business and 2 majored in Computer Engineering.

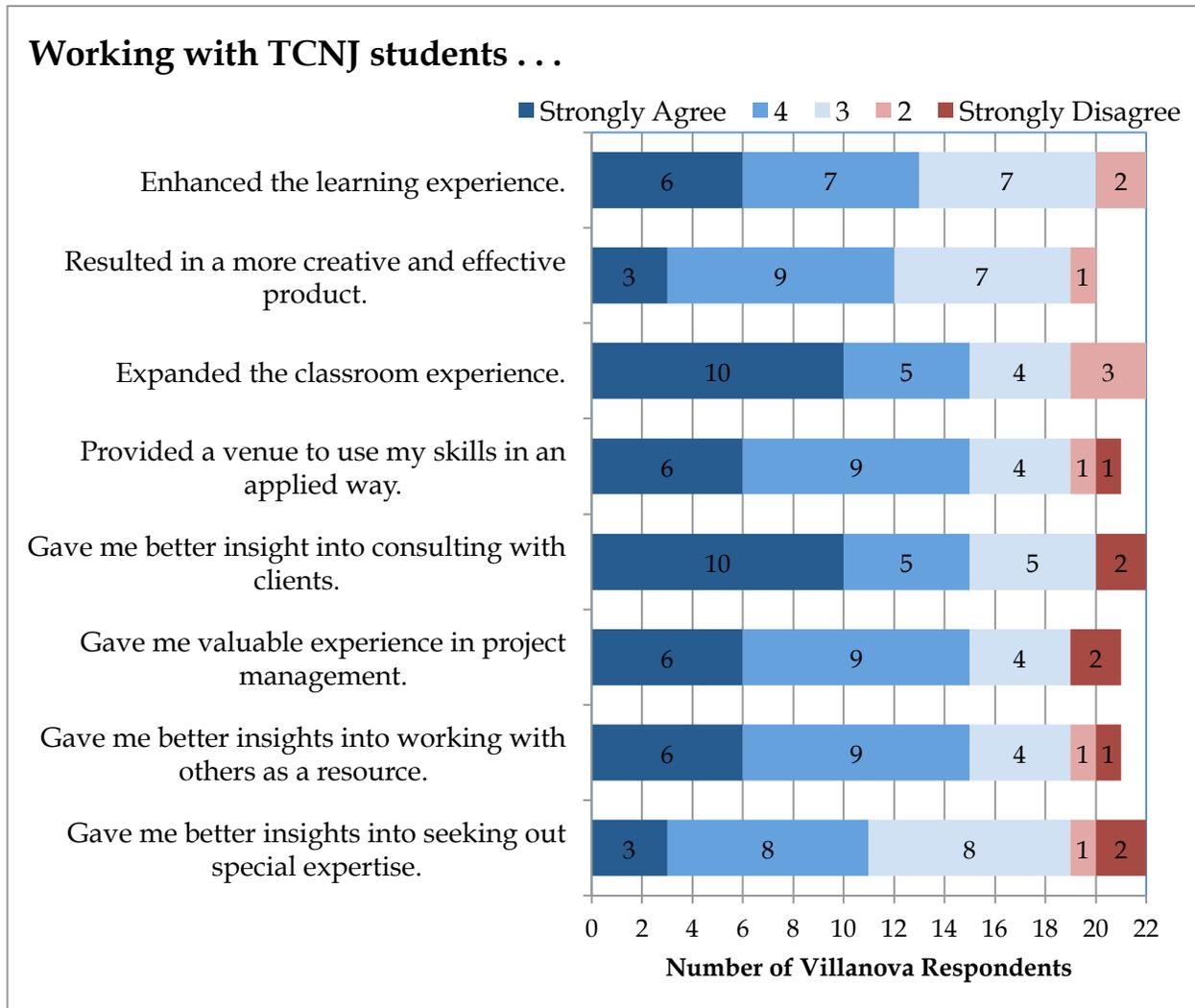
The TCNJ students were 79% male; were sophomores (21%), juniors (42%) and seniors (37%); and majored in Computer Science (47%), Communication/Journalism/IMM (35%) and Arts/Humanities (12%).

As can be expected with the nature of the courses, the students brought differing expertise and perspectives to the collaboration. Students at both TCNJ and VU were asked to indicate the extent they agreed or disagreed with three statements about the value of collaboration. As shown in the following table, VU students perceived much more value in collaborating with another University than did the TCNJ students. TCNJ students saw how computing can be applied across other fields more so than the VU students. Both groups of students saw how these skills can be applied in the world of work.

Respondents who Strongly Agreed or Agreed	Villanova		TCNJ	
	#	%	#	%
I believe that collaborating with another university as part of a class adds value to my educational experience.	18	86%	7	50%
This course has helped me see how computing can be applied across other fields.	16	73%	12	86%
This course has provided me an opportunity to see how skills can be applied beyond the classroom setting in the world of work.	19	86%	12	80%

Villanova students were asked about their experiences in working with the TCNJ students as a whole; not specific to each course. They were asked to indicate the extent to which they agreed or disagreed with a series of statements assessing the results of the work with TCNJ. The following chart shows the number of Villanova students who rated each item from 5, Strongly Agree to 1, Strongly Disagree. A total of 22 students completed the survey, which is shown on the horizontal axis. Any white space to the right of the bars represents students who did not answer a particular item. For example, 20 of the 22 respondents indicated their level of agreement with the statement "Working with TCNJ students resulted in a more creative and effective product." The

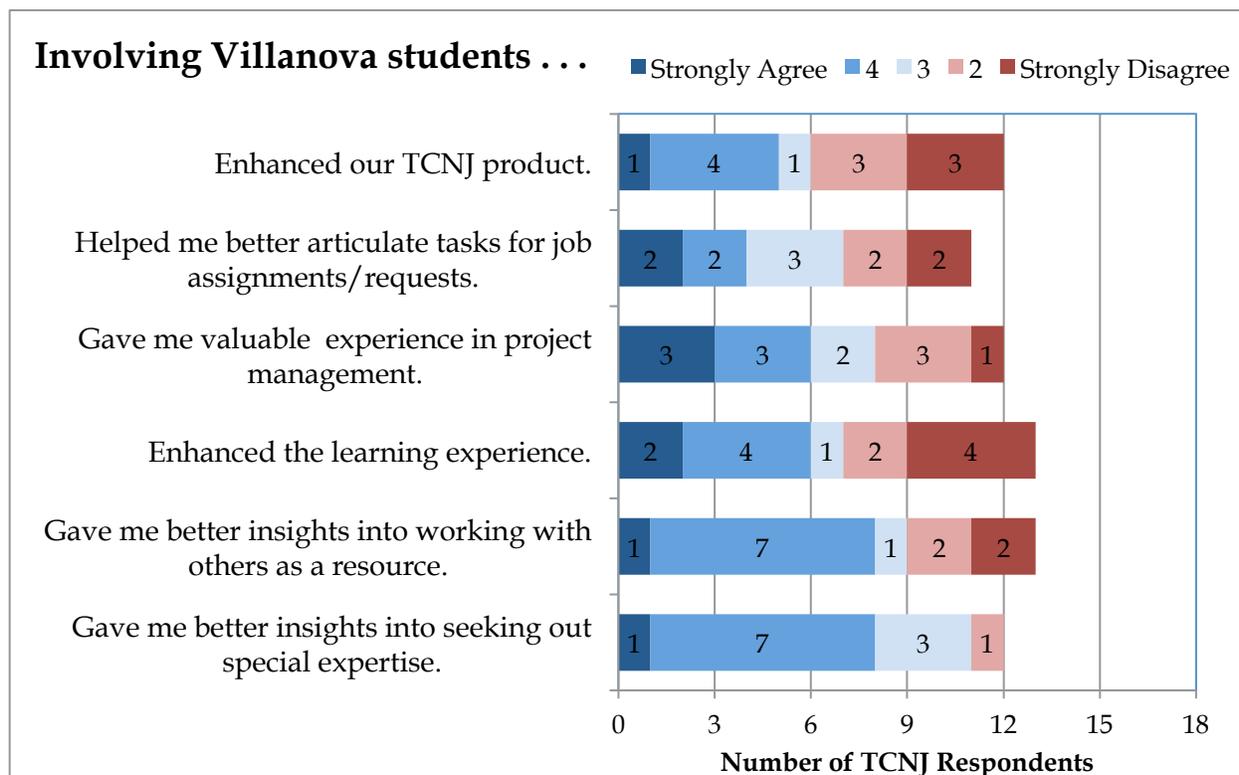
following chart presents VU students' assessment of their experiences working with TCNJ students.



