GOODMAN RESEARCH GROUP, INC.
Program Evaluation • Consultation • Market Research

Dan River Information Technology Academy (DRITA)
Summative Evaluation

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EXECUTIVE SUMMARY

In 2006, the Institute for Advanced Learning and Research (IALR) received a three-year grant from the National Science Foundation's Information/Innovative Technology Experiences for Students and Teachers (ITEST) division to create the Dan River Information Technology Academy (DRITA) for under-served high school students in rural Virginia. The only program of its kind in Southern Virginia, the program was designed to provide participating students with competencies in information technology (IT) and workforce skills. In addition, the program seeks to encourage students to graduate from high school and attend college.

In 2009, DRITA is in its final year of funding under the three-year NSF ITEST grant, but has been granted a no-cost extension to proceed with program activities until July 2010. Currently, DRITA serves three Cohorts of students. Cohort 1 began in 2006 and accepted 32 students; Cohort 2 entered in 2007 with 32 students; and Cohort 3 entered in 2008 with 28 student participants. DRITA has retained 21, 27 and 26 students from each of the Cohorts, respectively; student retention rates improved as the program matured.

Students participate in a variety of skill-building activities in information technology (IT) and science, technology, engineering and math (STEM) topic areas, including:

- Courses on Basic IT Skills (BITS), Programming using C++, Animation, Robotics, and Geographic Information Systems (GIS);
- Seventy-hour externships in Year 2 and 3, with local businesses, IALR departments, and educational institutions; and an
- Annual Tech Expo & Banquet where students present the fruits of their summer work for their families and instructors.

Students who complete their courses are eligible to receive up to 6 college credits through Danville Community College. Students who complete externships are eligible for $500 in scholarship dollars.

DRITA students and their parents attend:

- College and Career Workshops that focus on PSAT, SAT, College Applications, Financial Aid, College Admissions, Career Choices, GPA, letters of recommendation, etc.;
- College campus visits; and
- Industry trip visits.

The aforementioned program elements are made possible through the work of course instructors, externship supervisors, and DRITA program staff and administration.

METHODS

Goodman Research Group, Inc (GRG) was contracted to evaluate the DRITA program in 2006 and has been the program evaluator for three years – the entirety of DRITA's program implementation. GRG's data collection targeted three major audiences in each year of the program: DRITA students, parents/guardians of DRITA students, and program administrators (staff, course instructors, and externship supervisors).

GRG collected information from students using web-based feedback surveys, content assessments, focus groups, on-site observation, and one-one interviews. Data collection regarding the students' experience focused on assessing attitudes toward STEM and STEM-related careers, changes in IT skills, attitudes toward college, and gaining feedback on the program's events and offerings.

GRG used paper-and-pencil feedback surveys to obtain feedback from parents/guardians on various program elements they may have attended. Parent feedback surveys and focus groups addressed parents' perceptions of their child's progress through DRITA.

GRG gathered data from DRITA staff, course instructors and externship supervisors through interviews, student rating sheets, and focus groups. This audience provided information on student performance, feedback on DRITA courses, and perceptions on the quality of communication among program administrators.

This report highlights findings that summarize the three years of the program's implementation from each of these audiences.

KEY FINDINGS

- DRITA successfully exposed students to STEM-related topics.
- As a result of that exposure, students gained significant skill development in IT-related areas, including basic IT skills, hardware, animation, C++ programming, and robotics.
- Students agreed that DRITA is fun, gives them a valuable work experience and prepares them for the college application process.
- Parents appreciated the opportunities the program gives their children, and believed that the entire region benefits from the program's existence.
- Students maintained their level of existing interest in IT throughout their years in the program.
- Students demonstrated that the program gave them marketable skills for the short-term, and believed that they gained marketable skills they could use in the long-term.

- The externships and the College & Career workshops were the most celebrated parts of the program.

- Externship supervisors and students felt students gained workforce development skills through the externships; however, some externship supervisors felt that their business or organization was not a match for the program.

- Some students have already earned money due to the skills they gained through DRITA: two students received part-time jobs through their externship placement and one student is pursuing an entrepreneurial endeavor to design and sell web layouts.

- Parents and students found the information they gained in the College & Career workshops to be helpful, valuable, and not accessible to them otherwise; students who were not previously interested in attending college became interested in college after the campus visits.

- Through the college preparation and IT courses, students were able to focus their career choices and see how STEM-related topics could fit into a variety of career trajectories.

- Program staff has navigated changes in leadership and programmatic challenges successfully, resulting in a streamlined program after three years.

KEY RECOMMENDATIONS

- Secure financial resources to continue the existing program activities.

- Consider extending aspects of the program through student's first year in college.

- Align all program elements to maximize the match between student's IT and STEM interests to their DRITA experiences.

- Clearly communicate expectations for the externship to externship supervisors and to students.

- Continue to improve the courses by reinforcing concepts that are a challenge to students and by maintaining high-quality course instructors.

- Increase program visibility and branding by advertising throughout the region and throughout the year.

INTRODUCTION

In 2006, the Institute for Advanced Learning and Research (IALR) received a three-year grant from the National Science Foundation's Information/Innovative Technology Experiences for Students and Teachers (ITEST) division to create the Dan River Information Technology Academy (DRITA) for under-served high school students in rural Virginia. The program was designed to provide participating students with competencies in information technology (IT) and workforce skills. In addition, the program seeks to encourage students to graduate from high school and matriculate to college. In 2009, DRITA is in its final year of funding under the three-year NSF ITEST grant.

PROGRAM RATIONALE

Historically, Southern Virginia possessed a thriving industry in textiles, tobacco, and furniture manufacturing. Now, empty factory buildings populate the downtown areas as vestiges of a once-thriving economic sector.

With the current economic downturn, Danville's economic prospects are even more strained. Businesses in the downtown area are closing up quickly, making the need for stabilizing the workforce more urgent.

The state-of-the-art facility at the Institute for Advanced Learning and Research (IALR) was built in Danville in 2002 as part of the effort to revive Danville's local economy by establishing Southern Virginia as a hub for technology companies. DRITA is located within the IALR facility, giving the program access to valuable technology resources. The only program of its kind in the

region, DRITA provides unique and meaningful opportunities for students to learn about technology, gain marketable skills for the future, and receive help preparing for college.

As the DRITA program continues, its influence reaches beyond Danville into surrounding counties in Southern Virginia. By grooming students in Pittsylvania, Martinsville, Henry and Halifax counties for science, technology, engineering and math (STEM) fields, DRITA is part of the solution that families with high school students in Southern Virginia need to move ahead.

BACKGROUND ON THE PROGRAM

To be considered for the program, students must complete a rigorous application process that includes writing exercises and requires students to provide written references. Because the DRITA program has strict attendance requirements to continue participating, each year DRITA aims to recruit and accept 32 students to participate, with the hope that at least 26 will continue with the program after the first year. Thirty-two students were accepted into Cohorts1 and 2 of the program, and 28 students were accepted into Cohort 3. Furthermore, the goal of the program is to serve at least these 26 students for a total of three years with a variety of activities (Table 1).

Table 1
DRITA Program Activities by Program Year

	Year 1	Year 2	Year 3
Basic IT Skills Course	■		
C++ Programming Course	■		
Animation Course	■		
Robotics Course		■	
Digital Media & Design Internship*		■	
Networking Internship*		■	
Hardware Internship*		■	
Robotics Internship*		■	
GIS Course			■
College Visits		■	■
College & Career Workshops		■	■
Externships		■	■
Industry Visits	■	■	■
Tech Expo & Banquet	■	■	■

* The IALR internships were eliminated after the second year of the program. Only Cohort 1 participated in the IALR internships in their second year; future Cohorts participated in the 70-hour externships.

Each Cohort of DRITA students participates in a separate series of IT courses and activities, except for the industry visits and Tech Expo which all Cohorts participate in collectively.

Year 1 Curriculum

School Year

The first year of a Cohort's DRITA programming begins in early winter with a kick-off "Super Saturday" event for students and their parent. The students then continue to meet in a series of Saturday sessions throughout the winter and spring to learn basic IT skills (BITS) such as how to use and troubleshoot computer hardware and software, networking, and using BITS programming language.

Summer

Students then return to IALR in the summer to complete two week-long courses, one focused on C++ programming and the other focused on computer animation. Students can earn up to six college credits through Danville Community College for the participation in the C++ and Animation summer courses. Cohort 1 students completed these activities in 2007. Cohort 2 completed these activities in 2008. Cohort 3 completed these activities in 2009.

Year 2 Curriculum

School Year

During the second year of DRITA programming, students met three times during the school year to learn about college preparation, the application process, and to discuss career plans. Parents are invited to attend these events with their DRITA student. Students and their families also go on a college tour as part of the second year of the program. In November 2008, Cohort 2 and their families took a college tour of the University of Virginia (UVA), which Cohort 1 families had done in their second year (April 2007).

Summer

During the summer of the second year of the program, students complete three weeks of DRITA activities, including a week-long course on robotics and a two-week externship hosted by local businesses and organizations. The first cohort of students had the robotics course and a 70-hour internship of their choosing in Robotics, Networking, Computer Installation or Digital Media & Design, hosted by IALR for their second year. After the first Cohort of DRITA students, the program offered externships to students in their second year. Distinct from the internships which were held at IALR, externships occur at a site other than the IALR building. All Year 2 and Year 3 students are referred to as "interns."

The Year 2 internships were discontinued in 2007 and have been replaced by externships. Moving forward, Year 2 curriculum consists of70-hour externships for DRITA students.. Students can earn up to six college credits for the robotics course. The externship provides students with the opportunity to take the IT skills they have learned throughout their DRITA training and apply those skills through the completion of a two-week project. At the time of this report, only Cohorts 1 and 2 have completed externships.

Year 3 Curriculum

School Year

In their third year of the program, students get increasingly intense college and career preparation. In addition to seven College & Career Saturday Sessions for students and parents during the school year, students have a one-on-one consultation with the session's instructor. Third year students go on a college visit to James Madison University (JMU) in the fall or winter. In the early fall, students have the opportunity to participate in a SAT preparatory workshops provided by Sylvan Learning Center. Sylvan gives students 28 hours of instruction in strategies for raising SAT scores. Half of the instruction period focuses on Critical Reading and Writing Instruction, while the other half is dedicated to Math Instruction.

Summer

The summer for third year students is dedicated to a 70-hour externship at IALR or another business, for which students receive $500 scholarship credit. The program provides transportation to the externship site when requested. The externship is broken up by a one-week Geographic Information Systems (GIS) summer course. Students can earn up to six college credits for the GIS course. Cohort 1 students completed these activities in 2009.

Culminating Events

DRITA's summer activities conclude with a Tech Expo event. This year's event was hosted on July 24, 2009. The event included students and their families, and provided students with the opportunity to demonstrate what they learned in the past year.

In the third and final year of funding, the grant manager was permitted a no-cost extension for the program. This extension allows program activities to continue through July 2010. To our knowledge, Cohort 2 will be able to complete all Year 3 activities under this extension and Cohort 3 will be able to complete all Year 2 activities.

HISTORY OF DRITA'S PROGRAM EVALUATION

Goodman Research Group, Inc. (GRG), a research firm in Cambridge, Massachusetts, was contracted by IALR in 2007 to conduct an external evaluation of the DRITA project for three years. Funding for the evaluation comes from the National Science Foundation grant to IALR. GRG developed an evaluation research study designed to assess outcomes and processes from the project. This 2009 report is GRG's summative report of program activities over the entire three years.

In the first evaluation year (2007), GRG submitted three separate preliminary reports on student, parent, instructor and staff feedback about the program. GRG generated additional reports outlining the results of the content assessments for student courses, and provided an annual report at the end of the first year. In the second evaluation year (2008), GRG provided several interim reports and an annual report. Those reports were submitted to give the program timely

feedback. The number of student, parent, and administrator participants in each form of data collection over the three years appears in Appendix X.

In the final year of the evaluation contract, GRG introduced several new data collection activities. In addition to hiring a field researcher to conduct on-site observations when GRG evaluators could not be there, GRG evaluators conducted focus groups with parents and with students, shadowed three students on their externships, and interviewed externship supervisors.

OVERVIEW OF THIS SUMMATIVE EVALUATION REPORT

The purpose of this report is to present data collected from all three Cohorts of DRITA students. This report format was modeled after previous reports provided to IALR. In this final evaluation year, GRG and DRITA program managers agreed that all Year 3 data should be contained in one report. Data from the field researcher are embedded throughout the report.

Because GRG provided interim and yearly reports with information on incoming student in previous years, this report presents data focusing primarily on data collected in 2009 with references to previous years for comparison. For most of the analysis, GRG opted not to report summary data over the three years of the program. Instead GRG reports Cohort-specific data per year of the program so as to highlight the specific elements of the program that were influential on students. Most findings were similar across years; in cases where findings were dissimilar across years or by Cohort, GRG reports detailed information by Cohort or program year.

The remainder of this report is divided into six sections. Sections one and two focus on how in GRG collected data about the program and who the program serves. The first section lays out the evaluation activities that GRG used to gain feedback from DRITA students, parents, instructors, staff, and externship supervisors by program year. The second section presents a profile of DRITA students over the three years of the program, including data on students' interest and activities prior to their participation in the program and statistics on student retention over three years.

The third, fourth and fifth sections detail the program's outcome measures. Specifically, the third section details student and parent perceptions about the overall program and specific program activities. The fourth section presents content assessment and survey data on how student's knowledge and attitudes toward STEM-related activities changed during their time in the program. The fifth section reports findings about DRITA students' career and educational aspirations and how those may have changed due to their participation in the program.

The final section provides GRG's conclusions and recommendations based on the findings in the prior sections.

METHODS

Survey data were collected from both students and their parent/guardian. In addition, students completed content assessments, interviews, and a focus group. Some of the parent/guardians also participated in a focus group. Instructors, externship supervisors, and program staff also provided data to the evaluators.

Each instrument and its administration procedure are described below, by target audience. Data collection instruments appear in Appendices A-W of this report. Table 2 summarizes each of the evaluation activities by program year and the target audience. The Year 1 pre-survey was added in the second year of the DRITA program, so Cohort 1 did not have pre-survey data.

Table 2
Data Collection Activities by Program Year and Target Audience

	Year 1	Year 2	Year 3
Students			
Year 1 Pre-Survey	■		
Animation Pre and Post Assessments	■		
BITS Pre and Post Assessments	■		
C++ Pre and Post Assessments	■		
Student Interviews	■		
Year 1 Feedback Survey	■		
Robotics Pre and Post Assessments		■	
Year 2 Feedback Survey		■	
Cohort 2 College & Career Workshop Feedback Survey		■	
Cohort 1 College & Career Workshop Feedback Survey			■
Cohort 1 Focus Groups in Danville			■
GIS Pre and Post Assessments			■
Danville Site Visit Classroom Observations	■	■	■
Parents			
Parent Feedback Survey - First Saturday Session	■		
Cohort 3 Parent Information Session Feedback Survey	■		
Parent Survey - End of Summer		■	
Cohort 1 Parent Focus Groups in Danville			■
Parent Feedback Survey - End of Saturday Sessions	■	■	

	Year 1	Year 2	Year 3
Staff and Instructors			
Group Internship Supervisor Interview		■	
Internship Supervisor Evaluation		■	■
Externship Supervisor Evaluation Forms			■
Externship Supervisor Interviews			■
DRITA Instructor Interviews		■	■
DRITA Staff Interviews		■	■

STUDENT INSTRUMENTS

Pre-Program Saturday Session Survey

On the first day of their Saturday Sessions, DRITA students completed a two-part pre-program survey. The first portion of the survey documented students' prior technology experiences, their attitudes about science and technology, and their educational and career aspirations. The second portion of the pre-survey consisted of a content assessment designed to measure students' baseline knowledge of the IT skills that would be covered in the Saturday Sessions.

Both surveys were Web-based and each was hosted through QUIA, an online system that can be used either as a teaching tool or to create Web-based assessments. A member of the GRG staff programmed and administered the surveys.

Content Assessments

As part of each DRITA course, students completed a pre-post content assessment. In collaboration with the course instructor, GRG developed the assessment questions for Saturday Sessions, Animation Course, C++ Course, Robotics Course, and GIS Course. For the sake of comparison, content assessments were re-used throughout each year of the program. All content assessments were administered online.

Student Interviews

Annually, two researchers from GRG conducted a July site visit to the DRITA program. The visit coincided with the final two days of the Animation and C++ Courses, and overlapped with externship hours. GRG used these visits as an opportunity to talk with students about the program. Each student participated in a 20-minute interview during which they provided feedback about each DRITA course. They also answered questions to demonstrate the knowledge and skills they gained from the program.