Of highest value to the VU students was that the collaborative expanded the classroom experience and gave them better insight into consulting with clients. While not as strongly, an equal number also agreed that the collaborative provided a venue for use of their skills; provided experience in project management and helped them see how working with others can become a resource. VU students were least inclined to acknowledge the value of seeking out special expertise. The VU students were generally favorable about their experiences with TCNJ.

A larger percentage of TCNJ students did not rate many of the items on the survey. As discussed in the prior section of this report, by design fewer students were actually

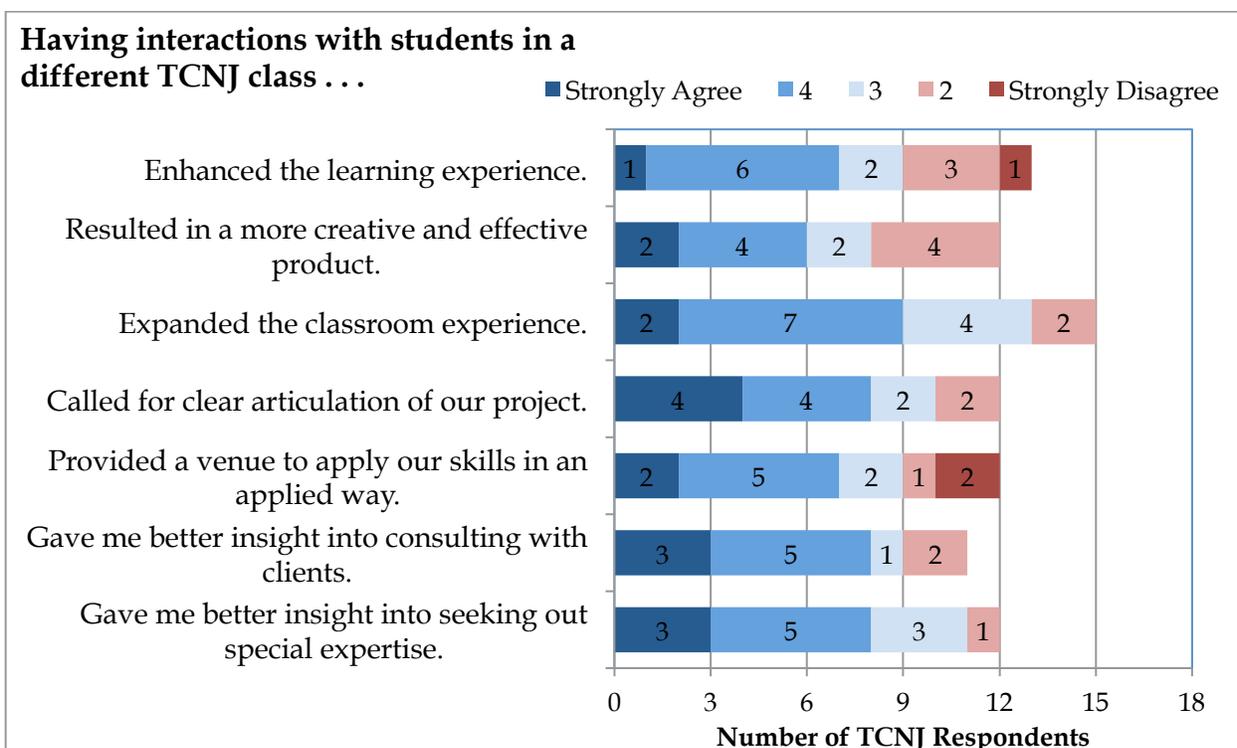
engaged in the collaborative activities with VU students. As shown in the chart below, those who were involved had mixed views about the benefits of the collaboration.



Nearly one-third of TCNJ students did not rate the items. Of greatest value in the VU/TCNJ collaborative were the insights that TCNJ students gained in being able to seek out special expertise and working with others as a resource. About half reported benefits in project management. TCNJ students were equally divided whether the collaborative with Villanova enhanced the learning experience, the product or their ability to articulate tasks for job assignments.

Their experiences in collaborating with the other TCNJ class received more favorable assessments. About one-third did not rate any of the items pertaining to the TCNJ class collaborative. Those who did rate the items were more favorable with their TCNJ collaboration than with their VU collaboration.

TCNJ students felt that the collaboration called for a clear articulation of their project. Of value were expansion of the classroom experience, and insights into consultation and seeking out special expertise. The effect on the end product was mixed. Most (6) agreed that the collaboration resulted in a more creative and effective product but 4 disagreed. Two respondents neither agreed nor disagreed.



Has this course changed your view of computing-based collaboration and problem-solving with students in another class? More than two-thirds (68%) of the VU students and more than half (56%) of the TCNJ students said these courses changed their view of computing-based collaboration. Some comments explaining this response included:

- Showed the importance of good project design and implementation of that design. Also showed how 3rd party collaboration can help.
- Working with diverse people was a challenge that was a good experience for future projects and collaborations.
- It showed how difficult it can be to understand what someone else is trying to do and how important specifications are to the process.
- Having never collaborated outside of a particular class before this class allowed for me to see the value of working with students who have very different ideas and perspectives.
- Working with others does make a difference, but it can be more effective through direct communication.

Those students saying it did not change their views of collaboration gave the following reasons:

- Collaboration was minimal and not codependent enough.
- Very limited interaction.

- I believe that there's a lack of interaction between Villanova & TCNJ, and having worked with interactive storytelling, I really cannot wait for them to work on their programs! If there is a way to interact it would make a better learning experience.

Essentially there was a genuine interest in the potential of collaboration, but concern that the minimal interaction and the timing did not allow a full experience and benefit. Students clearly would prefer more direct interaction on projects and more clearly delineated roles and expectations to enhance the learning experience.

Source: Year !! Evaluation Report, Fall 2010

2. The Virginia School District – Middle School Steve Harrison & Deborah Tatar Computational Thinking (Virginia Tech)

A year ago, year principle investigators, Dr. Deborah Tatar and Dr. Steve Harrison, both from Virginia Tech, reported that a school district in suburban Richmond was quite interested in furthering computational thinking, not simply in a single class but across the entire Middle School curriculum: *“All sorts of classes, not just math and science – classes like social studies and art.”* The pair of PI’s were demonstrably excited about the project for its innovative and conceptually challenging dimensions (*“What can we learn about the ways in which other subjects are taught and their relation to computational thinking?”*). However, they were also excited because the school district has exceptional resources and curricula. Not only does every child in every class have a laptop, the technical staff offer *“much more than tech support; they know the software that all the teachers use – they not only know the programs but are on the lookout for new programs and applications that can further the education process.”*

Last spring 2011 Dr. Harrison observed: *“These resources, and the deep commitment they symbolize, greatly escalate the chances of successful implementation.”* These human and physical district assets attest to the capability of adopting and adapting new technology, if such is proposed by the PIs. As Harrison noted:

“There is no absolute model for this undertaking but if it works in the pilot school and is adaptable to various other teachers’ styles, the odds are good that it will go to scale and be replicated at least throughout this school district if not on a broader basis. The infrastructure makes this project especially attractive in that it obviates the hurdles we’ve met at the college level.”

[It is interesting to note that the School District had originally sought to partner with UVA but plans fell through and the District approached the other local major institution, Virginia Tech. Upon contacting VA Tech’s computer science department with a “cold call,” an entourage of about 15 Tech faculty made the several hour ride to meet with District personnel. Part of the reason for such a response may be due to the fact that Tech was, at that time, in the planning stages for its Institute for Creativity, Arts and Technology (ICAT) – see below – which fits hand in glove with this project.) Harrison and Tater agreed to spearhead the project if their NSF grant

request to do such was approved. Said grant was approved in the fall (2011) as NSF awarded Harrison and Tater an E21 Pilot Planning Grant to begin this project. As of spring 2012 they were “*up to their necks in getting it going.*”

The size of their NSF grant is modest and most of the funds are “*eaten up by travel and lodging*” since the District is a significant distance from VA Tech.

The PIs note that they are beginning this groundbreaking venture from scratch. There are no established models to draw from.

Program Structure and Activity: The School District invited 15 or so of its master teachers, from across various disciplines to participate. There is a history wherein senior teachers develop new, pilot curricula which are subsequently adopted across the District. Of the 15 invitees, five moved forward to be active in the project:

- two Science teachers
- two English teachers
- one Math teacher (a fourth study area, Social Studies is not represented)

Each Middle School teacher works with a team of four to six Tech undergrad students who are majoring in computer science. In turn, each team is led by a computer science doctoral student (two are rather new Ph. D’s; two are well along in their doctoral studies). These Ph. D team leaders all attended Middle School classes to experience firsthand the Middle School educational milieu. There are 4 teams *in toto*, 1 teacher per team except that one team has both (2) of the science teachers.

The teams communicate with the teachers weekly, mostly via Skype, and weekly contact time with a given teacher varies from 45 minutes during a planning period for some to a few hours for others, the latter teachers often working from her/his home. According to Dr. Harrison, the student teams “*seem to be resonating well with the teachers.*”

Professors Harrison and Tatar teach these Tech students in a course that runs from 7 to 10:00 pm on Mondays. The Ph D’s attend each class. The in-class experience ranges well beyond the technical. For example, early on the center stage was occupied by enhancing students’ listening skills and their ability to discern the educational needs and the issues that the curriculum hopes to address (as opposed to “*jumping right in and viewing everything as a problem they have to promptly solve and moving immediately to writing a program.*”)

The overall purpose of the class and the work with the teachers is to collaboratively discover educational “*opportunities for computational thinking as an alternative way to learn.*” This is meant “*not to replace the current curriculum but to augment it.*”

So far PIs perceive the communication as engaging and many times “*exciting,*” but it is a clearly prelude to developing strategies and tools. They hope that will not be the case for long.

The course ended in May with the completion of four prototypes that were used in classes. Each of the four was initially targeted to single class sessions but with the possibility for more

widespread use through the year with other curriculum development and iterative refinement of the software. Two of the four were carried forward for further work by a summer graduate researcher and incorporation into a revised version of the course in the fall. The course to be offered in the fall will use smaller teams to extend the first two prototypes and to develop two new ones.

The PIs see this project as a variation and a “*direct consequence*” of their C-PATH-DE participation, and intend to bring much of their C-PATH work and insights into it. This system wide change project will be carefully tracked over the upcoming year since it represents major potential for DE.

Source: Evaluation of Year IV, Fall 2012

3. People & Computers: Writing and Translating Course

**Seth Whidden and Tom Way,
(Villanova)**

As noted in past reports, new course development, a concept that held high hopes when the project was conceptualized almost five years ago, has been a rocky road. For example, in the 2010 Evaluation Report the PIs are quoted as observing: “*Often the stumbling block is administrative, so convincing deans and chairs that there is benefit is more of a concern than the nuts and bolts of organizing and running such a course, although those are concerns as well.*” “Nuts and bolts” administrative barriers range from scheduling to gaining course approval to a dearth of electives. Faculty workloads and financial considerations also play a part. Nonetheless, where the culture supports it, and the faculty are committed to it, and the administrative is supportive, DE can flourish. This is the case at Villanova University where co-PI Dr. Thomas Way had developed and implemented two courses and is now working on a third. In his first course, he partnered with Drs. Kim Pearson (Co-PI) and Dr. Ursula Wolz (closely involved in the CPATH DE project from the start), who were at TCNJ, to launch a very successful offering in Game Theory. Last year he launched another innovative DE course on the environment.

Dr. Way’s latest effort resulted from a happenstance meeting with French professor, Dr. Seth Whidden, at a faculty social. As a result, the pair submitted a proposal to Villanova’s Institute for Teaching and Learning (VITAL) and, in April 2012, were awarded a \$9,700 developmental minigrant for their project, “Developing a Cross-Disciplinary Approach: People and Computers, Writing and Translating.” The project is based on techniques developed through Dr. Way’s CPATH DE work and is scheduled to be implemented in the fall 2012 semester. It involves interdisciplinary instruction between two classes that have simultaneous meeting times twice per week (Mondays and Wednesdays from 3:00 to 4:15p.m). The project emphasizes a cross-disciplinary approach to teaching language translation to Computing Science and French and Francophone Studies students. Joint class meetings will be held occasionally as students explore their respective disciplines and investigate the nuances of human language, and the computational manipulation of that language, through lectures, activities, and team-based projects. Students will collaborate to develop computer-based language analysis and translation tools, learning to critically examine algorithms and their resulting translations. The students will apply knowledge from their respective own areas of expertise (their major areas of study) in the collaborative effort, but will team up on developing/critiquing/analyzing tools related to translation.

Thus, Dr. Way’s course on machine translation, which he will offer to computer science students, is only

half of the undertaking. His collaborator, Dr. Whidden will teach his course on analyzing French literature to language majors.

For the CS students the value added is the opportunity to have hands on, meaningful practical applications. For the language students, this presents a unique opportunity not only to become topically proficient with machine translation but to engage in computational, algorithmic thinking characterized by conceptualizing with a deep degree of specificity and causal chain logic.

Learning Modules: One of the main features of Dr. Way's course will be the construction of four to seven learning modules, such as identifying whether a passage was person or machine translated and identifying cues for such a judgment. As noted in last year's report, Dr. Way sees these types of modules as being *"self-contained educational packages complete with such tools as video demonstrations, software, handouts & homework assignments."*

In terms of value added and wide application, the course and its modules have significant potential. Dr. Way pointed out, for example, that the modules are not limited to *français*; rather, the modules will be generic in processes and procedures, and thereby applicable to all languages, even including those not using the Roman alphabet. He prophesized that this course might be followed up with a Spanish one, and continue to progress through various languages since the infrastructure is replicable across all tongues. For example, one module idea is a takeoff on the game "Telephone" also known as "Whispering Down the Lane" wherein a passage is machine translated, for example, "from English to French to Spanish to Swahili to Mandarin Chinese." The various machine translations can then be content analyzed. The initial English version can be compared to the final step, Chinese, to discover discrepancies; each step in between can be scrutinized to unearth translation defects/strengths. As is apparent, these modules elicit direct student participation and interaction.

Both professors are very excited about the collaboration which reflects an attribute that has been present in practically all the successful courses we've studied; namely, a high degree of enthusiasm on the part of the instructors from disparate disciplines.

Role of Administration: Keenly aware of the need for proactive administrative support, Dr. Way noted: *"Both chairs and Associate Deans were and will continue to be a critical factor in moving forward with the collaboration in concrete ways such as assuring that the courses are scheduled, and scheduled at the same time, and in close proximity."* He acknowledged a consistent finding of this evaluation; namely that the role of administration can *"make or break"* a DE course.

Role of Funding: While not seeing the VITAL grant as an absolutely essential condition, Dr. Way affirmed that it added both *"acceleration and accountability"* to the process and reaffirmed a point he made in last year's evaluation report: *"a wee bit of funding can stimulate substantial DE projects."*

Source: Evaluation of Year IV, Fall 2012

4. Knactive

Steven Chappell , Chris Graves, David Shadinger, Carol Spradling, Deb Toomey (NW Missouri State)

The Knacktive Project at Northwest Missouri State University is perhaps the flagship effort of this year's CPATH Distributed Expertise evaluation report, embracing all benchmarks of a successful DE project and more.

According to its fully developed web site <www.knacktive.com>:

Knacktive is unique to Northwest Missouri State University where it combines five areas of study into one interactive class. This class provides students the opportunity to take their specific strengths and put them to work in a team setting found in most marketing communication agencies. During the class students are separated into groups and compete to create an integrated campaign for a real client; providing market research, creative strategies, product planning, promotions, and public relations. At the end the students then present a formal and professional pitch to the client.

In a phone interview, one of the first questions the evaluator interviewer asked of two Knacktive designers, Drs. Carol Spradling and Dave Shadinger, was:

“What is the etymology of *Knacktive*?”

They responded that the term was coined by participating students in 2011, the project's first year, because “everyone has their own unique knack.”

Knacktive traces to 2010 when a NWM alum, a successful advertising agency owner, saw the need for a more interdisciplinary emphasis in preparing students for the workplace. The alum funded a faculty member to work on a plan and subsequently a decision was made by the University president with the full support of five department chairs and a number of faculty to move forward. And move forward they did with vigor and velocity. Six faculty members, all of whom had private sector work experience, became the planning phalanx and devoted many extra hours to customize an interdisciplinary course covering critical functions in the marketing, public relations, advertising, promotion, and technology fields. “We worked from May through December in 2010, meeting at least weekly” to craft the tri-semester long course.

The final product is a tri-semester course, launched in Spring 2011, and described on the website as a course in which:

Students experience a realistic, agency-like atmosphere as they work with multiple teammates on a promotional campaign plan for a real client. The competing teams conduct research, analyze the data, devise a strategy, formulate tactics, and ultimately make a formal presentation of their plan to the client.