Feedback Surveys

Each year, students completed a web-based Feedback Survey at the end of the summer sessions. Feedback surveys were specifically tailored to ask about the program components that Cohort participated in during that year. In spring of 2009, Cohorts 1 and 2 completed an additional College & Career Workshop Feedback Survey. These surveys assessed how students felt about the material in the workshops and what they wanted to learn more about in upcoming months.

Student Focus Groups

During the 2009 site visit, GRG conducted focus groups with 14 Cohort 1 students. The focus group questions were designed to elicit student's feedback on how the program has influenced them in the past three years.

PARENT/GUARDIAN SURVEYS

Super Saturday Feedback Survey

Within two weeks of attending the Super Saturday kick-off session, parents/guardians of DRITA students received a brief Feedback Survey in the mail. The survey asked parents/guardians to report how their child became involved in the program and their expectations for their child's performance in the program and beyond. The survey also gathered feedback on specific components of the Super Saturday session and asked what additional information parents/guardians would like to receive from the program. GRG mailed the survey to the parents/guardians, along with a pre-paid business reply envelope in which to return the completed form. The same survey was mailed a second time with a reminder to complete the survey and return it to GRG.

End-of-Saturday-Session Feedback Survey

As part of the final Saturday Session in Spring 2007, parents/guardians were asked to attend a presentation event that featured the students' work. As part of this event, one parent/guardian from each family completed the End-of-Saturday-Session Feedback Survey. Questions focused on parent/guardian perceptions of whether their child was enjoying the DRITA program, the benefits of their child's involvement in the program, ways in which the program was influencing students, and the extent to which the program was meeting their own expectations. Surveys were administered by the DRITA team who then mailed the completed surveys to GRG to be entered and analyzed.

Parent Focus Groups

During the 2009 site visit, GRG conducted focus groups with 11 parents of Cohort 1 students. Cohort 1 parents were chosen because they are the most

familiar with the DRITA program. The focus group questions were designed to find out about DRITA's impact on the region of Danville and to gain general feedback about parent and student involvement in the program.

INSTRUCTORS AND EXTERNSHIP SUPERVISORS

Instructor Individual and Group Interviews

Each year, GRG attempted to contact DRITA instructors for one-on-one or small group telephone interviews to hear feedback about their courses. In the program's history, GRG has interviewed 13 of the 14 instructors. We have only been unable to reach the new GIS instructor for an interview. The other new instructors with whom we spoke explained that new instructors were not told to expect a feedback interview and many of them initially avoided our calls because they did not have the expectation of participating. The instructors finally responded after repeated attempts by both the GRG evaluators and the program director's encouragement.

Externship Supervisor Interviews

In 2009, GRG conducted one-one-one telephone interviews with eight of 13 externship supervisors (62%). Interview questions focused on supervisor's experiences working with the DRITA students and staff, collectively.

Externship Supervisor Evaluation Forms

Eleven of the 13 externship supervisors provided individual feedback on a total of 24 DRITA student interns. Using a 4-point scale from "Poor" to "Excellent," supervisors rated each of their students on workforce domains of general professionalism, job-specific skills, and interpersonal/community-building skills. The feedback form also gave supervisors space to comment openly on student performance and growth.

PROGRAM STAFF

Individual Interviews

Each year, program staff were given the opportunity to comment on the successes and challenges over the year, rate their progress toward program goals, and talk about any issues in leadership or implementation of the program. In the first two years, GRG conducted three separate interviews with the principal investigator, the program manager, and the co-principal investigator. Because the leadership team down-sized in the third year of the program, GRG conducted two separate interviews in 2009: one with the new grant manager and one with the program manager.

A DESCRIPTION OF DRITA STUDENTS

This section describes DRITA students and characteristics of their families from all three Cohorts. These findings are based on data that were collected through three data collection activities to describe DRITA students before they began the program:

1. a pre-survey that students completed on the first day of the Saturday Sessions,
2. a parent survey that was administered at the kick-off meeting held at the beginning of the program year, and
3. focus groups with parents of Cohort 1 students.

See Appendices A – W for copies of these surveys.

Results are also presented to describe how students became involved in DRITA.

PROFILE OF DRITA STUDENTS

As part of their application to be part of the DRITA program, all DRITA students provided basic demographic information. GRG compiled some of these data to create the profile shown in Table 3. Of those students who entered these data:

- Most students are between 14 and 15 years old;
- Of those who reported their race/ethnicity, most identified as African American;
- Twice as many girls as boys participated each year; and
- Each wave of students would increasingly not be the first in their family to attend college.

Table 3
Profile of Incoming DRITA Students

% Respondents		Cohort 1	Cohort 2	Cohort 3
Age	13 years old	0%	3%	0%
	14 years old	52%	90%	85%
	15 years old	43%	7%	15%
	16 years old	4%	0%	0%
Race/Ethnicity	African American	65%	63%	58%
	Hispanic/Latino	4%	3%	4%
	White	13%	27%	35%
	Other	0%	0%	4%
	Did not report	22%	14%	0%
Gender	Male	35%	37%	35%
	Female	65%	63%	65%
First to attend college	Yes	18%	12%	8%
	No	82%	88%	92%

Number of respondents ranged from 22 to 33 across questions. Note that for race/ethnicity, students could have reported more than one race and thus the total is greater than 100%.

Reasons for Participation

Similar to the first two Cohorts of students, about two-thirds of Cohort 3 students found out about the program on their own (32%) or through a parent (36%). In contrast to previous years, Cohort 3 students were much more likely to have found out about the program by word-of-mouth or through a friend, which may signify a rising awareness about the program in the community. Other ways that Cohort 3 students heard about the program were through a sibling, friend, teacher, brochure from school, or the National Society of Black Engineers (NSBE).

Even though students were likely to have found out about the program through a personal connection, parents did not believe that peer or teacher recommendation was a major reason that students eventually chose to participate in the program. Instead, for each of the Cohorts, an interest in STEM was the primary reason parents cited that students were attracted to the program (Table 4). Although GRG did not directly assess self-reported reasons that students chose to participate, students also believed that participation in the program would make them more competitive college applicants. One parent recounted,

> *"My son signed up because of an interest in IT because that's not offered at his school. He felt he would be a less competitive college candidate compared to students in northern VA and Richmond."*

Table 4
Parent Perception of the Main Reason that Students Are Participating in DRITA

Number of Parents/Guardians	**Cohort 1** (N=14)	**Cohort 2** (N=24)	**Cohort 3** (N=25)
He/she is interested in science, math, and/or technology.	9	14	17
To help him/her get in to college.	2	4	2
I thought it would be a good experience.	2	2	4
He/she wanted to try it out.	1	2	1
A teacher asked him/her to participate.	0	0	1
His/her friends were participating, so he/she also wanted to.	0	1	0
It was something to do on weekends and for part of the summer.	0	0	0
To help him/her do better in school.	0	0	0
To help him/her get a good job.	0	1	0

Specifically, parents believe that students come into DRITA because of an interest in technology and expressed high interest in studying specific technology subjects during the program. As illustrated by Cohort 3's findings, DRITA students in all Cohorts consistently rated an interest in Multimedia the highest; Web Design received the second highest ratings (Table 5).

Table 5
Cohort 3 Students' Interest in Program-Related IT Features Prior to DRITA

	Not Interested 1	Somewhat Interested 2	Not sure 3	Interested 4	Very Interested 5
Multimedia	0%	0%	0%	13%	88%
Web Design	4%	0%	4%	29%	63%
Programming	0%	8%	8%	38%	42%
Networking	4%	4%	25%	42%	25%
Hardware	0%	4%	21%	46%	29%

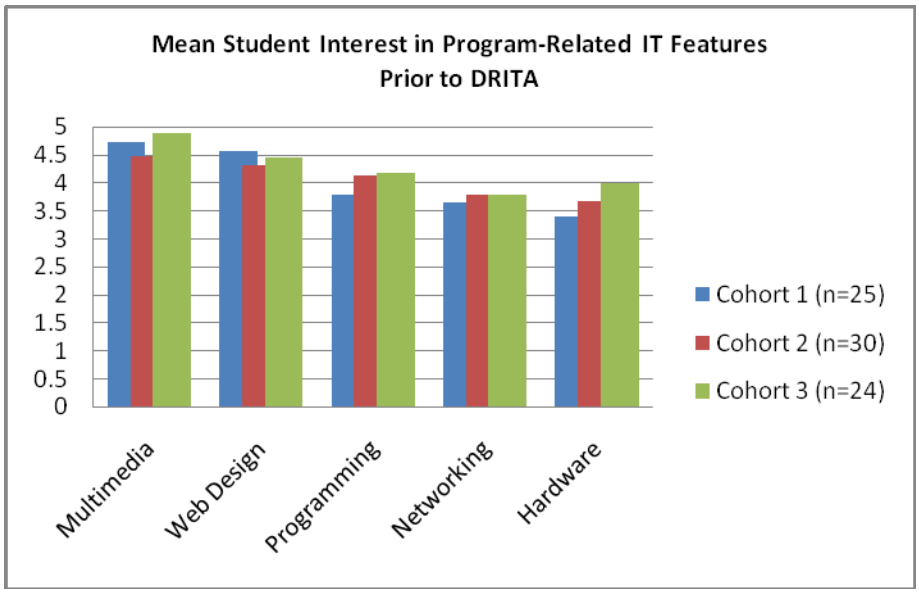
N=24

Similar to the previous two incoming Cohorts, Cohort 3 students had a broad range of future career interests, both in STEM and in non-STEM. Examples are architect; computer programmer; medical professional: physician, dentist, veterinarian, or specialist (8); engineer (2); pharmacist; recording studio operator; NBA player. Seventeen percent of students reported they did not know what career they wanted, but all students believed that they would need a minimum of a 2-year college degree to pursue their intended careers.

Cohort 3 parents were generally supportive of whatever their child wanted to pursue for a career, whether or not it was in IT. Many mentioned they wanted their child to have a lucrative or stable career. Parents specifically mentioned that their children were interested in careers in science, medicine, or engineering. Considering student career interests, it is not surprising that students had high interest in the program-related IT features.

Figure 1 compares the mean level of student interest in each of the program-related IT features across all Cohorts. Students rated their interest from 1 to 5, with 1 being *"Not at All Interested"* and 5 being *"Extremely Interested."* An interest in hardware increased notably across Cohorts, with an average rating of 3.40 for Cohort 1, 3.67 for Cohort 2, and 4.00 for Cohort 3.

Figure 1
Mean Student Interest in Program-Related IT Features Prior to DRITA



Separate from student's motivations for choosing DRITA, Cohort 2 and 3 parents felt that college credit was a compelling draw. The college credit incentive led parents to prioritize DRITA above other extra-curricular programs. For example, one incoming DRITA student this year retold how he was supposed to do another summer program and possibly go to Congress with 4-H, but his parents advised him to do DRITA instead because of the college credit.

Parents and students also expected different things from the program. This difference in expectations were common across all Cohorts, but is exemplified by Cohort 3's data this year. Parents' expectations at the beginning of the program were that students would get general exposure to IT and help with focusing on a technology field of interest, while students' expectations seemed to focus on specific areas of content knowledge they wanted to explore.

Parents were excited about their child's future involvement with the program:

> *"I appreciate the opportunities this program will give the students. This program will help them to decide if technology fields are where they want to work."*
>
> *"I think that my child is very excited in the challenges that DRITA is going to offer. As a parent I am as well."*
>
> *"I think that my child will love this program."*
>
> *"I think this is a wonderful opportunity that the students are receiving with this program. [We] both are excited about the program and all the great things it has to offer!"*

Student Exposure to Technology Prior to DRITA

A continuing challenge for many IT pipeline programs is to adapt to the rapidly changing technology field, and the DRITA program is no exception. Student usage of technology prior to the DRITA program shows how much of a shift there has been in popular technology tools over only three years. For instance, significantly higher percentage of students in later years used instant messaging, chat rooms, and programming software compared to the first Cohort of students. Table 6 compares across the three cohorts the computer resources that incoming students used prior to DRITA.

Table6
Computer Resources Students Used on Their Own Prior to DRITA

	Cohort 3 (n=24)	**Cohort 2** (n=29)	**Cohort 1** (n=25)	**All Cohorts** (N=78)
Search Engine (Google, Yahoo, Ask, etc.)	96%	100%	100%	99%
Computer Games (including online)	96%	97%	72%	89%
Email	96%	83%	84%	87%
Mapping websites (MapQuest, Yahoo! Maps, etc.)	83%	67%	76%	75%
Instant Messaging	79%	73%	52%	68%
Chat Rooms	75%	47%	40%	53%
E-Commerce/Shopping (shopping, purchase music, e-auction, etc.)	71%	37%	36%	47%
Photo editing software	67%	47%	40%	51%
Blogs	50%	47%	32%	43%
Programming software	29%	27%	20%	25%
Wikis	25%	13%	28%	22%

Technology is increasingly finding its way into more practical uses in every day life, and DRITA students are certainly feeling its touch. Over time, usage of communication tools such as e-mail, instant messaging, chat rooms, and blogs increased considerably. Each Cohort of incoming DRITA students is more tech-savvy than the previous and is using more sophisticated tools like programming software and photo editing software before the program even begins.

In addition, DRITA students were exposed to IT-related activities prior to the program at increasing rates (Table 7). Creating web pages and computer animations were the only IT-related activities students did outside of DRITA that decreased with time.

Table 7
IT-Related Activities Completed by Students Prior to DRITA

	Cohort 3 (n=24)	Cohort 2 (n=33)	Cohort 1 (n=25)	All Cohorts (N=82)
Installed software	63%	33%	60%	50%
Installed hardware	50%	24%	20%	30%
Installed a peripheral	46%	24%	52%	39%
Created a web page	33%	30%	40%	34%
Computer programming	17%	9%	8%	11%
Networked computers	17%	0%	8%	7%
Created a virtual environmen	13%	0%	4%	5%
Created computer animation	8%	18%	40%	22%
Built a robot	8%	9%	8%	8%
Designed a computer game	8%	6%	4%	6%

DRITA STUDENT RETENTION

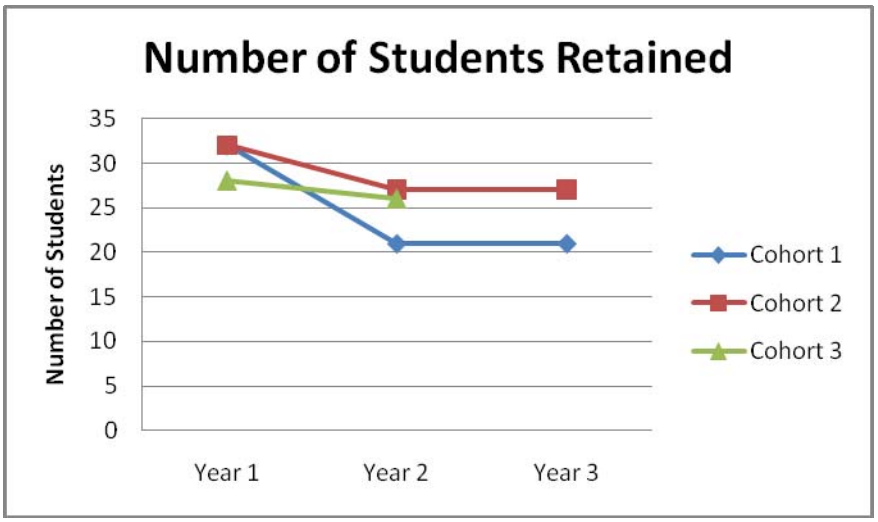
The previous section detailed information from all incoming students; but not all incoming students remained in the program over the entire three years. Retention rates improved as the program became more streamlined[1] (Figure 2). DRITA retained:

- 66% of 32 accepted applicants Cohort 1 students after one year;
- 84% of 32 accepted applicants Cohort 2 students after one year; and
- 93% of 28 accepted applicants Cohort 3 students after one year.

Though the program fell short of its goal of retaining 26 students from Cohort 1 over the entire program (21 of the students stayed in both years 2 and 3), Cohorts 2 and 3 are meeting and exceeding this goal so far. The program has retained 27 of 32 Cohort 2 students in Years 2 and 3, and has kept 26 of an original 28 Cohort 3 students.

[1] The program became more streamlined in the sense of resolving programmatic challenges. For instance, there were difficulties with getting students reliable transportation, finding instructors who could speak clearly enough for students to understand, and software hiccups during the first year. In subsequent years, program staff resolved these challenges and prevented them from reoccurring, resulting in a more streamlined program.