Description of the Course: Students actually go through a formal application process for individual positions on a team and each position has a detailed job description. The eight team positions include:

- Project Manager
- Public Relations Manager
- Media Manager

- Research Manager
- Art Director
- Graphic Designer
- Copywriter
- Interactive/Digital Manager

Further, a faculty member (sometimes two) interviews each student. Thus the selection process is serious and rigorous.

Students learn of Knacktive through participating faculty, other faculty, the web site and flyers but student-to-student word of mouth is becoming more a factor as the news gets out about Knacktive. It was challenging to enlist students for the initial class of 24, when there were just three teams. But enrollment has steadily grown since then. In its second offering, 14 students applied to be Project Managers, and there were over forty applicants for the 32 positions. Faculty expect that enrollment will grow exponentially.

Distinctive Properties: In terms of the new course's uniqueness, the founders point to a factor intrinsic to the CPATH DE initiative, the use of technology and computer science. Interactive Digital Media (IDM) –Computer Science, Management Information Systems and/or Computer Science students are key members of each student team, and there is a strong technology presence including the “*critical area of social media.*” “*This makes us different from purely advertising agencies. We use a great deal of technology.*” The students interact directly with peers who have programming and graphic design skills. The CS, MIS and IDM students know web development, app creation and can interface with graphic designers and help classmates in social media and other areas. Social media in particular crosscuts PR, marketing, and graphic design.

The Teams and the Course: Students from the various teams meet at a reception late in the preceding semester to get to know one another. The fall 2011 gathering was attended by the NWM president, provost, all participating Deans and chairs – a clear signal of institutional support.

During the spring 2012 tri-semester, classes were scheduled 4 days per week – three fifty minute sessions and one 75 minute one. Early on, all participating students attend each class and learn widely applicable skills such as project management. Special topic lectures are also offered such as “From Creative Ideas to Concrete Realities.” As the semester progresses the teams begin to meet separately during class time, many times with a faculty member(s) present for guidance and technical assistance. Some teams become so immersed in their projects that they have met most evenings, even sharing dinner. An interesting value added is that teams often call upon the insight/talents of other students at NWM for special assistance so, the project actually radiates a bit through the student body.

Each team receives a budget of \$750 which is typically used to pay for special graphics, creating a hard copy “client book”, a final report. (One team actually put their final product on Kindle Fires for distribution to key members of the firm.)

There is no common textbook for the course; selected notes, handouts and online sources are used. Grades are determined via several processes. Students rate each other on a six variable rubric. In addition, faculty confer on each team's final product.

Business Partners: There is one business partner client per year and all teams work with that partner. Teams tend to work independently and often keep their projects secret from their competitor teams. Knacktive got off to a marvelous start with its 2011 partner, Cincinnati-based LasikPlus, a national firm specializing in customized laser vision correction techniques. The NWM teams not only created a slogan that became officially adopted by the company - "Eyes Save Lives" - but three months after the final student presentation, the company incorporated much of the students' material into a national ad campaign. This generated extensive external praise from the area business community.

The 2012 client was Science City, a museum in Kansas City, Missouri, whose branding had become outdated. The Knacktive teams were requested to work on a new brand, on ways to expand the museum's market, and on raising awareness of Science City's mission in the metropolitan area. The judges for 'best team product' were key staff from Science City – CEO, CFO, head of IT and several others. They were impressed with the students' work, conferred for an hour before picking a single winner, and attested that Science City could indeed incorporate "various pieces" from each of the teams' campaigns in the museum's marketing efforts.

The partner client firm is asked to contribute \$10,000, but the actual contribution with the museum nonprofit was \$6,000. This amount, along with students' tuition payments, practically covers all expenses.

In addition to the formal business partner, there are other private sector partners whose support has been invaluable. For example, VML, one of the world's leading digital marketing agencies, has a strong presence, generously sharing its processes and even having three top level staff visit the campus and meet with Knacktive students and faculty for extended sessions.

The local business community is becoming more and more aware of Knacktive and the program has received a number of "shout outs," including one at a statewide meeting of business leaders. In addition, a Knacktive faculty leader, Dr. Carol Spradling, was chosen to receive the 2011 Governor's Award for Excellence in Education, and Knacktive was highly profiled in the award process.

These types of recognition can only strengthen the program's image on campus.

Administrative Support: A number of CPATH-DE projects have been plagued and at times scuttled by lack of administrative support and logistics (course scheduling, faculty availability, etc.) This was not the case at NW Missouri as there was pronounced administrative support from the president, deans, chairs and many faculty. The few scheduling snags were quickly resolved.

Another marker of NWM backing is the fact that the increase from 24 students in Y1 to 32 in Y2 was a dean level request. Also, a very important factor in light of other CPATH-DE experiences, is that although the key faculty are all non-tenured, their work on Knacktive constitutes a

positive contribution to their tenure process, especially since interdisciplinary work is a pillar of the NWM strategic plan. The Knacktive faculty are currently thinking of publication possibilities for articles.

The positive attention that Knacktive is garnering from the regional business community has quickly built program credibility within the campus and business communities. Additionally, Knacktive has been the focus of significant NWM internal articles in the alumni publication and newsletter on campus.

The CPATH DE Grant: The reader might wonder what additional value, other than financial, did the modest CPATH grant bring. A bit of history is needed here. During the time that Knacktive was being planned, the lead PI of the CPATH-DE project, Dr. Lillian Cassel visited the NW Missouri in a different role, that of evaluator for a NSF grant that the University had received. The NWM administrators and faculty who met Dr. Cassel at this time were impressed with her experience and insight. Concomitantly, Dr. Cassel was impressed with the Knacktive work and a correspondence began with one of the leaders of the Knacktive team, Dr. Carol Spradling. After a few months of communication, Dr. Cassel awarded Knacktive a small grant which partially supported the additional planning work of the Knacktive faculty during the summer and fall of 2011.

Although modest in the dollar amount, Knacktive faculty emphasized that the grant lent substantial credibility to Knacktive in the eyes of several influential NWM administrators and faculty, both in meriting the grant itself and the fact that it conveyed the respect that Dr. Cassel held for the project. While administrative support and respect for Knacktive already existed, this allocation, according to Knacktive faculty, furthered it even more.

SWOT: The six faculty from five departments (Art, Communication, Languages & Theatre, Computer Science/Information Systems, Mass Communication, and Management/Marketing) issued a project summary report in June 2012. This report speaks to many of the strengths which have been described above. Further, a content analysis of the weaknesses by the evaluator seems to point up fairly common pedagogical issues such as the students' "*low level of experience with critical thinking/problem solving*" – issues with which faculty across the nation struggle. Some fiscal concerns were noted especially in assuring that Knacktive will at least break even, especially if "*a nonprofit is not able to cover the cost of the course.*" But such concern does not seem very threatening in light of the statement above that: "tuition plus organization partner fee = breakeven (almost)." Frankly, the threats and weaknesses, real as they are, were not perceived as perilous to the program by this evaluator, especially when compared to its strengths and opportunities.

The NWM faculty noted, the success of Knacktive is attributable to three driving forces: (1) administrative backing, (2) faculty interest (3) accolades from the business world.

Source: Evaluation of Year IV, Fall 2012

5. Interdisciplinary Directed Study for Journalists & Computer Scientists

Ingrid Sturgis and Todd Shurn (Howard)

An Interdisciplinary Directed Study for Journalists and Computer Scientists:

One of the highlights of last year's report was PI Kim Pearson "*mentoring a colleague who has been laying groundwork for a new DE course centering upon Social Media.*" This work is being done by Professor Ingrid Sturgis, Assistant Professor at in Howard University's Department of Journalism. The project was launched in this past spring semester of 2012. Professor Sturgis, like Professor Pearson, had been a journalist before entering college teaching; she has experience with several newspapers and on-line firms.

While the goal is to eventually grow the project into a fully developed course, it was piloted as a directed study with a five-student subgroup (2 journalist majors, one public relations major and 2 CS majors). The five students came from two different classes. One was a Computer Science course; the other, Professor Sturgis' Journalism course. The computer science students were part of a larger gaming course which assigns students to complete various projects. The 5-person team worked collaboratively with SCRATCH to develop a game. The story line of the game is a group of college students who are in a band, traveling to various locations over spring break. The CS students built the game, with the non-CS students generating specific questions and doing research related to the theme (e.g., music, background images, sprites). The subgroup started out very ambitiously with a whole array of questions, but they had to cut back to addressing up to five or so major questions in order to set a reachable goal.

Professor Sturgis emphasized the value of the journalism/communication students experiencing "*the type of computational thinking that computer science requires - very specific, step by step and problem solving. They can benefit immensely from the logical thought patterns of computer science and also the computer science impact in the world today.*" Conversely, the CS students have an opportunity to enhance their creativity and entrepreneurial skills by going beyond their course content.

She noted that SCRATCH tool is not the most sophisticated tool: "*It is not quite as polished as I would have liked but you have to start somewhere.*" Also, SCRATCH was the clear choice of the class professor. But she coped well with this, using the drawbacks of the SCRATCH program to "*further reinforce the need to think very stepwise.*" In the future however, she may look to another tool that is more sophisticated and adaptable.

The Impact of the DE Grant: Professor Sturgis received a modest grant from the CPATH-DE project. Without doubt, this stipend was a "boost" to initiating the project. She may use part of the grant to offset her overload, but also may allocate a portion as an incentive to the students if they bring the project in on time. She is hoping to have the students present to staff/faculty. But time is a factor. The directed study began two weeks after the start of spring semester classes and "it took awhile to ramp up." The learning curve was steep and slow, but ultimately because they dealt with fewer questions in the game, the team was able to get back "*on track.*"

Facilitating Factors: At Howard, there are several facilitating factors to this DE task. Professor Sturgis' chair and dean are very supportive and were instrumental in her receiving "*fast approval for the directed study.*" There are other influential administrators who have experience in such distributed expertise projects and are supportive. Additionally, Professor Sturgis herself is well a respected and well known member within the journalism field.

Next Steps: Professor Sturgis has been encouraged to offer the directed study again in spring 2013. She very much likes the assignment but it is “*an extra course for which she does not receive a lot of support.*”

She has met one of her goals, to use the products of the directed study as components of a full, three-credit class; namely her copy editing class. The class is set up like a game with achievements and badges. In addition, the class works on creating board games to teach AP style.

Professor Sturgis is also teaching the directed study News Game class this fall, this time with two students. They are examining how gaming is being used in journalism and PR. The students are working with computer science students, using App Inventor to develop a homecoming game for Howard to launch in October.

Thus, this is an interesting model; namely, using directed studies with diverse majors to develop interdisciplinary tools and techniques.

Source: Evaluation of Year IV, Fall 2012

6. Issues in Computer Ethics

**Deborah Tatar (Virginia Tech), in
collaboration with University of
Limerick, Ireland**

Reader’s Note: This section is largely based on a very comprehensive summary/assessment report written by the VT CPATH Distributed Expertise professor. All quotes come from that report unless otherwise referenced. The Irish professor has not yet been interviewed nor has he yet been requested to submit evaluation information.

The TCNJ/Villanova partnership was begun by colleagues who had known and respected each other for some time and who were anxious to work together. The VT/Limerick collaboration had a radically different birth. Essentially, according to the VT professor, she “fell into” this opportunity. Here’s how.

A UL ethics professor, several years ago, developed a distance learning, on line distributed learning model and subsequently has delivered it in collaboration with approximately eight institutions. His course addresses the ethical and writing dimensions (not oral) of professional behavior. He became aware of the VT’s course, “Professionalism in Computer Science,” and its points of commonality by researching the Internet. He contacted the VT professor who, after discussions with the Irish professor and assessing course content, felt this was a marvelous opportunity for cross-institutional and cross-Atlantic learning...“The chance for students to learn how other people outside the familiar points of view ...think about ethical issues.”

The fact that the course had already been offered numerous times with partnering institutions in the United Kingdom and the United States with apparent “considerable success” made it especially attractive. The alliance was quickly forged, and the class premiered spring semester, 2009.

H.1 Course Description: Basically, the course plan followed the Limerick model which features five phases: (1) a “getting to know you” phase, (2) formation into teams, (3) a practice case study (4) structured, on-line discussion associated with the formation of views regarding the final case study, (5)) and the production of a 6,000 word report on the final case study.

The VT course to which the ethics was soldered is a required class for computer science majors at Tech, entitled “Professionalism in Computer Science.” This is an undergrad course with four areas of emphasis:

- (1) Writing intensive
- (2) Oral presentations
- (3) Professional ethics
- (4) Professional behavior (e.g., interviewing)

Two classes were offered in spring 2009 with 31 and 29 students respectively, but only the larger one is studied in the CPATH evaluation. This class enrolled two international students. Of the remainder, all but three were Caucasian, practically all from Northern Virginia. One woman enrolled. The two Irish classes were much, much smaller (11 and 8) but much more diverse with “students from all over the world, as many from outside Ireland as within it.” It should be noted that at Limerick, in contrast to VT, the class is an elective class, “Issues in Computer Ethics,” open to graduates and undergraduates alike.

A team approach was applied. Teams consisted of groups of 6, divided into pairs. Each pair was assigned a different ethical perspective (e.g., utilitarianism, deontology, virtue ethics and so forth) then developed arguments around the case studies from the point of view of that ethical perspective. The case studies embodied conflicts in much discussed and current issues in computer science and information-based ethics. Because of the 3:1 ratio of VT students to UL, some teams were entirely VT.

The inter-institutional communication was on line via “Moodle” with each class meeting physically with their professors at their home institutions. No direct real time class interaction occurred due to different schedules.

H.2 Results of the Cross-Atlantic Collaboration

The VT professor wrote an extremely forthright and reflective report of the experience. Here again we must carefully distinguish between the collaboration between professors and the dynamics and characteristics of the students. On the up side, as with the prior course, this linkage was established in extremely rapid fashion. The course designs had been well conceptualized and well documented and the ethics section was easily embedded within the VT course. Although the VT professor is skeptical of the courses educational value, this appears to derive more from student traits than from course formation.

Her observations about student participation and learning are based on observation and on standard end-of-class student evaluations that were complemented by a customized survey instrument. While almost all students completed the former (28 of 31) only 9 Tech students in the target class completed the questionnaire that specifically assessed the collaboration.

H.2.2 “Best and Worse Things”: Students were requested to describe through open-ended questions “the best and worst thing about the distributed, collaborative activity.” Responses about “best” from mixed institution groups included:

- “The forum debate because other people thought of different arguments than I would have.
- “Learning of the culture of the UL students and the ability to dedicate yourself to one perspective.”
- “Presentation was also very good.”

In response to the question “What was the worst thing about the distributed, collaborative activity?” the two mixed institution groups reported:

- “The collaborative paper because there was no defined structure for work on a paper as a group.”
- “UL→Time difference and the collaborative paper creation.”
- “Not having enough time to fully debate after presentations.”

H.2.3 Level of Student Contribution and Level of Feedback Across Three Classes (total n=54) : Data were specifically collected on the two VT courses and one of the UL courses via a brief, special end-of-class survey conducted by the CPATH Distributed Learning professor. The survey asked each student, on ordinal level rating scales, to indicate how much they and each of their team mates contributed to the project as well as the perceived level of feedback they received. Results were not encouraging with most VT students reporting low levels on each variable and many reporting that “they had gained little or nothing from the experience.”

H.2.4 Overall Student Perceptions and Themes: “Overall, the evaluations were poor. The students did not like the projects and felt that they had learned little. The overall class received an average rating of 1.8/4.”

The professor went on to note that, “While this class has historically low ratings, this was a full point lower than usual, and not one student thought it was good or excellent.” Multiple theories could be generated to explain the ratings but one that does not appear to be valid is teacher competence as the professor achieved a rating of 3.9/4 overall rating from the other class she taught the very same semester.

“The distribution of complaints in the general reports included the nature of the case studies, lack of participation by group members, and the perceived irrelevance of the course (in general) to computer science and to their lives. Especially concerning was the widespread perception that there had been little critical feedback from other teammates and little development of ideas, although the activity was structured to promote such feedback and thought.”

Further, the professor writes that “students were correctly unhappy about disorganization and miscommunication on the part of instructors and teaching assistants.” Some of this stemmed from communication miscues between the professors; in particular the Irish students did not think a final paper was required while the VT students did. The professor also wonders whether

more specific behavioral expectations would have helped. For example, “It was specified that the paper should be a joint production, but it was not spelled out that, in working on a joint paper, one should read and make suggestions for editing the other people’s portions multiple times on multiple occasions.’ ”

Two additional functional issues deserve specific mention:

1. The enormous “amount of on–line activity she had to track.” “She received almost 200 email messages every week related to the collaboration and more than 3000 over the course of the 16 weeks. Although it was not necessary to read each of these carefully and it was possible to read them as threads on the forum (rather than as separate emails), many problems were hidden in the gaps between messages.” She felt “overwhelmed” with the “voluminous correspondence.”
2. “While time differences were known to exist on a daily basis and a semester basis, differences in the face-to-face meeting schedules of the class contributed to communication difficulties, with the Limerick classes meeting once/week on Thursdays and Fridays and both of the VT classes meeting Tuesday and Thursdays mornings before the Limerick classes. While information was distributed online, emotional and intellectual feedback from students was received in an uncoordinated way. If the professors solicited feedback from students and therefore changed their plans, it was frequently not possible for all students to receive the information face-to-face for 5 days or a week. “

H.3 Deeper Issues: With respect to these operational snags, the professor argues that “all of these problems are addressable and fixable” and even lists seven Pragmatic Considerations including designing a single “comprehensive schedule” and creating a “structured recourse, such as arbitration, for students whose team mates are not responsive.”