Figure 2
Number of DRITA Students Remaining in the Program



The DRITA program has excelled at being accommodating to program participants, which has proved to be a successful strategy for keeping students involved. To maximize student's ability to participate, the program manager coordinated DRITA's schedule with schedules from other local student enrichment programs in the second years of the program. On the issues of retention, program staff observed,

> *"We lose the students after the BITS portion. After that, we retain all of the students. We lose students not because they're not interested, but we have students that are in so much right now. They're all very active – sports, band, clubs – and they have a lot on their plates. They want to come to DRITA but they have other activities, or they have to work for the summer. I am lenient towards them missing things because I know those activities as well are important for their college apps, and are important to them. So that's why we have retained most of our students, because we have worked around their schedules."*

One challenge with retention that program staff outlined is that during the years of the program, some of the students go from not being eligible to work for pay to being eligible to work for pay, and working is a huge need that can preclude student involvement with DRITA in later years.

FEEDBACK ABOUT DRITA

At the end of each program year, students were given the opportunity to provide their feedback on DRITA by rating the extent to which they enjoyed the program over the past year and by sharing their favorite thing from the year's activities. Based on students' ratings, it is clear that they have enjoyed the DRITA program both over the past year and throughout the program. The majority of students from each Cohort provided a rating of *Quite a Bit* or *A Great Deal* (the top two ratings on the scale), when asked to rate how much they enjoyed the program. Cohort 1 students reported high enjoyment all three years. This is impressive because it is difficult to strike a balance between giving a workplace experience and keeping the program fun.

Students described the program as "fun," "cool," or "good," adding comments:

> *"It is a great experience that will teach a great deal about technology."*
>
> *"It's all about technology. You learn a lot about technology and you grow from the experience."*
>
> *"The DRITA program is about learning new things about technology in most every form. It not only informs about technological things, but it also mentors in the college making process."*

When asked about their favorite parts of the program, a number of students said "everything." Table 8 outlines other student favorites, of which the externships (Cohort 1), robotics and the BITS (Cohort 2), Animation and C++ courses (Cohort 3) topped the list.

Table 8
Students' Favorite Thing about DRITA, by Cohort

	Favorite Thing	# Students	Sample Quotes
Cohort 1	GIS Course	1	▪ Experiencing first-hand the job of a network administrator ▪ It was fun ▪ Learning more about technology and having a great ▪ Meeting with Alexis and talking about the application process into college ▪ My externship at the race car testing lab
	College workshops	1	
	Externship	6	
	General program	1	
Cohort 2	Robotics	3	▪ Meeting new people and being with my friends and learning things other people wouldn't have thought of ▪ The ability to learn and complete things that I thought I would never be able to ▪ The college stuff. I love that they are helping us prepare for college. It is a very hard thing to go through and with some help it really makes me think that I can go!! ▪ The externship because it gave me a step into the real world! ▪ Everything, especially the robots segment
	General program	2	
	College workshops	1	
	UVA Trip	1	
	Externships	2	
	The people	1	
Cohort 3	DRITA courses	12	▪ I really REALLY loved the C programming and the robotics because I was actually able to use my brain and solve the problems ▪ BITS and C++ instructors had a very positive attitude and always gave you help without giving you the answer
	The people	1	
	Gaining new skills	2	

As an indication of the broad student interests the program serves, each of the major program components was mentioned by at least one student as a favorite. In addition, some students from each Cohort mentioned the importance of the people in the program. These favorites help illustrate the educational and social benefits that students perceive they gain from involvement in the program.

Parents felt that the program was a success as well. When asked how the program has met their expectations, 100% of parents agreed the program had *met* or *exceeded* their expectations:

> *"I have seen my child grow and become more interested in college as a result of her participation and staff encouragement."*

> *"I never thought she would get the opportunities and experiences she has received. I have learned a lot from DRITA as well."*

PROGRAM BENEFITS

DRITA students and parents perceive that the program has benefits both STEM-related and otherwise. When Cohort 1 students reflected on their three years in

the program, they underscored how the program helped give them new opportunities in IT and a support system:

> *"It really helped me in the long run. I know what I want to do. And I have many supporters behind me."*

> *"It was a very rewarding experience and I learned a lot. Do whatever you can to get the grant and continue the program so others will have this opportunity."*

> *"It's been sooo fun. I am glad I did it, because I got to meet new people and have new experiences."*

Cohort 1 parents reported benefits of career focus, maturity and confidence they perceived their children gained over the course of the program:

> *"[He] realizes that technology is an important part of practically every career option and believes that he can use the knowledge gained in his career of choice."*

> *"My child has really grown up. She has learned a lot and experienced a lot attending this program."*

> *"He's more confident. His knowledge base for different technologies has expanded enormously."*

At the end of three years, nearly 80% of the Cohort 1 parents claimed that their student had improved *"quite a bit"* or *"a great deal."* While parents connect these benefits to the program directly, for high school students, it is difficult to know whether or not changes in maturity and confidence are simply due to maturation. Nonetheless, DRITA may have given students additional opportunities for growth – or even a context for showing how they have grown.

Parents endorsed other benefits of the program, including that their child learned about technology, gained skills to use in a career, and had a positive educational experience, among others. Parents provided feedback on the specific benefits they perceived their child has received from the program in the past year (Table 9). Cohort 1 parents reported on the program benefits for Year 3activities, Cohort 2 parents reported on program benefits for Year 2 activities, and Cohort 3 parents reported on their child's first year activities .

Table 9
Parent/Guardian Perceptions of How Students Benefitted from DRITA in the 2008-2009 Program Year, by Cohort

		% Cohort 1 Parents (N=18)	% Cohort 2 Parents (N=17)	% Cohort 3 Parents (N=19)
Fun	Had fun	67%	88%	83%
Educational	Had a positive educational experience	87%	88%	95%
	Learned about college options	80%	65%	100%
	Became more interested in college	47%	65%	90%
	Became more interested in technology	73%	68%	90%
	Learned about technology	100%	88%	100%
Social	Was able to spend time with friends	47%	53%	56%
	Was able to make new friends	87%	82%	72%
Career-Related	Gained skills to use in a career	93%	94%	94%
	Learned about career options	73%	88%	74%

In a focus group, parents added that DRITA's scope goes beyond benefitting the participants. One parent commented that knowledge from DRITA *"ripples out into the community*" and helps Southern Virginia as a whole.

While DRITA offers many benefits to students and the community, it does not have high awareness within the community, according to parents and instructors alike. This year, program staff did PowerPoint presentations at local high schools and placed ads and articles in the newspaper to raise program visibility. Staff felt the article appealed to parents, who wanted more information than an ad could provide. Still, parents and instructors felt the program could be better advertised and should be advertised year-round, not just during recruitment. One said,

> *"There isn't enough advertisement in the community, and people don't know what a great opportunity DRITA is for the students."*

The respondent went on to suggest ways to heighten program visibility throughout the year. Suggestions included things like publicizing DRITA's Tech Expo and the names of DRITA accepters and graduates in the local newspaper and the school papers. Another parent suggested having a DRITA newsletter during the school year, both to keep DRITA in the minds of existing participants

and to have something tangible that they could share with other parents.

The DRITA program exposes students to STEM-related topics through program activities.

Understanding how to access technological resources is important for high school students to stay competitive in an increasingly tech-savvy world[2], and DRITA is doing its part to help Southern Virginia students have that competitive edge. DRITA's goal is to offer students a variety of mechanisms to interact with STEM-related topics through its curriculum, workshops, college visits, and industry visits. Two program staff listed program activities that address each of the DRITA program's goals and provided ratings from 1 (*Not At All Successful*) to 5 (*Extremely successful*) (Table 10).

Notably, each of the program's goals had program activities attached, and all program activities were mentioned. Having program activities that are not aligned to goals is a chronic problem with other programs. DRITA is engaging in activities that are specifically and exclusively driven by the program goals, which reflect focus, efficiency, and parsimonious use of.

[2] Arafeh, S. & Levin, D. (2003). The Digital Disconnect: The Widening Gap Between Internet-Savvy Students and Their Schools. In C. Crawford et al. (Eds.), *Proceedings of Society for Information Technology and Teacher Education International Conference 2003* (pp. 1002-1007). Chesapeake, VA: AACE. Retrieved from http://www.editlib.org/p/18081.

Table 10
Summary of DRITA Goals and Program Activities, With Ratings of Success by Two Program Staff

	Activities Conducted to Achieve Goal	Ratings of Success
Increase students' competencies in a range of IT areas	– Basic Information Technology Skills (BITS): introductions to computers, digital media, programming – Course to equip students with networking and design skills – Summer curriculum for building foundations for gaming design and animation – C++ classes – Robotics – Internships and externships for hands-on training	3,5
Increase students' abilities to perform effectively in the workplace	– Internships and externships – Industry tours – College & Career Workshops	3,5
Increase the percentage of African-American students graduating from high school	– College & Career Workshops – Marketing to target audience and organizations like NSBE – Hiring African-American course instructors	4,4
Increase the number of students matriculating to 4-year colleges to pursue STEM	– IALR experience – Overall DRITA program – College counseling and tours – Offering scholarship credit for internships and externships – College & Career Workshops	3,4
Increase the percentage of girls/students of color with plans to pursue STEM studies	– Black staff members – Course curriculum – Recruitment of Black female students into the program	4, 5
Develop the IT workforce and career opportunities within the region	– Internships at IALR – Outreach to local employers, businesses and institutes through externships and industry visits	4, 4

By successfully implementing all of its planned activities, the DRITA program is achieving its goals of:

- increasing student's competencies in IT;
- increasing students ability to perform effectively in the workplace;
- increasing the percentage of girls/students of color with plans to pursue STEM studies; and
- developing the IT workforce and career opportunities within Southern Virginia.

These particular goals have short-term outcomes, while the remaining goals

regarding high school graduation rates and college matriculation will need to be assessed through long-term follow-up of the Cohorts in upcoming years.

Parents also felt that the program was successful. One hundred percent of Cohort 3 parents claimed that, through the program, their student learned about technology and that, consequently, just over half of students became more interested in technology. The exposure to IT topics that DRITA gave students may have spurred their desire to pursue STEM and IT topics outside of DRITA program hours. For example, Cohort 3 showed greater independent usage of many IT-related activities that they learned during DRITA, compared to before DRITA (Table 11). Whereas only 17% of Cohort 3 students had done any computer programming before the program started, 53% program had used computer programming skills outside of program hours by the end of the program, representing a 36 percentage point increase.

These data are preliminary evidence that DRITA is equipping students to make use of the skills they have learned even when they are outside of the DRITA program. Each of these activities is directly related to first-year DRITA courses, which most likely equipped students to be able to do each of the activities on their own.

Table 11
IT-Related Activities Completed by Cohort 3 Students After DRITA

	Cohort 3 (N=15)	**Percentage Point Change**
Installed software	80%	+17
Installed hardware	60%	+10
Installed a peripheral	60%	+14
Created a web page	27%	-6
Computer programming	53%	+36
Networked Computers	20%	+13
Created a virtual environment	13%	0
Created computer animation	13%	+5
Built a robot	20%	+12
Designed a computer game	0%	-8

Externship Experience

The 70-hour DRITA externships for Cohorts 2 and 3 were of the most praised – and most criticized – aspects of the program. In its third year, DRITA successfully placed 45 Cohort 1 and 2 students in externships at 13-15 companies across Southern Virginia, including at IALR. Year 3 was the first time that externships were offered through DRITA. These summer externships were a 70-hour on-site learning experience for second and third year DRITA students only. All externship participants were referred to as interns.

Students generally liked their externship experiences, and claimed that they learned a lot and gained new skills – both workforce development skills and

exposure to IT work in the real world.

> *"I loved my [externship]. I was able to see the things network administrators have to go through. And what I will be doing in the future"*

> *"I met new people and used my skills in a working environment."*

> *"I learned that teaching yourself when you can't receive help is crucial."*

Two students were offered and accepted part-time summer jobs through their externship experience, with the option of extending the position through the school year.

Still, some students expressed dislikes, such as not having enough variety, no vacation time, and having to work alone. Students were divided on whether or not they would be interested in pursuing externship content areas as a career: half said "no", and the other half said "possibly" or "yes."

Parents were given the opportunity to comment on what they thought about their student's externship activity, noting the influence it has had on student future. This was exemplified by one parent's comment:

> *"He was very excited …. Everyday he would come home and talked about all the things he would do and learned. He enjoyed working with [his instructors] and he has decided he wants to major in computer technology."*

Additionally, as an indicator of student interest, parents were asked to rate their child's behavior during the externship experience (Table 12). Data from Cohort 1 parents are presented here, since Cohort 1 students were the focus of the externships with local businesses outside of IALR. According to parents, complaining about the externship was minimal. In contrast, half or more of students mentioned having fun, and talking about the technology or projects from the externship at least 3-4 times throughout the experience.

Table 12
Cohort 1 Parent/Guardian Reports of Student Behavior During Externships

	Never	Once or twice during the externship	3-4 times during the externship	5-6 times during the externship	Almost every day of the externship
Talked about technology used that day	0%	25%	17%	8%	50%
Mention that he/she had fun	0%	50%	8%	8%	33%
Complain about something that happened that day	58%	42%	0%	0%	0%
Mention that she/he did not want to go back	84%	17%	0%	0%	0%
Share materials/projects from that day	8%	25%	17%	25%	17%
Ask questions about that day's material	33%	25%	16%	8%	8%
Try to do similar activities at home	33%	17%	17%	8%	17%

N=19

While the externship experience has a lot of potential for students, communicating expectations of students to supervisors and students could improve the experience. For instance, it seemed that both DRITA students and externship supervisors were not clear on what to expect it terms of types of work and the level of skill needed for assigned tasks. DRITA staff recognized the difficulty in setting expectations for externship supervisors and explained that it was difficult to express that, for example, *"interns don't* know *C++, rather, they have been* exposed *to it.* The challenge therein is that supervisors have no quantifiable way of differentiating to what extent a student possesses knowledge about a content area, or even to what degree students can practically utilize their knowledge.

In some cases, it seemed that student interests were not matched well to the externship experience, and supervisor expectations were unrealistic in that they thought students would be able to do more than the students were prepared to do. One externship supervisor recalled his experience with DRITA students:

> *"[Students] had a general exposure to technology and that helped. My biggest suggestion is if [program staff] could match on interests with where they're going to place students. We were kind of expecting that the students would be more geared up and hyped up and having an interest in writing/developing software. And that wasn't really the case. So that made it a little bit harder."*

The lack of match with student interest may have been a result of lack of opportunities. That is, it is possible that the program was unable to make connections with a broad enough range of technology organizations with which to pair students. This is an issue that should be resolved as the program itself expands and becomes more well-known to Southern Virginia businesses.

DRITA is a valuable resource to students in Southern Virginia.

Throughout GRG's data collection, parents, staff, and externships supervisors attested to how the DRITA program benefits Southern Virginia as a whole. Respondents often cited that IALR and the DRITA program could be Danville's remedy for the dearth of opportunities for professional jobs in technology. Many respondents felt strongly the program was "one of the best things" that has happened to Danville and its students, and expressed sincere desire that the program continue. Some parents noted:

> *"I can't think of a region that's more in need of this program than this region. Not just for the students, but for this whole region because so few opportunities exist. I hope that they can find more funding so that more students can be in this program. Northern Virginia gets everything, and we don't get what we need."*

> *"It's a good program for the area, introducing students to new technologies. They can get experience, so they can decide what to take in college. There aren't many programs like it in the area."*

> *"In this area, we have a poor population, so a lot of kids would not have these experiences had it not been for the DRITA program. I really wish they could do this program for more kids, because there are so many kids in the area who have the potential, but nobody's showed them that they have that potential."*

Additionally, externship supervisors and instructors believed:

> *"This program and the IALR facility is one of the best things to happen in this area. Technology wasn't important before, it was all about tobacco, textiles and factories. But then some of the youth would go away to college and have nothing to come back to. They disappeared once they got educated and never came back; maybe they would if they had jobs here to go to."*

> *"I think it's a great program for Southern VA…It connects their education with their careers which is important too. All of that is really great, and are good things that our students need."*

FEEDBACK ON PROGRAM MANAGEMENT

The program successfully navigated changes in leadership and management.

The DRITA program has gone through several changes in leadership since it

began. The program launched with a principal investigator, co-principal investigator, and program manager, all of whom remained through the end of the second year of the program. In the third year of the program, a new grant manager took over, and the co-principal investigator assisted on an as-needed basis.

As the program has become more streamlined, the program manager has taken on overseeing the majority of program aspects. The program manager is the central agent for coordinating with students, parents, and externship supervisors. The former grant manager is now a consultant to the program to help with arranging industry visits and setting up college visits. Throughout the changes in leadership, staff felt there was clear and open communication so that the leadership transitions went smoothly. There were no disruptions in program activities during the transition period.

For the transition period, the program used the successful strategy of retaining the same program manager over the entire three years. Since the program manager was intentional about developing solid relationships with the students, the program manager's persistence over the program years was a point of continuity and stability. The DRITA student participants and their families did not seem to be noticeably affected by the changes in leadership.

As a result of maintaining a functional leadership team, program staff have been able to work together to resolve issues of student transportation, retention, qualified instructors and limited resources. As the team maintains open lines of communication, this program has the potential to continue to be successful in the future.

LEARNING OUTCOMES ASSOCIATED WITH PARTICIPATION IN DRITA

Over the course of three years, the DRITA program has offered many ways for students to be exposed to IT topics, including courses, industry visits, externships and the Tech Expo. GRG was able to capture information from students, parents, instructors and program staff on how each of these program elements influenced student knowledge and skills through pre- and post-content assessments, surveys, one-on-one interviews, focus groups, and a field researcher site observation. Results of findings for each of these program elements are presented below.

KNOWLEDGE AND SKILLS GAINED THROUGH DRITA

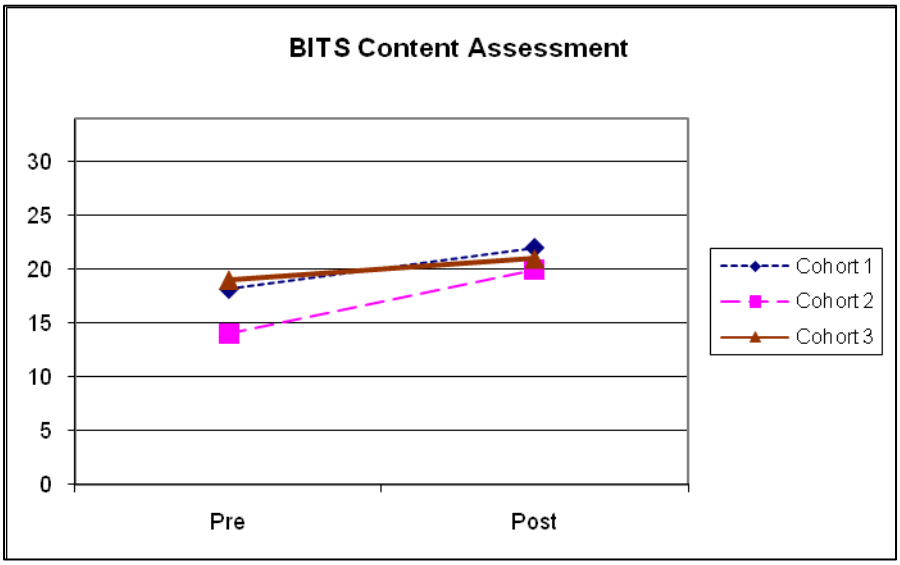
Students' IT knowledge and skills increased significantly in a variety of subjects.

Basic Information Technology Skills (BITS) Course

The BITS Saturday Sessions were held over five Saturdays in the winter and spring of 2009, as was the schedule for previous DRITA Cohorts. During these sessions, first-year DRITA students learned basic IT skills including how to: build an Ethernet cable, design a Web site using Dreamweaver software, use digital cameras and photo editing software, build a computer, and use Alice software to create three dimensional objects. The Saturday Sessions ended with a culminating event during which students demonstrated to their families what they learned.

When it comes to reviewing basics, program staff are sometimes concerned that that the material will be too easy for students. But according to the BITS Content Assessment (Figure 3), students showed significant increases in knowledge of Basic IT Skills from the course. A minority of students complained that the course was too easy or too slow. Most students reported learning a lot, and admitted that they did not previously know many of the basics such as what computer memory or a hard drive is.

Figure 3
Before and After Results for the BITS Content Assessment for All Cohorts



The BITS instructors felt that the course went well, too, and noted how critical it is for students to get basic IT skills:

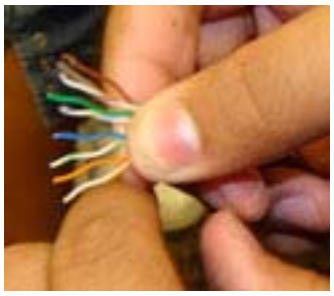
> *"You've got to cover the basics. If you do not spend time covering the basics, then when you get to some of the higher level things, they're completely lost."*

As a point of success, the BITS instructors felt that a successful planning strategy was to use the template from past instructors as a guide, to get a sense of how much material could be covered and where students need the most guidance.

The only notable challenge was that, unlike the summer courses, the BITS course sessions were spread out with 4-6 weeks between each session, and instructors would have preferred meeting students every two weeks. In the future, instructors would like to strengthen the networking curriculum, and would like to incorporate more critical thinking opportunities for students.

GRG staff and field researches conducted site visits to observe the BITS course, as well as other DRITA elements. In addition to the BITS observation report on the following page, there are five vignettes in the report about other DRITA program activities.

BITS OBSERVATION



One group was working on “How to Build Cable.” Two of them were working hands-on with the cable, splicing wiring and twisting cable. They were testing the cables on a wireless router in the computer lab. Their other team member was putting together a PowerPoint that included transitions and effects along with appropriate text and imagery.

The first two students did not appear to be excited about their project, but seemed to be more reflective learners. When asked, they were able to answer many questions about their process. The other student in the first group seemed more interested in using computers. Although initially stressed about finalizing the project, he was satisfied when it was finished.

One of the DRITA instructors was going from group to group answering any questions and reminding everyone to leave enough time to go to the auditorium to test their presentations. The students appeared confident, articulate, and knowledgeable about their topic. They explained their process thoroughly as they were working through the final activity, mastering the task. When they gave the final parent presentation, they passed the cable out, so parents could see the cable firsthand.

In the computer lab down the hall, the five Group 2 students were busy brainstorming the script for their digital video on “The Components of a Computer,” which they had created using MovieMaker. The group was demonstrating excellent team skills; each student had been given a specific task and they were all on target to get the project finished on time.

The group on digital video on “The Components of a Computer” displayed the most positive affect. Generally, they were more enthusiastic when responding to questions; they excitedly mentioned, "you wouldn't believe what we all have learned during the past five weeks" and went on to articulate the specific activities. Everyone in the group appeared highly interested and grasped the technical skills involved in making a digital video, so much so that they were able to work with minimal instruction.

Students enjoyed the BITS course "a lot" during all three years of the program. Similar to previous years, Cohort 3 students felt that the course was informative, useful, and easy to understand, and were especially fond of the teachers. During one-on-one interviews, noted that the teachers were "cool" and took time to help them when they needed individual attention. Cohort 3 students came in with more pre-existing knowledge than did the first two Cohorts, which the instructors noticed and adjusted to, by adding more material to challenge students.

Students particularly enjoyed the hands-on activities, which is a something that the program intentionally increased as a result of a previous GRG recommendation. A related previous GRG recommendation was to help students see how program activities relate to their lives. The BITS course this year demonstrated that well and students felt that what they learned related to their daily lives. They described,

> *"I liked pretty much everything because it was helpful. Like making the USB cords because we use those at home."*

> *"It was way more fun than school - it was great. It was more hands-on than school, we got to use the computers a lot, not just taking tests. Everyone was really nice, the teachers were really nice, I actually enjoyed what we learned at the sessions."*

Instructors agreed that students left the course with knowledge and practical skills that they could use in day-to-day life. Accordingly, when Cohort 3 students were asked to demonstrate the steps to building an Ethernet cable, 19 of the 23 students responded affirmatively, with an additional two responding that they might be able to do it, and the other two noting they were not able to attend the Saturday Session and thus never learned how to do it. Over half of students demonstrated that they could carry out, unassisted, at least five of the eight required steps to build the Ethernet cable (Table 13).

Table 13
Steps Students Mentioned When Describing How to Make an Ethernet Cable

	# Students
Estimate how much cable you will need for your run and cut it.	11
Strip cable ends off to expose about 2 inches of the cable sheath.	21
Untwist the pairs - don't untwist them beyond what you have exposed, the more untwisted cable you have, the worse the problems you can run into.	21
Trim all the wires to the same length, about 1/2" to 3/4" left exposed from the sheath.	10
Insert the wires into the RJ45 end - make sure each wire is fully inserted to the front of the RJ45 end and in the correct order. The sheath of the cable should extend into the RJ45 end by about 1/2" and will be held in place by the crimp.	11
Crimp the RJ45 end with the crimper tool	18
Repeat the above steps for the second RJ45 end.	11
Test the cable to verify the proper connectivity of the cable	12

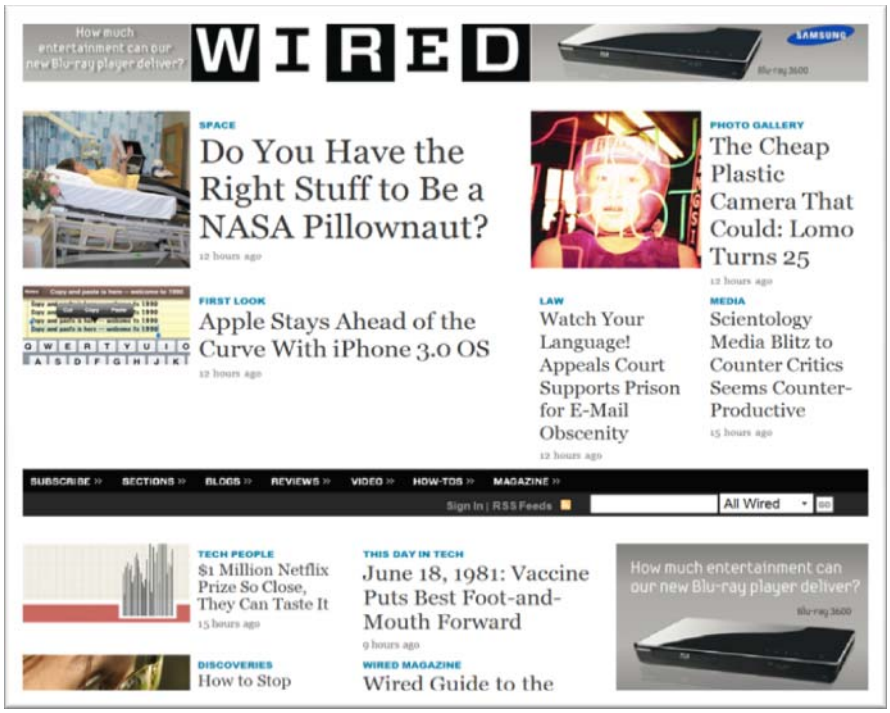
N=23

Based on GRG's coding of the list of required steps, the number of correct steps is lower than in previous years. This may be due to having new instructors who may not have had a good sense of the best way to reinforce what the students learned, or even what would be important to emphasize.

For example, nearly all the students could not correctly name the type of cable it was, a "straight cable", and only a third knew why it was important to even know the type of cable. Still, students had a general familiarity with types of cables, which may indicate that the BITS experience this year showed them the physical skills they would need to build a cable, but not the critical thinking skills to determine what type of cable it was.

The results for Cohort 3 for other BITS activities, like evaluating Web sites, were similar. While nearly three-quarters of students stated that they could do a thorough evaluation of a web site's design for a job interview, the number of students giving correct answers on how a WIRED.com web-site was laid out was at an all-time low in Year 3.

Figure 4
WIRED.COM Screenshot that BITS Students Analyzed in Student Interviews



Less than one-third of students could correctly identify the number of columns and rows at the top, middle, and bottom sections of the website, compared to at least half of the students identifying each of those correctly from last year's Cohort. Although students were somewhat familiar with inspecting the rows and the columns, these results indicate that they still have much to learn in the BITS courses.

C++ Programming Course

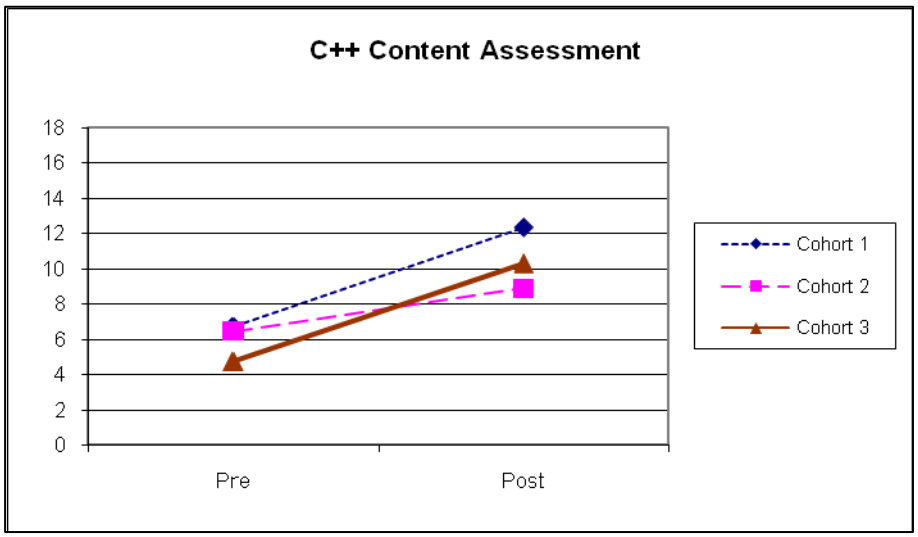
As part of the 2-week summer course for first-years students, Cohort 3 students learned the basics of C++ programming by using the Microsoft Visual C++ program. Students learned about variables, common functions, expressions, and loops. As with all introductory-level courses in programming, the students' first assignment was to create a "Hello World" program. This one-week experience culminated in students' programming robots.

In the first two years of the program, staff had difficulty finding a course instructor for the C++ course. Past instructors had language barriers or were unable to make the information easy for students to understand. In the third year, DRITA staff located a new instructor who, judging from student feedback did not have the communication challenges that previous instructors had faced.

With the previous instructors in Years 1 and 2, students had unfavorable reviews of the course. Students complained of not learning much and, instead, just being told what to type, but not understanding why to use those commands. Later in the program, externship supervisors would similarly note that it seemed students did not really know how to use C++, beyond simple features. Both students and externship supervisors wanted students to have the ability to use the program independently, without assistance, but this had not happened for students who took C++ under previous instructors.

For the first time in the program's history, the 2009 C++ program was an overall success in terms of student favorability and content knowledge. After having the less improvement in content knowledge in the second year of the program compared to the first, the rate of student increase in content knowledge rebounded this year in Year 3 (Figure 4).

Figure 5
Before and After Results for the C++ Programming Content Assessment for All Cohorts



When asked to demonstrate the skills they had learned, which was assessed by correcting C++ code that had errors, students were able to correct an average of

4.52 out of 6 errors. Specifically,

- 9 in 10 believed they could find and fix the all the errors if asked to do so in a job interview; and consequently
- 9 in 10 were able to run the code.

Although the majority had errors after the first run, nearly five in ten found and fixed the residual errors, and four in ten were able to run the code again with complete success.

Many of Cohort 3 students mentioned that the quality of teaching was key to their appreciation and enjoyment of the course content. For example,

> *"[C++] is pretty cool. Like basically the way the teacher has taught has been really good. She gives real-life examples of how everything works."*

> *"I actually like it because of the way she teaches. She's interesting when she teaches and that helps me understand it better -- even though I don't understand it all. She lets us write on the clipboard, do exercises (like with loops), we shout out the answers, a lot of hands-on stuff."*

Commendably, this year's C++ course tied in elements of robotics, which is a DRITA program activity during the second year of the program. In the past, C++ students programmed a hangman game, but this year students programmed robots to scoop plastic balls off the floor. One of GRG's past recommendations focused on integrating the elements in the program, and the tie between C++ and robotics is a great example of how that can work well. In the future, the instructor noted that she might try to tie in gaming elements as well.

PROGRAMMING

In the Programming Class, some of the learning goals were for students to become familiar with C++ programming, including functions, special symbols, and identifiers. The students were able to explore simple data types and examine string data types.

The class was given an overview of coding, how to input, how coding and computer language is similar to and different from html, and how to run small programs displaying names. The class was preparing to use Visual Basic and also learning how to program a robot using code.

Two instructors worked directly with the students, demonstrating and teaching how to write code for loops. The students were presented with a variety of instructional strategies such as small group exercises, performing small board work on how to calculate loops, etc. The students really seemed to "get it," and gave the impression that they all related to their instructors.

The first Programming instructor asked students to calculate totals and she checked their small board work one by one and make sure that each student understood the material. She also successfully redirected students and kept them motivated and actively involved in the learning process. Both instructors always provided positive feedback and asked relevant questions before moving on. They also employed collaborative learning techniques such as letting the students teach each other after they had mastered an exercise.

Robotics

In July 2009, Year 2 students attended a course focused primarily on the analysis and control of robot systems. Students designed, assembled, and programmed robots using VEX Robotic Design System starter kits. The robotics course culminated in a final project that involved students working in teams to design, build, and operate a simple robot with a movable arm to compete in an obstacle course.