Important as these operational fixes are, they pale in the context of deeper issues that the professor raises. Consider these four quotes:

- “One challenge important for the CPATH goal and experience is the difference in motivation, expectations and likely in-class experience between students at the University of Ireland and those at Virginia Tech. Students in Ireland were in small, optional classes. They appeared to expect to engage in free discussion and ideation. Students at Virginia Tech were in relatively large, required classes. They frequently advanced the idea in class that *ethical issues, including professional issues, were outside the proper domain of computer science and should not be part of the curriculum.* Their goal was to *execute the requirements of the class with as little trouble as possible.*”
- “While Irish conversations contained discussions of such topics as whether it is ever ethical to eat meat or kill animals for pleasure, and if so under what conditions, the *American students often defined themselves as “meat eaters’ ”*
- “In general, these discussions seemed to ask students to go beyond name-calling; however, *the students were rarely able or willing to support their opinions with actual*

facts and often reverted to remarks like “That comment is of such low intellect that I cannot respond.”

- “Some of the comments that the students made combine with other class events not detailed in the current discussion to suggest that the one reason that students had so much difficulty benefiting from the possibilities inherent in the joint exercise and from the particular case studies presented had to do with *an unwillingness or inability to empathize with the process and the purposes of the process, or to take on ethical dilemmas, writing and communication as part of the job of being a computer scientist.*”

Note: italics in the above quotes are the evaluators’ not the professor’s.

These are disturbing words which, as the professor clearly conveys in her report, speak directly to deeper issues such as professional and personal responsibility, interdependence, ethical and moral consciousness in the workplace, and ultimately democratic citizenship. Perhaps the professor is correct when she wonders: “The question is whether the students are able to use the challenge presented by these means to enable them to pursue this path, or whether we asked too much of them.”

While understandably, the attitudes conveyed by the American students are deeply disappointing, the evaluators wonder whether this is just the sort of situation where CPATH Distributed Expertise approach can be uniquely applied and most useful. In other words, assuming the reluctance of these American students to engage in deeper ethical thought and exchange is valid, how better to stimulate in them reflective thinking and self-examination than to bring them face-to-face digitally with students from other cultures and use the ensuing mentoring discussions (both cross-institutional and within class) to try to stimulate critical assessment of one’s own views, how they were shaped and how they will be carried forward. The potential for such contemplation appears to be much more probable in a CPATH Distributed Expertise setting than in solely third person reading/viewing assignments. The evaluators are realists and keenly aware that change in deeply-rooted attitudes is very difficult. The point we make is that Distributed Expertise, via cross-cultural, real person (peer/professor)/real time communication offers a powerful, ideology challenging opportunity. Assuming that the course is repeated, the evaluators will devote specific attention to this strategic issue.

H.4 Some Up Sides: Thomas Aquinas wrote: “omnia distinguat”... “always distinguish.” As repeatedly mentioned, in the CPATH Distributed Expertise project we must constantly bear in mind the difference between classroom issues (that may stem from a variety of exogenous variables) and year I start up issues from core issues of distributed learning. A core question here, as noted earlier is: “Does this CPATH Distributed Expertise project bring learning to places where it wouldn’t have occurred? Does it create new access and opportunities?”

Posit that there were student attitudes that impeded a transition to ethical thinking; consider it a datum that some operational mistakes were made. Nonetheless the course brought together two distinct cultures in a new way.

Further, upon reading the above, one of the PIs underscored that now the professor is more in tune with the attitudes of the VT students and, next time around, can address these biases in a more informed, direct pedagogical fashion,

In fact at the May CPATH Distributed Workshop, in spite of all the difficulties and disappointments, the professor listed three major pluses of the course:

1. increased diversity of interaction
2. increased student listening to each other and questioning/challenging one another
3. the student electronic dialogue helped the professor zero in more precisely in instructional intervention than in a usual class and helped her learn more about the students from reading their email threads than she has in typical classes

She noted at the workshop that her original hope had been for the “collaboration to offer an opportunity for increased international dialogue for her students and that working in teams with the Irish students would add to students’ serious approach to the course and increase their study hours.” She then added that she believed that “increases occurred on all these variables.” When asked: “Would you teach this course again?” she answered “Yes.”

Assuming this occurs, the evaluators will more closely assess both the overarching questions of distributed learning as well as the more specific objectives of the project.

Source: Evaluation Report, Year I (draft 4)

7. New Games Course

Kim Pearson (TCNJ)

“**News Games:**” Like Dr. Way, PI Kim Pearson has continued to develop and offer DE courses, in particular those that extend her work in gaming and journalism. In fall, 2011, she introduced a fresh course entitled: “News Games” and, after its premier offered it again in fall 2012. The course explores the emergence of news games in terms of their implication for gaming and for journalism.” In their recent book, *Newsgames: Journalism at Play* (MIT Press, 2010), Ian Bogost and his colleagues use the term “Newsgames” to mean, broadly, using game design techniques to “do” journalism – that is to report, present and or comment on the news. This broad definition, according to Professor Pearson, takes in everything from crossword puzzles to videogame-like simulations and alternate reality games. Since the TCNJ students in the class are journalism and interactive multimedia majors, not computer science students, Professor Pearson “*sees the class as a practical exploration of computer science concepts relevant to journalism, as well as an opportunity to learn about and test the possibilities of this rapidly developing journalistic medium.*” In the course, students create games related to current events in the news, and reflect upon what it means to create games as an act of journalism. No prior knowledge of game design or programming is assumed.

In the fall 2012 iteration of the class, Professor Pearson strove to increase student involvement by turning the journalistic spotlight upon two pressing issues - pollution and food security - in Trenton New Jersey, a city just blocks away from the TCNJ campus. Trenton has experienced the difficulties that have beset many industrial American cities: disinvestment, environmental

degradation, and a crumbling infrastructure. Enrollments in the federal supplemental nutrition assistance program have risen dramatically in the last five years. How can “newsgames” make the issues more visible, more comprehensible, and more amenable to citizen dialogue, engagement and resolution?

At the beginning of the course, the students were confronted with a hands-on learning experience, a newsgame that Professor Pearson created using Scratch. The “Food Stamp Game” challenges players to buy a week’s worth of groceries on a “food stamp budget” – about \$30/week. (The title reflects the name of the prior federal assistance program Food Stamp Program, now termed the Supplemental Nutrition Assistance Program.) Professor Pearson has refined the game based on the initial experience, but did not intend to present it to students as a finished product. In fact, there are a number of technical glitches and design flaws, and she did not feel it had enough story elements to make recreate the experience of having to shop with an EBT card. The aim is for the students, using critical thinking, reflective dialogue, additional reporting, the texts and the professor, to “*critique and remix*,” improving the elements of the game. For example, Professor Pearson raised the question of how much information needs to be built into the game, and how much would need to be part of another story package. The idea was to get the students to first try to improve on what she’d done, and use the strength and weaknesses of her approach, along with the guidance from the texts, to develop their own ideas.

As Professor Pearson developed the course, one of her first challenges was to spark student thinking about the requirements for their own game projects. She found no literature on how one actually reports and organizes information for a “newsgame,” nor did she discover any ethical standards that apply to such endeavors. She commented, “*Game designers are accustomed to thinking conceptually not literally, so they sometimes take liberties that potentially violate the canon of journalism ethics.*” This has led Professor Pearson to open some interesting discussions with colleagues, and has added an unanticipated albeit important dimension to the course, namely an ethical perspective. It also led her to the conclusion that a method for developing content for news games can be adapted from established reporting techniques for literary journalism.

Student response to the courses has been positive. Pearson plans to teach the course again in Fall 2013, this time in concert with computer science colleague Professor S. Monisha Pulimood’s course on databases. That collaboration is related to her most recent NSF-supported project, TUES: Collaborating Across Boundaries to Engage Undergraduates in Computational Thinking (http://www.nsf.gov/awardsearch/showAward?AWD_ID=1141170), and will include formal assessment of the effectiveness of this kind of curriculum as a tool for teaching computational thinking.