Robotics has been a consistently popular course with DRITA students. Students like the interactivity of the course, and enjoy the way the course is taught. As part of the Year 2 curriculum, it seems as though students had difficulty connecting their externship experience with the robotics course. While some students loved the robotics course, others felt it should be optional since it stands apart from the Year 2 externships.

Those who loved it made comments such as,

> *"I liked that we were given a book of instructions and a building kit and made to teach ourselves on how to build our robot. At the end when we completed our robot, we knew that we did every by ourselves."*

"I really loved it! It was extremely interesting and Ricky Gordon was a wonderful teacher who always kept me interested!!!"

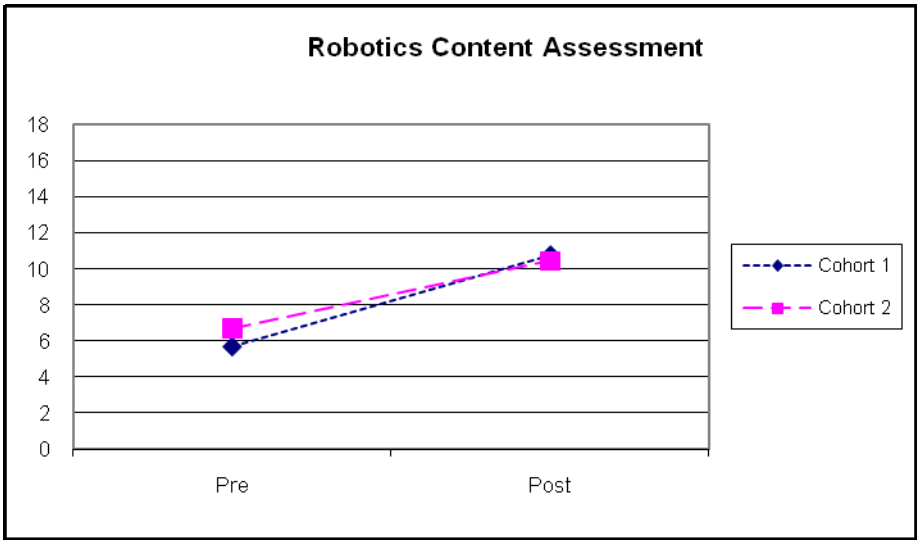
Even those who were not as fond of the course felt that the experience was valuable, and said,

"It was very beneficial and interesting to learn new things. It wasn't hard but yet it also wasn't easy either."

It was very fun. At first I did not think that I would enjoy it. But even though I do not want to do that when I get older, it was still a great experience."

DRITA consistently demonstrated success in teaching students new information about robotics. Both Cohorts 1 and 2 showed similar significant increases in robotics content knowledge (Figure 6). Cohort 3 students have not yet been assessed because robotics is for second-year students only and Cohort 3 students are completing their first year of the program in Fall 2009.

Figure 6
Before and After Results for the Robotics Content Assessment, Cohorts 1 and 2



One of the keys to success and potentially one of the reasons the students enjoyed the course so much is that the instructor focused on allowing students to be creative and celebrated their creativity. The instructor also employed creative techniques for teaching, recalling,

"I teach electronics and robotics at a local HS. I could go through and talk about air cylinders and how they work. But let's customize it and turn it into a Halloween project. Like you have a camouflage

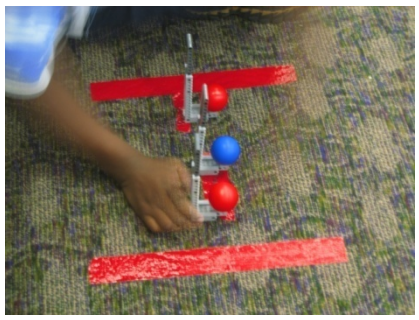
net on the wall, and what looks like a table with a plastic skull on it. But it's not a table, it's a mouth that is air-operated, a covered over air cylinder. Things like that trigger a creative flow. And in the robotics course, they've come up with some wild ideas in years, using what I went over with them."

However, with 20 students, no intern, and defective robot kits, this year's teaching experience was a bit more challenging than in the past two years. Even program staff suggested that there should be an additional instructor for robotics, in order to have a more manageable class size.

Despite these challenges, the instructor raved that the support from the DRITA program has always been top-notch and the program did everything possible to ensure that students had proper resources. The one constructive comment from the instructor was to receive the evaluation feedback on the course, so as to make any needed course improvements.

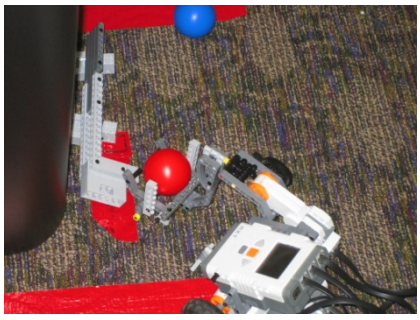
ROBOTICS: INSTRUCTOR RECAP

First, the instructor reviewed information that had been covered earlier in the week. He recapped the basics of how to build, test, and compete with robots. He held a sample robot and compared its components to the *NASA Mars Robot*. He quickly reviewed how to program the robot to maneuver faster or slower, how to improve lifting power and increase or decrease the transmission.



The instructor then discussed ways students could become more active in robotics programs at their high schools and school districts. He gave real-world examples of how robots are used in industrial and research applications, for instance, how industrial machinery is used in warehouses (i.e., robots can be used as bar code readers for quantity analysis). He mentioned a marine robotics engineering program at Old Dominion University that is planning to build an underwater robot that can search for missing persons. He told the students how the U.S. Army uses robots in the battlefield. He also said that robots are used in tractor plows for soil testing, and explained how the automotive industry incorporates robotics in the assembly line.

The instructor ended the review by encouraging students about the importance of achieving personal goals and relayed his own personal story of how he became involved with robotics. The students seemed very interested in his comments and were asking questions. They seemed to appreciate the real-world examples he gave and enjoyed hearing his personal account of his trials and tribulations of getting through college and his experience in the technology industry.



ROBOTICS COMPETITION

The students completed their final course assessments and returned to the next activity, which was the robotics competition. Everyone assembled around the robotics obstacle course to compete. The students had perfected their robots and were all excited and ready for a challenge. The timekeeper reviewed the rules of the game and each competition lasted two minutes. Every team had the opportunity to compete with each other and the best robots did multiple races.

Animation

In their second summer course, Year 1 students studied animation using a software program called Maya to design and animate a space ship (Figure 7), a rocking chair, and a bouncing ball. Toward the end of this one-week experience, students created and animated a personal logo.

As with the previous Cohorts, DRITA students in Cohort 3 genuinely enjoyed the animation course. Some of them described animation work as "tedious" but still enjoyed what they did in the course, and especially enjoyed the level of freedom the teacher allowed them in creating their own animations. They were easily able to connect their animation experiences to use of animation skills in real jobs.

> *"It's difficult sometimes but it's fun also. It's a good example of what Pixar and animation people do, like the new movie 'Up'."*

> *"I really like animation. I'm a big video gamer, and it might be a career I might head towards when I get older. I like using Maya. We use it to make a ball bounce, and right now we are using it to create a cartoon."*

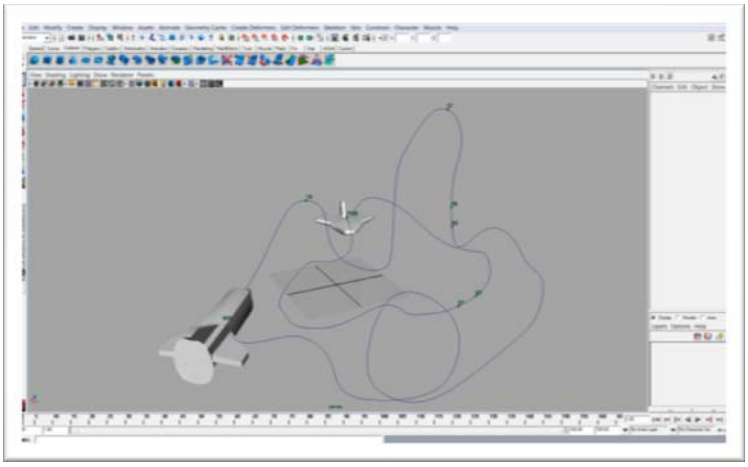
During the student one-one-one interviews, students suggested other creative career uses for animation skills, like computer modeling, engineering, building flight simulations, making 3-D animations of architectural structures, designing presentations, and for showing weather patterns on the news.

The animation course was a favorite for one student who commented on how it built on an existing interest:

> *"Animation obviously, because even before the program I was already interested in pursuing in animation as a career. So learning about it even more was fantastic.*

The MAYA software had been problematic in the past. This year, the program met this challenge by purchasing more updated software, but had fewer licenses so that students shared work. Still, some students complained about how frequently the MAYA software crashed, which was frustrating to them and limited the time they had with the material. However, the students often attributed the software issues to being a part of having an animation job, and felt that the program gave them a true experience for the pace of animation work – even when that meant they had to key in the animation commands frame-by-frame.

Figure 7
MAYA Software Screenshot of Space Ship Animation by DRITA Student

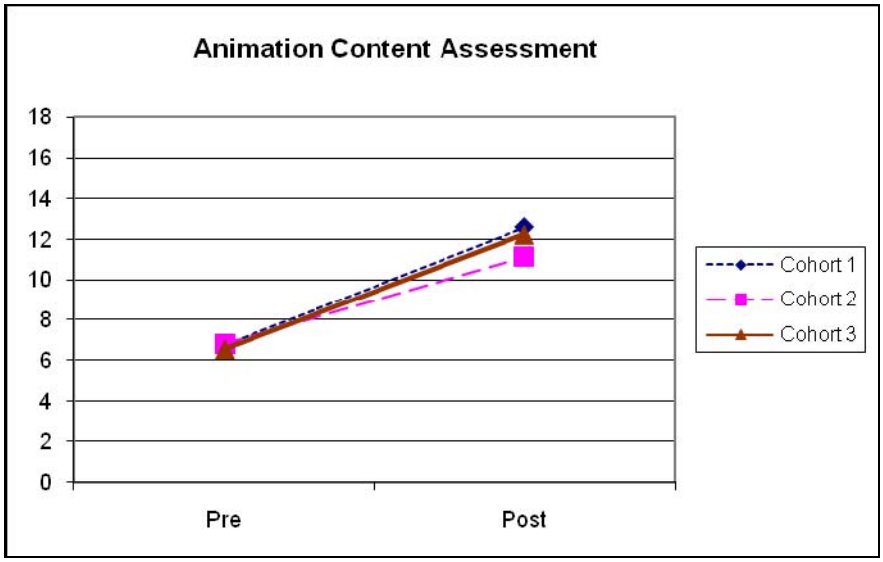


The Animation course has maintained the same teacher over the three years of the program, and the instructor had a good idea of what to expect of DRITA students during a one-week session. In the first two years of the Animation course, the instructor taught the entire Cohort of students at once over a one-week period.

This year, the students were split into two groups, giving the instructor half a day with each half of the Cohort over a two-week period. This change was helpful to the instructor, who was better able to tend to students' needs and enabled her to cover more material than in the past. Still, the smaller class size does not seem to be linked to how much the students learned from the course, since Cohort 3 students did no better than Cohort 1 students who all took the class in one large group. Instead, the smaller class size seemed to provide relief for the instructor.

As seems to be the trend, Cohort 3 students performed better than the Cohort 2 students, and about equally as well as the Cohort 1 students (Figure 8). All Cohorts showed significant increases in content knowledge for animation ($p<.05$).

Figure 8
Before and After Results for the Animation Content Assessment for All Cohorts



During the student one-on-one interviews, students demonstrated their level of facility working with animations independently. All students expressed that they would *"definitely"* or *"maybe"* be comfortable creating a computer model of an object. When asked to outline the steps for how to animate an object such as a rocking chair, students could name between one and six of the six total steps (Table 14). Additionally, over 80% could animate an already-created object. Together these findings suggest that in their first year of the program, DRITA students gain a solid foundation to build on future animation experiences.

Table 14
Steps Cohort 3 Students Would Take to Animate a Rocking Chair

	# **Students**
Start with a cube	22
Extrude the same cube many times to flesh out the pieces of the rocking chair.	16
Scale the same cube many times to being to flesh out the pieces of the rocking chair.	14
Move the same cube many times to being to flesh out the pieces of the rocking chair.	12
Duplicate the same cube many times to being to flesh out the pieces of the rocking chair.	14
The chair is simply made out of several basic cubes.	8

N=23

Geographic Information Systems (GIS) Course

The DRITA program launched the GIS summer course this year. The course was geared toward Cohort 1 students who already had a working knowledge of computers. Though the course was scheduled in July, it was delayed until August because there were difficulties in finding a suitable course instructor.

During the GIS course, Cohort 1 students learned about the history of map-making and cartography, used raster and vector data to produce maps, worked with tables to display data, and ran queries on map data. The students were introduced to GIS by using the ArcGIS 9.x geocoding software.

Although the GIS course received positive feedback from students, it seemed to be the least desirable of all the courses. Three students said the course was "interesting," one described it as "cool." Another student noted,

"It was very interesting. I felt that it showed what a broad field technology is."

Yet, after the course, nearly two-thirds of students were either "*not sure*" or "*not interested*" in using GIS in a future job, which is the lowest level of interest a DRITA component has ever received. Based on parent feedback (Table 15), it seemed that students did not express much interest in GIS outside of the course sessions; over half of students only occasionally talked about GIS, asked questions about it at home, or tried to replicate activities at home.

Table 15
Parent/Guardian Reports of Cohort 1 Student Behavior During GIS Course (N=19)

	Never	Once During Sessions	2-3 Times During Sessions	3-4 Times During Sessions	After Every Session
Talked about technology used that day	0%	9%	46%	18%	27%
Mention that he/she had fun	18%	0%	27%	27%	27%
Complain about something that happened that day	72%	18%	9%	0%	0%
Mention that she/he did not want to go back	100%	0%	0%	0%	0%
Share materials/projects from that day	10%	30%	20%	30%	10%
Ask questions about that day's material	36%	36%	27%	0%	0%
Try to do similar activities at home	40%	30%	30%	0%	0%

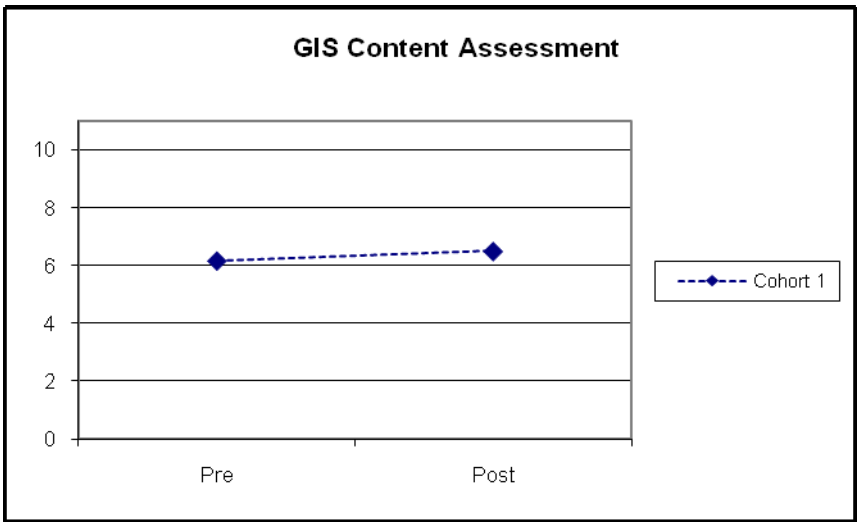
The students' lack of sharing and replicating course activities may have occurred because – unlike other DRITA topics such as media and hardware – GIS is not a topic that is easily accessible and readily usable in the students' daily lives. It is also likely that the lack of sufficient time students had to complete activities, which students did not like, influenced the course's low favorability ratings. For instance, students felt that they did not have enough time to do all they had

wanted to do during the course. This may have been because GIS was a new course with a new instructor who may not have overestimate the amount of work that students can accomplish in one week.

Instead, students suggested that time could have been used more efficiently if the instructor focused on one project for the duration of the course: "*We should have had one focus, researched it, then put together the maps.*"

The GIS course was the only course that did not show significant changes in terms of knowledge gained (Figure 9). Although the number of correct responses on the post-assessment showed an increase from pre-assessment, the change was small. Pre- and post-content assessment showed no statistically significant gain in knowledge.

Figure 9
Before and After Results for the GIS Content Assessment for Cohort 1



Again, having a new instructor may have been a limiting factor for student learning, especially if the instructor ran out of time to address a significant amount of planned material. The instructor for the GIS course was unavailable to give feedback on how the course went. Program staff commented that finding a GIS instructor was challenging – so challenging, in fact, the GIS course had to be rescheduled. But through that experience, program staff learned a new strategy to recruit directly from a local college a college instructor who lives in the nearby area.

ATTITUDES AND BEHAVIORS ASSOCIATED WITH DRITA

Students sustained existing attitudes toward IT topics.

Entering the program, DRITA students had various levels of interest in IT topics. When students were asked about their interest in STEM in general at the beginning of the program, across all Cohorts, students gave high ratings. For instance, on a scale from 1 to 5, with 1 being *"strongly disagree"* and 5 being *"strongly agree,"* students rated they liked science, technology and math (mean of 4.29 or above) at the start of the program (Table 16).

Table 16
Cohort 3 Students' Attitudes Toward STEM Before and After Their First Year of DRITA

		Before DRITA	End of Year 1
Science	I like science.	4.29	4.00*
	I enjoy learning science.	4.21	4.07
	Science is boring.	1.71	2.15
	I am good in science.	4.42	4.00
Technology	I enjoy learning about technology.	4.43	4.43
	I like using new technology.	4.14	4.21
	I am good at using technology.	4.50	4.43
Engineering	Engineering is boring.	2.07	1.64
	It would be fun to be an engineer.	4.07	4.07
	I think I will take engineering classes in college.	3.86	3.64
	I might pursue a career in engineering.	3.79	3.71
	Most people my age think engineering is cool.	3.21	2.86
Math	Math is useful for solving everyday problems.	4.50	4.43
	I am good in math.	4.29	4.07
	I like math.	4.38	4.23
	I won't need to know about math when I grow up.	1.43	1.29
	I think I will take advanced math classes in high school	4.36	4.00

N=14; *p<.05

Because of the high ratings at the beginning, there was not a lot of room to show significant improvement using the same rating scales. In DRITA's case, it can be difficult to demonstrate changing student attitudes when ratings are high from the beginning. It is also possible that our assessment tool was not sensitive enough to detect changes in student attitudes. Whatever the case, the data show that the program sustained existing high levels of enjoyment and engagement.

Likewise, parents noted that DRITA helped students maintain high levels of existing interest in STEM, which was contagious among the group of students:

"My son's high school has a Technology track which he's stuck to, may not have stayed with it if not for the reinforcement this program provided."

"My kid was already interested in STEM, so for him it was about exposure to the workforce and IT field. Kids are surrounded by mediocrity at school so it's good for them to be around other students who are motivated."

The data from Cohort 3, as shown in the table above, is similar to the Cohort 1 and 2 attitudes toward STEM from before and after the first year of the program. When reviewing/analyzing data for the eight students in Cohort 1 for whom we had data for the entire three years of the program, students' positive attitudes towards math and science did not change significantly over the entire three years, but in most cases, they sustained a high level of interest.

As another indicator of students' attitude toward STEM topics, students were asked about the likelihood of taking STEM courses in the near future (Table 17). Across Cohorts, students' likelihood of taking advanced STEM courses did not show any obvious patterns.

Taking advanced science and math were consistently popular options. Taking advanced technology courses seemed to gain increasing importance both across Cohort years and years in the program (the latter is not shown in the table). A greater percentage of Cohort 1 students, who had spent three years in the program, were "very likely" to pursue advanced technology courses in the upcoming school year than students who had been the program for fewer years. There were students in each of the three cohorts who were interested in taking advanced STEM courses in the 2009-2010 school year.

In contrast, an interest in taking advanced engineering courses was consistently low. By the end of the program, Cohort 1 students were less likely to plan on taking engineering classes in the upcoming school year ($p=0.03$) than at the start of the program; however, they were equally as likely to plan to take engineering courses in college[3]. This may be because students' likelihood to take courses in engineering in the upcoming school year may be based on the availability of courses to take. It is also possible that since these students were rising seniors, they prioritized other courses that are requirements for graduation over an engineering course, which would most likely be an elective.

[3] Nine Cohort 3 completed the feedback survey for all three years of the program. This makes a small sample size for comparison purposes. Because we only had data on students who remained in the program, the results may be biased. Those who left the program may have yielded very different results than those who remained.

Table 17
Students' Likelihood of Taking Advanced STEM Courses in the 2009-2010 School Year, by Cohort

		Not Offered	Very Unlikely	Unlikely	Possibly	Likely	Very Likely
Cohort 3 (N=15)	Advanced Science	7%	0%	0%	13%	20%	60%
	Advanced Math	7%	7%	7%	7%	0%	73%
	Advanced Engineering	13%	0%	20%	7%	33%	27%
	Advanced Technology	13%	0%	13%	27%	33%	13%
Cohort 2 (N=12)	Advanced Science	8%	0%	8%	8%	8%	67%
	Advanced Math	8%	8%	0%	8%	25%	50%
	Advanced Engineering	17%	0%	25%	17%	8%	33%
	Advanced Technology	8%	0%	0%	50%	0%	42%
Cohort 1 (N=9)	Advanced Science	13%	0%	25%	0%	0%	63%
	Advanced Math	13%	0%	25%	25%	0%	38%
	Advanced Engineering	11%	22%	11%	44%	0%	11%
	Advanced Technology	13%	0%	13%	13%	13%	44%

In the focus groups, students commented that the internships and externships helped shape their positive attitudes toward math and science. Further, it helped them to narrow down specific interests in science. One student proclaimed,

> *"I loved it!! It was seriously the best part of my DRITA experience! I truly believe I've found my calling and that it's in tech education for K-12!!!!"*

Parents corroborated what students said and noted that the DRITA externships helped refine their children's thoughts on how technology could fit into an intended career path. Parents also recalled noticeable positive changes in their child's attitudes towards math and science.

For instance, one parent explained that her child intends on taking math every semester now because the child now understands the importance of taking high-level math, which he would not otherwise have done if not for DRITA. Another noted that their child has a better sense of the ways in which STEM topics can be incorporated into careers across many different fields. A Cohort 3 parent mentioned that DRITA students tend to seek out other enrichment programs focused on STEM topics, and excel in those programs. This parent believes that the students would most likely have dropped out of other enrichment opportunities, if not for how DRITA has helped students see the value of knowing STEM topics.

DRITA STUDENTS' EDUCATIONAL AND CAREER PURSUITS

Because the workforce sector in Southern Virginia historically did not require high educational attainment, a steady one-third of adults in the region are high school dropouts. In some communities in the region, there is still a pervasive attitude that higher education is pointless. With the help of DRITA's resources, students in Pittsylvania, Halifax, Martinsville, and Henry counties are becoming equipped with skills and confidence to help them achieve academically and prepare them to go on to higher education.

STUDENTS' EDUCATIONAL PURSUITS

DRITA students and parents have high educational aspirations.

DRITA has continued to attract high-achieving, involved students. In 2009, the majority of students were already taking classes toward an advanced diploma. Survey results showed that an advanced diploma is being pursued by:

- 8 of 9 Cohort 1 student survey respondents;
- 13 of 15 Cohort 2 survey respondents; and
- 11 of 12 Cohort 3 survey respondents.

These numbers have been fairly consistent over each year of the program. A full 100% of students in all Cohorts were *"very"* or *"extremely"* confident that they would graduate from high school. If all DRITA students do graduate, the program will have superior numbers to the 80-86% graduation rate in the surrounding Pittsylvania and Halifax County high schools (2008 data).[4]

Most parents expected that their child would pursue studies beyond high school. Like the previous Cohorts, all of the Cohort 3 parents hoped that their child would pursue at least a 4-year degree, with approximately 8 in 10 encouraging graduate or professional degree attainments.

Parents also reported that the DRITA program has helped their children to have a higher standard of achievement for themselves than before the program. They note that the children no longer settle to take just the required courses, but instead enroll in higher-level courses. As one parent put it,

> *"My daughter is more aggressive…not afraid when it comes to taking technology or math courses. Like when she chooses courses for school, for a while she said she wouldn't take any more math courses. Now, she's planning on taking as many as she can before she graduates."*

[4] Database: Virginia graduation and dropout rates. The Virginian-Pilot. Accessed 20 October 2009. http://hamptonroads.com/2008/10/database-virginia-graduation-and-dropout-rates?appSession=591113379728828

Another added,

> *"College was already an expectation for my son. But now I know he's looking at engineering. UVA offered a paid engineering program for students and professional and many people dropped out – except for the DRITA students. They all stayed and earned a B or better as high school students."*

The last quote reflects how DRITA may be helping students to focus on academic achievement in STEM-related fields, even when they are in a different STEM-related enrichment program.

All of the DRITA students are interested in attending some sort of college, 4-year or otherwise, and about two-thirds of Cohort 2 and 3 students are confident they can attend their college of choice. A little over half of Cohort 1 students are confident they can attend their college of choice. Despite their desires to attend, feelings of preparedness seemed to vary by number of years in the program. Students who have more years in the program, and assumedly more exposure to DRITA's college and career enrichment, feel more prepared to apply for college (Table 18). This may be an indicator that DRITA is successfully preparing students to apply for college.

Although preparedness increased, confidence dropped over the years of the program. It is possible that after three years, the program had successfully equipped students to apply to college, but may have caused them to rethink whether or not they could go to the highly selective schools they originally claimed to want to attend.

In support of that notion, note that in the first two years of the program, students often claimed wanting to go to the most selective schools but were very general, saying things like "any Ivy League." As time went on, students readjusted their options to want to attend moderately to very selective schools like James Madison, University of Virginia, William & Mary, Virginia Polytechnic Institute.

Having lower confidence in being able to go to their top choice school might not be a matter of students not believing that they have the skills and talent to go, but may include circumstances that might hinder or support them in going. For instance, Cohort 1 students expressed concerns about whether they would be able to afford to go to the school of their choice, or whether their test scores would be high enough.

Table 18
Student Interest, Confidence, and Feelings of Preparedness toward Going to a 4-Year College, by Number of Years in DRITA

% Students Reporting "Very or Extremely…"	**Interested in Attending a 4-year College**	**Confident Can Attend Top College of Choice**	**Prepared to Apply to College**
After 1 Year	100%	67%	67%
After 2 Years	100%	67%	84%
After 3 Years	78%[5]	56%	88%

N=36

The oldest students have the expectation that, once they enter college, they will pursue STEM-related studies. By the end of their third year in DRITA, the nine Cohort 1 survey respondents, who are the nearest to starting college, expressed varied interest in taking college-level STEM courses:

- eight of the nine are *very* or *extremely likely* to take science courses in college;
- seven are *very* or *extremely likely* to take math courses in college, which is the same number as those *very* or *extremely likely* to take technology courses; and
- three are *very* or *extremely likely* to take engineering courses in college.

The DRITA program equipped families with important knowledge about the college application process, which they were not getting elsewhere.

According to parent and student reports of satisfaction and students' increasing feelings of preparedness for college, the college and career portions of the program may be DRITA's most successful component. This component consisted of Saturday Session workshops for students and parents, one-on-one counseling sessions for students, college campus visits and an SAT preparation course.[6] The workshops and campus visits are open to all Cohorts of students, while the one-on-one counseling sessions are for later years of the program. Over the three years, the college and career component intensifies to meet the growing needs of precollege students.

Despite the low percentage of students who would be first-generation college attendees for Cohort 3, Cohort 3 parents were relatively uninformed about the college and financial aid process prior to the DRITA program. In one case, a parent even referred to the SAT test as the STD test.

At the start of the 2009 program year, nearly 70% of Cohort 3 parents claimed they needed significant information on some aspect of the college process, financial aid, or standardized testing. Considering how much the college

[5] The remaining 22% were interested in pursuing 2-year college degrees.
[6] The SAT Preparation Course was offered just prior to the publication of this report, so no data or feedback on the SAT preparation course appears.

application process changes, it is also possible that even when parents have gone through the college application experience in the past, they do not feel prepared for upcoming application seasons. Examples of what parents had hoped the program would provide to them are:

"Any information that is possible that my child can apply to a good college & any other information."

"Any new information."

"We need all the steps explained please."

"What she needs to do: S.A.T. and what she needs to prepare."

"Where to apply for scholarships."

"Where can we find financial aid, who is eligible etc..."

DRITA's college and career workshops were designed to address these needs, and successfully met those needs, according to students and parents, as described below.

College and Career Saturday Sessions

The College and Career Saturday Sessions helped students gain information on the college process, which they were not receiving in their own high schools. College and Career Workshops focused on topics such as standardized testing, the college applications process, the financial aid application process, career choices, academic performance, letters of recommendation, and more. Held throughout the school year and summer, Cohort 1 participated in six total sessions over two years, and Cohort 2 participated in two sessions over one year.

Students described these workshops as "incredible," and appreciated the thoroughness of the information they received. In the focus groups, students noted that every part of the college and career aspects of the program was helpful, from meeting with the course instructor in one-on-one sessions to go over report cards to getting information about the FAFSA and setting timelines taking standardized tests.

Students felt that all session topics were equally helpful. For 2009:

- 7 in 10 attendees found sessions admissions, curriculum planning, standardized testing, college access, and paying for college *very* or *extremely helpful;* and
- 61% of all attendees said they are more likely to go college after having completed the sessions than before attending the sessions.

On its helpfulness, students raved,

> *"YESS!!!! The [sessions] are very good, and super helpful!!! I am actually excited to go to college!!!"*

> *"[The sessions have] introduced my mother and I to different steps to gaining financial aid. It's taught me many things about technology that could help secure my spot in a school of my choice"*

The college and career workshops and the college visits reinforced students' desires to attend college.

One student remarked,

> *"I got to taste a little bit of the college life and it seems like a worthwhile life choice to attend college."*

The timing and intensity of the information given was well-placed. Students agreed that it is not necessary to provide a lot of college information to 9th grade students because that is too early. The only additional resources students would have liked were more information on scholarships and a practice PSAT test.

As their knowledge of the application process grew through the sessions, the type of questions about college changed from what the steps are in the application process to focus on how to successfully execute the steps. For example, when the program started, the first Cohort of students had barely any information on the college application process, financial aid, or general college preparation. At the beginning, students requested "any and all" information about college, and had very broad questions about college such as, "whether I should go to a college in or out of state."

By the end of the program, students had more detailed and informed questions about college, for instance, "which colleges are best for Computer Science and IT" and "how to put relevant information on the application." One student even felt so prepared by the college and career sessions to claim that *"I feel like I know what I need to do now, thanks to [the program instructor]."*

Likewise, parents across all three Cohorts praised the College and Career sessions. Parents often found it difficult to keep up with the changing requirements for college entry, which made the College & Career Sessions feel all the more helpful. In some cases, these sessions helped parents to see the value of college. For example, one parent noted the attitudes toward college by some parents in the region:

> *"The history of southern Virginia is that there are many high school dropouts or those who went right to factory work; lots of generations of parents who didn't go to college so many parents don't understand what they need to know about college."*

When parents do not know have information themselves, it is difficult for them to help their child navigate the college application process. Parents in the focus groups explained that the DRITA program, in some cases, was the only source for which they could receive information about the college process. Representative of many of the parents' praises of the college and career workshops, another parent noted the comprehensiveness of the program's college preparation activities:

> *"[My child] learned about which courses he should take in HS, how & why to prep for PSAT and SAT. He learned about improving his HS transcripts, applying to college, college applications & interviews, financial aid, and so much more."*

One-on-one Sessions

Cohort 1 and 2 students had the advantage of meeting with the College & Career workshop instructor in one-on-one sessions. These sessions allowed for personalized attention to individual needs like report cards, transcripts, financial aid, and standardized test scores. The student and instructor were able to customize a strategy for tackling the application process that worked for each individual student's particular set of needs.

Students liked the one-on-one sessions because it allowed them to "speak freely" about personal challenges or fears. They felt comfortable asking questions in a confidential setting and they liked that the instructor was available as a resource for personalized help.

Students suggested that, in future years, these sessions could be used to go through the entire application process and to have a "roadmap" for the actual application process. Because the DRITA program only goes until junior year, students do not have the instructor's help during the actual application process. The instructor for the one-on-one sessions also noted this as an issue during a separate interview. The instructor believed that increased funding could allow the program to serve students through the first year of college.

Students who were not previously interested in college became interested and were empowered to go; for students who were already interested, the program reinforced their desire to go.

Entering the program, most DRITA students already intended on going to college. After spending three years in the program, about 8 in 10 Cohort 1 parents claimed that the program taught their child about college options, and about 4 in 10 claimed that the program increased their child's interest in college. Parents also noted seeing changes in their child's appreciation for the benefits of a college education. One parent told a success story of how the program changed her son's interest:

> *"Before program, going to a college was not a priority. He was always interested in getting a good education but wanted to work with his hands. Now he's seen DRITA as a step to help him get into college and has even picked one out that he has his heart set on: James Madison University."*

The parent added that the child now spends time researching schools on the internet, and has more confidence, maturity, and a feeling of responsibility for his own future.