Professor Pearson continues to share her reflections on the process of developing and implementing these classes, along with their syllabi, on her blog, <http://kimpearson.net/?tag=newsgames>.

Source: Evaluation of Year IV, Fall 2012

In May, 2009, under the C-PATH DE grant, the lead PI (Dr. Lillian Cassel) convened a workshop to discuss the then new DE project. Fifteen professors from various institutions and disciplines attended. One of the many ideas that emerged was a potential collaboration between Villanova University and Alcorn State in the area of environmental science. The collaboration did not materialize but the Villanova professor and Co-PI (Dr. Thomas Way) pursued the idea on his own. He submitted a competitive proposal to develop such a course to the Villanova Institute for Teaching and Learning (VITAL) and was awarded a modest grant to design and launch the new offering. The class was offered in Fall 2010. Dr. Way, in a January 2011 summary report to VITAL, describes the course as follows:

“The primary goal of this project was the development of a computer science course called, ‘Computing and the Environment,’ that was to be a sufficiently advanced computer science elective while also being suitable for students of any major. The course made use of interdisciplinary content including hands-on computer labs and in-the-field data gathering projects, lectures that introduced new topics and supported other class activities, discussion of the scientific and cultural issues surrounding the subject including seminal scientific and popular works from the field, two guest speakers, and a variety of supporting multimedia materials. Throughout the semester, course materials were gathered and organized so that the course can be replicated in subsequent semesters.... The final goal of the course was to try to include students from a wide variety of majors in this advanced computer science course, and to make use of an interdisciplinary approach to offering the course that supports the broader Villanova mission of providing value to the community at large.”

The goal of attracting a diverse set of majors appeared to be well on its way to achievement during early registration, as a balance of computer science and non-computer science majors enrolled. However, as Professor Way writes, *“Gradually, enrollment shifted until of the 10 students in the course, nine were computer science majors. The 10th student, the only female enrolled, was undeclared arts major who was attracted to the topic. Unfortunately, the current core requirements worked against the course being useful to as many non-computer science majors as was anticipated.”*

Professor Way’s quote points up a theme that has nagged the DE project consistently; namely, that while the concept of DE is powerfully appealing to faculty and students alike, academic and administrative requirements frequently stymie putting ideas into action. As noted, this theme received considerable attention in last year’s evaluation report and was a prominent topic in an extremely informative project report authored by the two Virginia Tech PI’s, Drs. Steve Harrison and Deborah Tatar.

In terms of evaluative data, the Computing and the Environment course scored high on Villanova’s standardized course evaluation which all students complete at the end of the semester. More telling are results from four assessment questions that Professor Way specifically designed for this course.

Item	Start of Semester	End of Semester
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Skill level with computers	7.8	7.9
Computer programming	6.3	6.5
Familiarity with environmental issues	5.3	6.7
Familiarity with green computing issues	3.1	7.3

*Scale ran from 1 through 10; average ratings are shown pre/post.

While the data do not suggest gains in computing *per se*, they solidly support the essence of DE; namely, extending computer science to new academic areas. In Professor Way's words: "*This experience vividly demonstrated how computer science is applied to another field.*"

Two final notes are important here:

(1) **Computer Science Faculty as Domain Experts:** The DE project with its formal emphasis upon distributed education is a trailblazing effort in many regards and, as is common with such efforts, lessons learned often fall outside preordained goals and objectives. For example, Professor Way in an interview with one of the evaluators observed that:

"Given that this was the first time that the course was offered, it proved too cumbersome to recruit a retinue of guest speakers, so I took it upon myself to learn more about the environment and assumed most of this [expert] role, using materials from researching the field and from talking with other professors, including a number of Villanova faculty."

In this case, he himself became the "domain expert" in environmental topics which he felt "did not prove to be an unreasonable stretch, given the introductory nature of the class." While not fully attaining the project goal of enlisting colleagues from other disciplines, this "domain expert" motif, especially in introductory classes, may constitute a viable means of melding computer science with other fields, thus maintaining fidelity to the core interdisciplinary value of the C-PATH proposal. Given the gains in the subject area reported in the students' pre/post assessments of familiarity with environmental issues (from 5.3 to 6.7) and familiarity with green computing issues (from 3.1 to 7.3), one could conclude that he was successful in performing this role of domain expert.

Indeed, this variation seems to resonate well with objective #2 of the DE proposal:

"Identify opportunities for innovative topic combinations where distinctly different combinations of talents and expertise yield new courses that appeal to a broad base of student interests and goals" (Proposal, p. 2).

(2) **Fiscal Motivation:** Dr. Way received a modest grant to undertake the design of this course. Given the time required to develop courses, particularly interdisciplinary ones, providing stipends for course design may be the stimulus for putting the flywheel into motion. Perhaps some of the C-Path DE grant dollars can be used to test this.

Source: Evaluation of Year III: Fall 2011

Part III: Expanding Distributed Expertise Projects: Facilitating and Restraining Forces

What Are the Hurdles?

At the CPATH PI Meeting, Arlington VA, March 25 – 26, 2010, all five DE PIs were present as well as another professor who is intimately involved with the project and although not a PI *de jure* functions as such *de facto*. An extremely impressive manual was distributed profiling the several dozen CPATH projects. This project, with the full title, “Distributed Expertise in Enhancing Computing Education with Connection to the Arts” was synopsised. Further, the profile stated the main challenge to the project. The PIs wrote:

“Making connections with educators who are willing and able to collaborate in the distributed expertise framework for offering courses. Often the stumbling block is administrative, so convincing deans and chairs that there is benefit is more of a concern than the nuts and bolts of organizing and running such a course, although those are concerns as well.”

The evaluators are in full accord with this observation. This has been a common theme in monthly meetings between the lead PI and the evaluators for updating and continuous assessment.

Indeed, the most pivotal issue of this entire project may be determining whether DE can stimulate new course collaborations both within and across institutions. Does DE resonate in the academy? In this respect, Year One ended on the upbeat. The initial project year exceeded expectations as it launched two inter-institutional courses. Further, at a May 1, 2009 project workshop, attended in person by fourteen faculty from seven institutions and remotely by another three faculty from three institutions, verbal commitments were made by participants to actively pursue two additional cross-institutional partnership courses, one involved three universities in Visualization; the other, two institutions in Environmental Science.

As noted above, enlisting new partners and expanding collaborative efforts that ‘create and implement courses taught’ in the DE mode has lost momentum. Not only did neither of the new partnerships materialize, but an Ethics course that was begun in 2009 was not continued.

Why has the project experienced a serious net loss in stimulating DE course partnerships? The answer is: “Several Reasons.”

Administrative Hurdles: Heading the list of barriers is a mix of administrative pitfalls. They include the following events which actually occurred within this project:

- One institution dropped the computer science major entirely.
- Another failed to reschedule the DE course.

- Another met with chair reluctance in offering a new course.
- Another had already assigned the professor to a different course the subsequent year.
- Another reassigned the professor to an entirely different content area.

Other possible deterrents noted by those at the May 2009 workshop and in subsequent interviews with those participants include:

- Gaining official departmental approval can be difficult.
- Course scheduling: courses are scheduled well in advance (e.g., one year), thus the introduction of a new partnership often has a long and discouraging wait time.
- Assignment of Professors: professors are also assigned well in advance, and may not have the flexibility to switch courses; conversely sometimes professors are assigned classes on short notice and must abandon anticipated schedules.
- Being limited in the number of electives a department can offer in a given semester (thus even if one wanted to inaugurate a new DE course it may not 'fit').
- Professors are stretched thin with current workloads making it hard to find the time to design new, collaborative courses.
- Financial considerations, especially in the case of a professor from another institution remotely teach significant segments of a team taught course.
- Mismatches in class size and/or class skill levels making assignments difficult.

These observations are reinforced and extended by the recent Virginia Tech white paper. Selected portions are quoted below:

- *“Probably the biggest Achilles heel for distributed expertise is schedule. If you have buy-in and you have two or more courses that need to jointly meet, finding a time to meet that works for everyone is very hard. This is particularly hard for remote collaborations across time zones.”*
- *“Faculty need to get buy-in from their administration.”* This, the VA Tech authors point out, can extend beyond chairs and deans. *“It may be that administrators such as course registrars need to buy-in since they often use “official policy” rather than creativity to solve problems.”*

At the May 2009 workshop, an engaging and pragmatic discussion ensued regarding administrative obstacles to cross-institutional collaboration, and it seems worthwhile to quote the summary statement from the Year I Evaluation Report:

“Several participants noted that the problem is not so much in identifying content areas for collaboration but rather in institution/department preferences/policies/procedures (e.g., lock step course sequence with little flexibility). Financial consideration was also

cited as potential stumbling block especially in the case of having a professor from another institution remotely teach significant segments of a course.”