College Visits

Cohorts 1 and 2 students attended college visits to the University of Virginia (UVA) and James Madison University (JMU) at various points during 2007-2009. Cohort 1 visited UVA in April 2007 and JMU in December 2008. Cohort 2 visited UVA in November 2008. In early 2009, Cohort 1 students were asked in survey to reflect on the college visits. Survey results showed:

- students enjoyed the JMU visit more than the UVA visit;
- the JMU visit influenced their future course choices, but the UVA visit did not; and
- more students were interested in applying for JMU than UVA after the visit.

One potential reason that UVA was less popular to JMU was because students were unable to see many parts of the UVA campus during their visit. When students arrived on the visit, some of the doors were locked, which limited students' ability to see parts of campus life.

The college visits reinforced student interest in post-secondary education and gave them a more experiential understanding of what college is like:

> *"Yes they did influence my desire to attend a 4-year school because it gave me more of a view of what campus life is like."*

> *"I've planned on going to college since I started school. This just made me want to go even more."*

> *"Yes, I had already planned to attend a 4 year college but visiting these colleges boosted my interest."*

> *"I learned that I love the college atmosphere, and to get away from my town's miasma."*

About one-third of Cohort 1 and 2 parents were able to attend at least one college visit with their child. Of these, a little under half felt their child gained an expectation for what life would be like through the visit.

Students generally liked the schools that they visited during the program, but believed that the schools they visited were based on distance from Danville, rather than on opportunities for pursuing STEM-related college paths. For instance, in the focus groups, students cited Virginia Polytechnic Institute (VTech) as an example of a school they should have visited for its relevance to the DRITA program activities. VTech was suggested almost unanimously in the focus groups and surveys, with students adding that they would be willing to travel the long distance for a visit there.

DRITA STUDENTS' CAREER DEVELOPMENT

Students gained marketable skills for the short-term.

Though DRITA students have maintained a high interest in STEM-related topics, the skill-building that occurs during the course of the program may be a more important factor than interest when it comes to a future career. Building skills builds self-efficacy. Psychologists have long recognized that both interest and occupational self-efficacy (that is, the belief that one could do a particular occupation) are important predictors of future career paths, especially for rural high school students of diverse racial/ethnic backgrounds. In particular, for math and science careers, occupational self-efficacy is a more important predictor than interest for a precollege student's intended career path[7].

By teaching a specific set of skills, the DRITA program is contributing to students continuing along a path toward STEM-related careers. For example, after taking the BITS course, students were given the opportunity to demonstrate what they had learned. When asked to perform a series of tasks on evaluating a web-site's design, at least half of Cohort 3 students could name at least three of seven total characteristics that GRG had coded, with at least one-quarter of students able to name five or more characteristics (Table 19). That students could name most, if not all, of the characteristics of the website is evidence that the DRITA program plays a major role in skill-building.

Table 19
Notable Characteristics Students Mentioned of Wired.com Website

N = 23	**# Students**
Use of images on the page (from cameras or scanners)	16
Big bold titles	10
Use of graphics on the page	10
Lots of eye-catching features	8
White background and black text.	8
Static content – nothing is changing	8
For the most part, a simple layout	10

[7] Hacket, Gail. "Self-efficacy in career choice and development." In Bandura, A. *Self-efficacy in changing societies.* 1997. Cambridge University Press: Cambridge, UK. pp232-240.

While these results still show that there is room for improvement, the reinforcement of these skills that students get over the course of three years is crucial. After three years in the program, one of the Cohort 1 students began building MySpace layouts for her friends using the skills she had learned in both the course and the Year 2 Digital Media & Design internship. Her sites became so popular that she was able to start selling her layouts to local business for $1.00 apiece. (Though seemingly small, charging businesses $1 for advertising is how, at the age of 21, Alex Tew was on his way to becoming a millionaire after launching The Million Dollar Homepage as a way for paying for his college education.[8]) It is an example of how the skills that DRITA students learn are transferrable to the "real world" in the short-term.

DRITA externships have also been shown to provide marketable skills in the short-term. Another DRITA third-year student was offered a part-time job based on knowledge learned from DRITA courses and the externship placement. The student's parent raved,

> *"[DRITA] gave him real-world work experience that he had not had, and in a field and a situation he would not have had without DRITA. They offered him a part time job during the school year and a job next summer. Things could not have worked out better."*

The externship supervisor who hired the student was equally pleased. He claimed, "*We were actually thrilled with what he did, so much so that we've hired him for an after-school job, 4-5 hours per week."*

Students gained workforce development skills for the long-term.

DRITA has opened paths for students to learn IT-related skills for future jobs through courses. Students entered DRITA with aims of wanting to learn mostly animation and web design. But student's exposure to other topics, through courses such as networking and programming, has lead them to want to use a broader range of IT skills in the long term. After taking a course in each subject, at least half of the students from each Cohort wanted to use at least one IT-related skill in a future job (Table 20).

Table 20
IT-Related Skills Students Want to Use in a Future Job

	Cohort 3 (N=15)	**Cohort 2** (N=12)	**Cohort 1** (N=9)
Networking	20%	75%	67%
Programming	60%	67%	33%
Animation	27%	58%	22%
Web Design	13%	75%	33%
Robotics	n/a	42%	22%
GIS	n/a	n/a	22%

[8] "Student's Cash-Raising Net Scheme." *BBC News*. 22 September 2005. http://news.bbc.co.uk/2/hi/uk_news/england/wiltshire/4271694.stm

Subsequently, DRITA has opened paths for students to practice IT-skills in a workforce setting through student externships. According to parents, DRITA students gained appreciation for what is required to advance their workforce development skills. Parents observed,

> *"[Our child] has a better understanding of the workplace and associated responsibilities post his participation in the externship opportunities."*

> *"Also, the externship experience helped [our child] realize the contributions one makes to an organization. He has an appreciation for the responsibility given to him during the work experience."*

Feedback from Externship Supervisors

Although some of the externship supervisors who oversaw Cohort 1 and 2 DRITA student interns felt students were unprepared coming into the externship, by the end of the summer, supervisors observed that students gained workforce skills through their experience. Activities that students conducted included:

- Redesigning a website or designing a social networking page (on Twitter, Facebook, etc)
- Learning a software package to do racecar driving simulations
- Creating databases that "went live" after the completion of the externship
- Creating guidebooks or training sessions showing others to use software packages or hardware peripheral devices
- Building Ethernet cables and imaged computers
- Creating soundtracks and visuals for a promotional video
- Recording podcasts
- Installing computers

At the end of the year, externship supervisors were asked to capture their perceptions of the intern's growth and performance of these activities using a rating survey. On average, all of the externship supervisors (n=24) felt that students performed at least at a "fair" level, with 50% of supervisors rating the intern's performance as "excellent." Mean ratings (Table 21) improved from last year's intern scores across the three domains: general professionalism (+0.22), job-specific skills (+0.13), and interpersonal/community-building skills (+0.07).

Table 21
Externship Supervisor Perceptions of DRITA Student Workforce Skill Development

		Mean Rating (out of 5)
General Professionalism alpha = 0.93	▪ Punctuality ▪ Attendance ▪ Demonstration of responsibility during externship. ▪ Efficient/effective use of time to complete tasks. ▪ Quality of work performed. ▪ Approaches work with a positive attitude. ▪ Completes work independently, when appropriate. ▪ Met project goals set by Supervisor.	4.40
Job-Specific Skills alpha = 0.90	▪ Ability of intern to grasp the nature of assigned problems. ▪ Ability to use problem solving/critical thinking skills. ▪ Ability to use technology in an effective way.	4.36
Interpersonal/ Community Building Skills alpha = 0.92	▪ Speaks effectively. ▪ Ability to listen to others. ▪ Overall ability of intern to work well with others. ▪ Demonstrates positive working relationships with peers. ▪ Demonstrates positive working relationships with Supervisor(s). ▪ Demonstrates respect for diverse perspectives.	4.29

Number of students rated ranged from 23-24 across composite variables.

General professionalism received the highest rating. From the supervisors' perspectives, this rating might be higher if students were given training on workplace etiquette, time management, and taking initiative at the workplace. Students were rated lowest for interpersonal/community-building skills. To this, externship supervisors suggested that the program incorporate more public speaking opportunities, possibly even tying in learning experiences about the technology associated with public speaking such as projectors and microphones.

Generally, externship supervisors felt that the externships went well and that the students were a helpful addition. Supervisors believed the externship experience helped expand DRITA students' skills and helped them to see what day-to-day life is like in an IT-related job. Sample supervisor comments were:

> *"He was familiar already to HTML (from DRITA) but was exposed to a more complex variety of it."*

> *"I think the students earned a respect for what goes on behind the scenes -- being a computer tech is not*

a glamorous job. There really are boxes, getting dirty, papercuts or cuts from a machine."

In two instances, the program did not seem to be a match for students because the planned tasks were not aligned with the students' interests and skill levels. The "fit" of the externship to the student's interests and skills may have been a great contributor to student performance and supervisor dissatisfaction.

In the cases in which supervisors observed that students were interested in the work being done, they had positive reports about student self-motivation and work ethic, saying things like:

"He was a very hard worker, and I was worried I might not have enough stuff for him because he kept finishing everything I gave him."

In the instances where it seemed student interests or skills did not align with what they were expected to do, those students had difficulty performing. Some supervisors even commented that students "Didn't understand what they were getting into." Other externship supervisors felt that the level of skill they had expected was beyond what a high school student could do.

One dissatisfied supervisor mentioned:

"The students were not prepared to do the task…. I don't think the students had the hard technical skills…They weren't self-motivated, they didn't seem interested or even pretend to be interested in the project we planned for them."

As a result of the unpreparedness that the supervisor perceived, the supervisor hired a part-time coordinator to manage and guide the students through the planned activities. The externship organization did not receive additional funds from the DRITA program to compensate the coordinator.
Students were most interested and motivated when they knew their work was going to be used in real life. When there were tangible products, the businesses and organizations benefited from student work. Supervisors recalled,

"The report they gave us ended up being a very good quality…And it is being used now and being sent out to management."

"He put together several presentations and presented that, and he was able to set up Facebook and Twitter and presented those to us as a group."

Student Feedback

Student feedback on the externships showed that students generally liked their externship experience. They felt they learned a lot and gained new skills – both in terms of workforce development skills and exposure to IT work in the

workplace. Students were able to connect what they learned in the courses to what they were learning in the externships, and could see how that played into real-life situations. Students commented:

> *"I loved my [externship]. I was able to see the things network administrators have to go through. And what I will be doing in the future"*
>
> *"I met new people and used my skills in a working environment."*
>
> *"I learned that teaching yourself when you can't receive help is crucial."*
>
> *"I think the animation class especially… it's based off of CAD software that I took in drafting so I'm familiar with how the programming that we do here in the program fits into my career path."*

As evidence of their satisfaction, 14 of 20 surveyed intern respondents disclosed that they would be possibly or definitely be interested in doing their externship activity as part of a future career. While there was mostly very positive feedback, a few students expressed dissatisfaction, for example, due to not having enough of a variety of activities and having to work alone.

Tech Expo

DRITA's year culminates with a Tech Expo where students present to their families on what they learned and created throughout the DRITA year. A GRG field researcher attended and reported on the Tech Expo.

2009 DRITA TECH EXPO AND BANQUET

On July 24, 2009, the Dan River Information Technology Academy held their end-of-summer Technology Expo and Banquet in the spacious state-of-the-art facility at the Institute for Advanced Learning and Research in Danville. There were Dell computer terminals with Internet access and plenty of space for guests to walk around and view student demonstrations and socialize. Cohorts 1, 2 and 3 and their families all took part in the live demonstrations to showcase their projects and presentations of student externships that were completed during summer sessions.

Cohort 3 had projects on display that were completed during the animation and programming C++ course. Maya software was used for the animation course and was loaded onto to the computers; Visual Basic software was used for the C++ course and loaded on the computers to show the C++ projects.

Also in the atrium, Cohort 1 had Geographic Information Systems (GIS) projects downloaded onto laptops. Arc GIS software was loaded onto laptops for parents and guests to view GIS projects.

Although Cohort 2 students did not have projects to display -- they completed the robotics course this summer and disassembled their robots – several students discussed robotics during their banquet presentations.

Many parents had travelled from several counties away just to take part. Each parent expressed how instrumental this program has been in their child's academic development. One of the things that they talked about was how they had watched their son or daughter's technical abilities develop throughout the course of the program, and some of their children had been in the program since its inception.

TECH EXPO ACTIVITIES

GIS PROJECTS
3-D SIMULUATIONS
C++ PROGRAMMING
WEB DESIGN
TV BROADCASTING
ANIMATION
IT NETWORKING
VIDEO PRODUCTION
ROBOTICS

2009 DRITA BANQUET

Role of Parents, Instructors, and Other Adults

Around 6:30 PM, everyone was seated in the Banquet Hall to begin the evening's program. In addition to all the students, present were their families and guests, all of the current and past DRITA staff members, IALR representatives, and many of the instructional staff. There was evidence of the community support for this program. The program began with the program's former principal investigator giving a brief history of the DRITA program and introducing each group of student presenters.

Student presentations focused on giving brief overviews and personal reflections of what and where each group worked, the skills they acquired, the lessons they learned and the insights they gained from their summer internships and externships.

Students showed a range of both soft and hard skills such as wearing suits and ties and demonstrating a professional business attitude. Presenters displayed poise and confidence and had a chance to develop their public speaking and verbal communication skills while presenting. Technical skills included web production, IT hardware setup, networking and software configuration skills, digital photography, creating blogs, digital video and TV broadcasting and an interesting demonstration on race car simulation from a student intern from VIPER.

The evening's Keynote Speaker was Professor Edmondson Effort from North Carolina A&T University who discussed how problem-solving and engineering apply to everyday life. Completion Awards were distributed to all of the student participants in the DRITA program.

Students were able to focus their career desires – many of them toward STEM-related careers.

As DRITA students progressed through the program, they accrued more specific ideas for their future careers. By 2009, at least half of all DRITA students were *likely* or *very likely* to pursue a STEM career after at least one year in the program (Table 22).

Table 22
Student Likelihood of Pursuing a STEM Career After DRITA

	Very Unlikely	Unlikely	Possibly	Likely	Very Likely
Science	6%	8%	28%	31%	28%
Math	8%	14%	25%	22%	28%
Engineering	6%	11%	31%	25%	33%
Technology	0%	3%	25%	31%	42%

N=36

When Cohort 1 students first entered the program, they named general categories such as "millionaire" and "teaching" as intended career paths. After three years, students had narrowed their interests and were more realistic about their career aspirations than they were in their first year of the program. Some were interested in STEM jobs that were directly related to DRITA's programming like "game designer for Nintendo", "IT Department," "Networking Project Manager." One student commented, "I have found my interest and what I would like to major in through this program."

At the end of the three years, remaining students had a better sense of the education they would need to pursue their career goals. In their first year, nearly 20% underestimated the level of education they would need to attain their career goals. After three years in the program, all but one of the students was able to correctly identify the level of schooling that would be required. Their educational aspirations ranged from "4-year college degree" (3), "Master's degree" (2); and doctorate degrees (2).

CONCLUSIONS AND RECOMMENDATIONS

High school is an important time for students to have their interests reinforced, since it is the entryway to their futures. By helping students stay on track in STEM and IT, the DRITA program embodies what it means to be a pipeline program.

The DRITA program team has successfully built an exemplary program that introduces high-achieving 13-16 year old students to IT-related topics and prepares them to pursue STEM studies. Through program activities, it is meeting its goals of:

- increasing students' competencies in IT;
- increasing students' ability to perform effectively in the workplace;
- increasing the percentage of girls/students of color with plans to pursue STEM studies; and
- developing the IT workforce and career opportunities within Southern Virginia.

Though it is too early to measure how well the program has attained its longer-term goals of increasing the number of students matriculating into 4-year colleges to pursue STEM and increasing graduation rates, predictors of these outcomes are evident.

Students agree that the program is fun, gives them a valuable work experience and prepares them for the college application process. With the program's guidance, students are able to focus their future career and educational plans.

Parents appreciate the opportunities the program gives their children, and believe that the entire region benefits from the program's existence. Local businesses and organizations who are involved with the program attest to how students' workforce skills have grown. Many of the involved businesses believe that they have benefitted from student work, while others feel that although the program is valuable, the externship is not a fit for their needs.

As the program has grown and matured over the three years, program staff members were able to resolve challenges with finding course instructors, having functional software for students to use, and coordinating student transportation. The program staff navigated changes in leadership smoothly through maintaining open lines of communication. Staff have been attentive and responsive to student feedback and have been accommodating to course instructors' needs.