Interactional Hurdles: Anyone who has team taught a course realizes that the initial co-planning time is significant as is the “during course” time required for continuous fine tuning and adjustment. In addition, the styles and expectations of the professors must be in some accord. In one of the courses, there seemed to be a lack of meshing or ‘chemistry’ that may have contributed to the course not being offered again.

Again we draw on the Virginia Tech paper: “[P]rojects all depend on faculty’s compatibility with one another.” Further, the Virginia Tech authors highlight several operational, “mechanical” issues such as:

- Agreement on ownership, access and maintenance of shared resources (e.g., “who can edit moodle?” “who can post”)
- Coordinating grading standards and processes
- Different methods of faculty assessment

Motivation: Above and beyond the administrative and interactional dimensions, the evaluators have observed that a certain sense of motivation, indeed passion and commitment seems to be a critical dimension. Where this is absent, intentions wane. Such seemed to be the case for several participants in the 2009 workshop who verbalized promises to work towards inter-institutional DE courses, but seemed to simply drop out of sight after the Workshop.

The hurdles listed above (and the list is no doubt incomplete) led one professor to summarize: *“It’s easy to find interested collaborators but hard to implement.”*

The Flip Side of Hurdles - Facilitating Forces

There are a few concepts that just do not go away when the evaluators reflect on the DE project. One is that the basic idea of DE which seems to intuitively make sense, even for those untrained in computer science such as the evaluators. Simply put, *“if you or your institution lacks a skill that is important to your teaching and learning, access it through collaboration and partnering with one(s) who has that skill.”*

The project leaders put it this way in their write up for the March CPATH PI Meeting in Arlington, VA:

“We are exploring effective techniques for collaborating across disciplines and across institutions, with courses that either offer majors experiences that are not currently available from their home departments, or offer major and non-majors interdisciplinary and cross-institutional course experiences that would otherwise not be available or practical. The overall approach is that of “distributed expertise” where the expertise to

offer a course is sought through collaboration of various forms with colleagues who might be at the home institution or any other institution."

The concept is rather easy to articulate but challenging to actualize. There are however facilitating forces which can effectively counter the obstacles noted in the prior section. The following were noted in individual interviews or observed during the first two years of the project:

1. The leadership or at least active support of administrators and senior professors with formal or informal departmental influence. Numerous potential logjams can be pried loose or avoided altogether if a leader with respect and clout champions the collaboration.
2. The collaborating faculty deeply desire the collaboration. This motivation and level of commitment has been extremely apparent in the TCNJ/Villanova cooperative. Indeed, the mutual respect among the participating faculty was a driving force in bringing about the union.
3. Perceiving the value added of distributed expertise.
4. Alignment with Mission. One professor noted that a Mission that underscores outreach and cooperation can actually serve as a dynamic force for teaming.

Source: Year II Evaluation Report, Fall 2010

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Helping DE Projects Take Root: One of the most weighty findings of this CPATH DE project is that establishing successful DE partnerships and courses is no easy task. Try as they did by communicating the meaning, benefits and attractiveness of distributed expertise, the five PIs and other project participants have come to realize that it is an uphill road. As documented in prior reports, the intuitive lure of DE tends to give way to a host operational snags. These are summarized in Appendix A.

To delve more deeply into this issue, the PIs and other individuals who have worked with the project were asked this question:

As noted consistently in past DE evaluation reports, "the Gordian knot of the current NSF C-PATH grant has been how to stimulate systematic, intentionally planned DE partnerships within and across universities." Do you have any new insights on this?

One PI suggested that key persons and especially decision makers be identified and addressed. They should come from selected disciplines and be not from only the sciences but deans, chairs and influential, well regarded professors from "*related disciplines such as economics, marketing,*

psychology, and communication studies” that use computational thinking. How can this be done? The PI proffered that possibly “*the NSF could convene a special meeting for this purpose and showcase the value of DE.*” This would seem to lend strong weight to DE agenda. The PI underscored that it is also important to include prominent individuals from institutions “*who graduate underrepresented populations, such as women’s schools, HBCUs and tribal colleges/universities.*” In sum, “*you have to affect institutional leaders, decision makers.*” Otherwise “*individual faculty must make the case which can often be administratively difficult and politically risky.*”

Other ideas that were shared during the interviews included:

- Presenting the DE concepts at faculty meetings with other disciplines (e.g., the Arts) and with other interest groups (e.g., professional conferences of other disciplines, journalists)
- Forming a Project Advisory Team of opinion leaders in other disciplines
- Convening colloquia with supporters from other disciplines, identified by PIs and others, to discuss new projects.
- Presenting DE concepts/projects at faculty gatherings in given institutions such as faculty colloquia on enhancing teaching and learning .

One of the very first interviewees responded briefly but firmly:

“External stimulus funding which would bring about more effort, more techniques/models, more awareness and hopefully more evidence of effectiveness. In tandem such could stimulate change.”

This may indeed be the most effective route. As witnessed above, funding played a role in practically all the projects featured above: the Knactive, the Virginia and New Jersey School Districts, the Machine Translation class, and the Journalism directed study. Even the modest CPATH DE grants carried weight in subsidizing certain critical tasks and/or enhancing project credibility. Further, DE seems very much in step with a number of recent Presidential and NSF initiatives. Stimulus funding therefore constitutes one of most viable alternatives. As one interviewee noted:

“You are so overextended that designing a new course, a new collaboration is very difficult – especially for those seeking tenure. Gaining release time through an external funding source may be the most realistic way to systematically further DE”.

However, such funding, if forthcoming, should embody a set aside for rigorous planned evaluation of several carefully selected projects to answer, with confidence, the lingering fundamental question:

“Do well conceived, well implemented Distributed Expertise learning experiences result in more effective outcomes than traditional methods?”

Retrospectively, we have learned much over the past four years about Distributed Expertise, from the experience of the PIs, from the involvement of several colleagues, and from the work of the evaluators. We have quantitatively demonstrated the teaching and learning effectiveness of several courses spawned by the CPATH DE grant, and we have documented a number of successful case studies at various (levels from individual courses to school district-wide interventions). We have also learned specific impediments as well as facilitating conditions for DE efforts.

Prospectively, as we enter the final year of the grant, the evaluators strongly suggest that the PIs sponsor a colloquium in Spring 2013 where the PIs, the evaluators and several other carefully selected collaborators and experts in DE can gather, dialogue, crystallize their thoughts and prepare a specific set of lessons learned, best practices and recommendations regarding Distributed Expertise and its future in the world of education.

Appendix A: Obstacles to Implementation of Distributed Expertise Courses

The following obstacles are synopsized from two sources:

1. The project evaluators work, particularly individual and group interviews with the PIs and other faculty participants in the CPATH DE grant.
2. A special report, Distributed Expertise, (July 2010) authored by the PIs from Virginia Polytechnic Institute and State University, Steve Harrison and Deborah Tatar

Administrative Hurdles:

- Dean, Chair, and entrenched professor resistance
- Faculty scheduling problems (already full loads, assigned to other courses and limited flexibility to switch)
- Difficulty in obtaining official departmental approval
- Red tape in approving new courses
- Course scheduling (e.g., courses are usually scheduled well in advance, such as a year ahead, thus the introduction of a new partnership often has a long and discouraging wait time.
- Limitations on the number of electives a department can offer in a given semester (thus even if one wanted to inaugurate a new DE course it may not 'fit')
- Financial considerations, especially in the case of a professor from another institution remotely teaching significant segments of a team taught course.
- Mismatches in class size and/or class skill levels making assignments difficult.

As far back as a May 2009 workshop, attended by seventeen faculty proponents of DE, an engaging and pragmatic discussion ensued regarding administrative obstacles to cross-institutional collaboration emerged, and it seems worthwhile to quote the summary statement from the Year I Evaluation Report:

“Several participants noted that the problem is not so much in identifying content areas for collaboration but rather in institution/department preferences/policies/procedures (e.g., lock step course sequence with little flexibility). Financial consideration was also cited as potential stumbling block especially in the case of having a professor from another institution remotely teach significant segments of a course.”

Source: Evaluation Report, Year IV, Fall 2012