Given the results of our evaluation, GRG makes the following recommendations to the DRITA program:

Secure financial resources to continue the existing program activities.

DRITA is successfully sustaining students' interests in technology, preparing students for the college application process, and developing student workforce skills in STEM and IT. Though highly successful, DRITA has been unable to secure financial resources to continue the program beyond the no-cost extension date of July 2010. In order to continue its valuable work, DRITA staff must secure financial resources through sustainable funding opportunities.

Part of securing financial resources is assessing the reasons for which the ITEST funding was discontinued. DRITA staff should obtain feedback from the grant's reviewers in order to determine why the grant was not funded. DRITA staff should pay attention to elements outside of the program, like the institutional environment or organizational infrastructure, which may have influenced NSF's grant decision. DRITA staff should share reviewer feedback with GRG's evaluation team as they assist on future grant proposal collaborations.

To be sustainable, DRITA staff may also want to consider supplementing governmental sources of funding with non-governmental funding sources. There may be opportunities for the program to partner with local businesses, especially those who are interested in having DRITA interns, who may provide financial sponsorship. Seeking corporate sponsors from the STEM and IT industry may also be a potential funding source. Before exploring private funding, staff need to weigh their willingness to modify the program to cater to the desires of private sponsors who become shareholders in the program.

Consider extending aspects of the program through students' first year in college.

Considering the successes it has seen thus far, GRG recommends that the program continue its work with its current offerings and continues to expand in order to meet program goals.

Specifically, the program could serve the community even more if it provides support through a participant's first year in college. As they get nearer to the college application process, students and their families will need ongoing help and attention, especially since their own schools do not provide this support. Extending the program's support will allow the program to further address its goal to "increase the number of students who matriculate to 4-year colleges to pursue STEM."

Students may also be able to return to the program as paid interns after their first year in college. In doing this, the program can continue to reinvest in student's STEM and IT interest. Creating opportunities for students to work with the program in the future directly addresses the program's goal to "develop the IT workforce and career opportunities within the region."

Adding onto the program in this way should included evaluation of new and

existing program elements. With continued evaluation for upcoming years, the program will be able to assess how well it is meeting all of their goals, both short-term and long-term.

In future iterations, the program should consider offering stipends for students. Offering stipends provides an additional incentive for students to remain in the program and may be especially important for reaching economically disadvantaged students in the region.
Align all program elements to maximize the match between student's IT and STEM interests to their DRITA experiences.

GRG recommends that the college visits and the externships be better aligned to student interest in IT and STEM-related topics. The program should consider focusing on visiting post-secondary institutions that have strong STEM and IT programs. Exposing students to these schools may increase their likelihood of pursuing STEM studies.

For the externships, the program manager should consult with local businesses about their specific IT needs and what basic skills students must have, versus what skills it would be helpful for students to have (e.g., training in MatLab, programming languages). This should be done before the beginning of the next program year to give program staff time to adjust the curriculum based on the feedback received.

Program staff should also develop a better system for matching interns' interests and skills to the externship experience. One idea would be to showcase the activities of businesses and organizations in a mock career fair and allow students to "apply" to externships. The mock career fair could be prefaced with workshops to equip students with workforce skills such as how to create a resume and how to participate in an in-person job interview.

Clearly communicate expectations for the externship to externship supervisors and to students.

Externship supervisors acknowledged that many of the challenges with the students placed with them were due to unclear expectations. GRG recommends that, in the future, program staff clearly communicate upfront what is expected from externship supervisors (including any evaluation follow-up they are expected to be a part of) and what they should expect from students. The program must communicate these expectations to the supervisors early enough so that they can plan appropriate activities for students. Similarly, before the externship begins, clearly communicate to students the expectations for their behavior and dress during the externship.

One idea for communicating student's strengths and areas for improvement to externship supervisors would be to provide externships supervisors with a summary report of the content assessment results for the group of students he/she will have care of. Allowing supervisors to get a sense of where student's strengths and knowledge gaps might be can help supervisors decide what which activities are most suited to students' existing skills.

Continue to improve the courses by reinforcing concepts that are a challenge to students and by maintaining high-quality course instructors.

Although the DRITA program has certainly been successful in increasing student aptitude in IT-related topics, the low content assessment scores leave much to be desired. GRG recommends that the program examine closely what elements students are not retaining, and then find ways to reinforce those concepts.

Given the most recent changes to the C++ course, future externship supervisor's ratings of student's ability to work with C++ will be an important metric to evaluate.

As with the robotics instructor, readily available and cooperative staff support has helped keep instructors coming back to the DRITA program. Having continuity over the years from teachers who are a good fit for the program and are experienced in DRITA's course material has helped the program overall become streamlined. To the extent that it can, the program should continue to retain teachers who do well teaching DRITA's students; so far, the program has done that in some of its courses (like robotics and animation), with great success. The BITS and C++ courses have changed course instructors, and could benefit from retaining these instructors since they have been a good fit with the students.

It is also important for instructors to receive feedback on their courses, to see where and how their teaching has been effective and where it has not. Sharing the evaluation report with program instructors is a simple way for program instructors to review their efforts.

Increase program visibility and branding by advertising throughout the region and throughout the year.

The DRITA program has a lot to be proud of. Considering all it has to offer, it is unfortunate that the program is not more visible than it is. GRG recommends that the program make itself more visible in the community in terms of recruitment and advertising. For instance, the program should consider reaching out more extensively via advertising in schools and should continue to present at local schools. Presenters should incorporate the products of student work throughout these presentations. For instance, the program could show a DVD of testimonials made by DRITA students in the Digital Media & Design course.

The program should also advertise throughout the year, beyond the recruitment season. Having a newsletter that goes out to parents can provide a tangible way for families to tell other families about DRITA. The program could also seek submit articles quarterly to a local newspaper or news magazine. Articles should highlight both the DRITA program and any recent accomplishments of student participants.

This report has documented the successes and challenges faced by the students, parents, staff, course instructors, and externship supervisors who have all had a key role in the DRITA program. The DRITA program is a beacon of opportunity for families in Southern Virginia – a region that desperately needs the type of resources this program offers. If DRITA can continue its work, it has the potential to meets its overarching goal of guiding students to STEM-related careers.

APPENDIX

Appendix A: 2009 Student Pre-Survey

DRITA
Pre-Program Survey

As part of DRITA this year, you will have the chance to use technology in many ways. Before you begin, we want to know what kinds of technology you have already used and what you have done with those technologies.

Name _____

USING COMPUTERS AND OTHER EQUIPMENT

1. Typically, how many days *per week* do you use a computer outside of school? (Pick one.)
❒ 0 days ❒ 1 day ❒ 2 days ❒ 3 days ❒ 4 days ❒ 5 days ❒ 6 days ❒ 7 days

2. How interested are you in learning about each of the following?

	Not Interested	Somewhat Interested	Not sure	Interested	Very Interested
Networking	❒	❒	❒	❒	❒
Web Page Creation and Design	❒	❒	❒	❒	❒
Computer Programming	❒	❒	❒	❒	❒
Computer Hardware	❒	❒	❒	❒	❒
Multimedia (digital cameras, web cams, scanners)	❒	❒	❒	❒	❒

3. Which of the following have you used outside of school? (Check all that apply.)
- ❒ Mapping web sites (MapQuest, Yahoo! Maps, etc.)
- ❒ Photo editing software
- ❒ Programming software
- ❒ Chat rooms
- ❒ Email
- ❒ Blogs
- ❒ Instant messaging
- ❒ Wiki's
- ❒ Computer games (including online)
- ❒ E-commerce sites (shopping, purchase music, e-auction, etc.)
- ❒ Online search engine (Google, Yahoo, Ask, etc.)
- ❒ I have not used any of these outside of school.

4. Which of the following activities have you done before? (Check all that apply)

- ❒ Created computer animation
- ❒ Built a robot
- ❒ Created a virtual environment
- ❒ Designed a computer game
- ❒ Computer programming
- ❒ Network two computers together
- ❒ Installed software
- ❒ Installed hardware (hard drive, memory, sound card, etc.)
- ❒ Installed a peripheral (scanner, printer, etc.)
- ❒ Created a web page
- ❒ I have not done any of these activities before.

5. How strongly do you agree or disagree with each of the following statements?

	Strongly disagree	**Disagree**	**Not sure**	**Agree**	**Strongly agree**
I like science.	❒	❒	❒	❒	❒
I enjoy learning science.	❒	❒	❒	❒	❒
Science is boring.	❒	❒	❒	❒	❒
I am good in science.	❒	❒	❒	❒	❒
I enjoy learning about technology.	❒	❒	❒	❒	❒
I like using new technology.	❒	❒	❒	❒	❒
I am good at using technology.	❒	❒	❒	❒	❒
Learning about technology is boring.	❒	❒	❒	❒	❒

6. Next, how strongly do you agree or disagree with each of the following statements?

	Strongly disagree	**Disagree**	**Not sure**	**Agree**	**Strongly agree**
Math is useful for solving everyday problems.	❒	❒	❒	❒	❒
I am good in math.	❒	❒	❒	❒	❒
I think I will take advanced math classes in high school.	❒	❒	❒	❒	❒
I like math.	❒	❒	❒	❒	❒
I won't need to know about math when I grow up.	❒	❒	❒	❒	❒
Engineering is boring.	❒	❒	❒	❒	❒
It would be fun to be an engineer.	❒	❒	❒	❒	❒
I think I will take engineering classes in college.	❒	❒	❒	❒	❒
I might pursue a career in engineering.	❒	❒	❒	❒	❒
Most people my age think engineering is cool.	❒	❒	❒	❒	❒

CAREERS

7. What is the *one job* you want to have *the most* when you are 30 years old? (Write only one)

1.

8. How far do you think you will need to go in school to do this job? (Pick one)

- ❒ High school degree
- ❒ Some vocational or technical education
- ❒ 2-year college degree
- ❒ 4-year college degree
- ❒ Master's degree
- ❒ Professional degree
- ❒ Ph.D. or M.D.
- ❒ I don't know

9. List *three* different classes you will have to take in order to do this job? If you can't think of three, type "I don't know" in the extra spaces.

a.

b.

c.

10. Do you think you will need to use science to do this job?

❒ Yes ❒ No ❒ I don't know

11. What kinds of technology do you think you will use as part of this job?

12. How important would each of the following resources be if you had to research and collect data about a specific topic?

	Not Important	Somewhat Important	Not sure	Important	Very Important
Internet	❒	❒	❒	❒	❒
Books	❒	❒	❒	❒	❒
Magazines	❒	❒	❒	❒	❒
TV	❒	❒	❒	❒	❒
Video	❒	❒	❒	❒	❒

FINAL THOUGHTS

13. What would you like to learn in this Information Technology class that you have not learned in other Technology classes?

14. Please respond to the questions in the table below.

	Not at all	A little	Somewhat	Very	Extremely
How confident are you that you will earn a high school diploma?	❒	❒	❒	❒	❒
How interested are you in attending a 4-year college?	❒	❒	❒	❒	❒
How prepared do you feel to apply to the college(s) of your choice?	❒	❒	❒	❒	❒
How confident are you that you can get accepted into the college(s) of your choice?	❒	❒	❒	❒	❒

15. Write a few sentences about how you think this course will prepare you for college.

Appendix B: 2009 Parent Survey: Kick-Off Meeting

Parent Information Session
Feedback Survey

1. Your Name _____

2. Your DRITA Student's Name _____

3. How did your DRITA student become involved in the program? (*Check only one.*)

- ❒ He/she found out about it on his/her own
- ❒ I found out about it and suggested that he/she apply
- ❒ Other; describe _____

4. What is <u>the main reason</u> your DRITA student is participating in the program? (*Check only one.*)

- ❒ He/she wanted to try it out
- ❒ He/she is interested in science, math, and/or technology.
- ❒ It was something to do on weekends and for part of the summer
- ❒ I thought it would be a good experience
- ❒ A teacher asked him/her to participate
- ❒ His/her friends were participating, so he/she also wanted to.
- ❒ To help him/her do better in school
- ❒ To help him/her get in to college
- ❒ To help him/her get a good job
- ❒ Other (*please describe*) _____

5. What are other reasons your child is participating? (*Check all that apply.*)

- ❒ He/she wanted to try it out
- ❒ He/she is interested in science, math, and/or technology
- ❒ It was something to do on weekends and for part of the summer
- ❒ I thought it would be a good experience
- ❒ A teacher asked him/her to participate
- ❒ His/her friends were participating, so he/she also wanted to.
- ❒ To help him/her do better in school
- ❒ To help him/her get in to college
- ❒ To help him/her get a good job
- ❒ Other (*please describe*) _____

Please continue on back

6. What questions do you still have about the DRITA program?

7. What other information would you like DRITA to give you about the college application process?

8. What other information would you like DRITA to give you about getting financial aid for college?

Looking Forward

9. What kind of job do you hope your DRITA student has when he/she grows up?

10. How far do you hope your DRITA student goes in school?

- ❒ High school degree
- ❒ 2-year college degree
- ❒ 4-year college degree
- ❒ Graduate/professional degree

11. Please share any final comments you would like to share about your child's experiences with DRITA.

Thank You!

Appendix C: 2009 Parent Survey – End of Saturday Sessions Cohort 1

DRITA Saturday Sessions 2009
Parent/Guardian Feedback Survey Year 1 – Cohort 3

1. **Your Name** _____

2. **Your DRITA student's name** _____

3. **In your opinion, how much has your student enjoyed DRITA thus far?**
   ❒ Not at all ❒ A Little ❒ A Moderate Amount ❒ Quite a Bit ❒ A Great Deal

4. **What do you think your student has gained from this program thus far?** (*Check all that apply*.)
   ❒ Had fun
   ❒ Had a positive educational experience
   ❒ Learned about technology
   ❒ Gained skills to use in a career
   ❒ Other (*please describe*) _____
   ❒ None of the above
   ❒ Became more interested in technology
   ❒ Was able to spend time with friends
   ❒ Was able to make new friends
   ❒ Learned about career options

5. **During the Basic IT Skills (BITS) Saturday Sessions, how often did your student do each of the following:** (*Check one response for each item.*)

	Never	**Once during the Saturday Sessions**	**Two or three times during the Saturday Sessions**	**Three or four times during the Saturday Sessions**	**After every Saturday Session**
Talk about the technology used that day	❒	❒	❒	❒	❒
Mention that s/he had fun	❒	❒	❒	❒	❒
Complain about something that happened during the day	❒	❒	❒	❒	❒
Mention that s/he did *not* want to go back	❒	❒	❒	❒	❒
Share materials/projects from that day	❒	❒	❒	❒	❒
Ask you questions about what s/he did that day	❒	❒	❒	❒	❒
Try to do similar kinds of activities at home	❒	❒	❒	❒	❒

Please continue on back

6. Over the Saturday Sessions, which activity do you think your student enjoyed the most?

7. During the Animation and C++ Summer Courses, how often did your student do each of the following: (*Check one response for each item.*)

	Never	**Once during the Summer Courses**	**Two or three times during the Summer Courses**	**Three or four times during the Summer Courses**	**After every Summer Courses**
Talk about the technology used that day	❒	❒	❒	❒	❒
Mention that s/he had fun	❒	❒	❒	❒	❒
Complain about something that happened during the day	❒	❒	❒	❒	❒
Mention that s/he did *not* want to go back	❒	❒	❒	❒	❒
Share materials/projects from that day	❒	❒	❒	❒	❒
Ask you questions about what s/he did that day	❒	❒	❒	❒	❒
Try to do similar kinds of activities at home	❒	❒	❒	❒	❒

8. Over all the Summer Courses, which activity do you think your student enjoyed the most?

9. So far, how has the DRITA program meet your expectations?

❒ Has not meet my expectations
❒ Has met my expectations
❒ Has exceeded my expectations

Please explain your rating.

10. Please share any final comments you would like to share about your student's experiences with DRITA.

Thank You!

Appendix D: 2009 End of Year Survey – Cohort 1

DRITA 2009
Year 3 Feedback Survey – Cohort 1

Name _____

FEEDBACK ABOUT DRITA

1. If you were describing the DRITA program to a friend, what one or two sentences would you use to tell them what the program is about?

2. How much have you enjoyed DRITA this year?
❒ Not at all ❒ A Little ❒ A Moderate Amount ❒ Quite a Bit ❒ A Great Deal

3. How have you benefited from being part of the DRITA program this year? (*Check all that apply*.)
❒ I have had fun.
❒ I have had a positive educational experience.
❒ I learned about technology.
❒ I gained skills to use in a career.
❒ I became more interested in technology.
❒ I was able to spend time with friends.
❒ I was able to make new friends.
❒ I learned about career options.
❒ Other (*please describe*) _____
❒ None of the above

4. How much have you learned from the program this year?
❒ Nothing ❒ A Little ❒ A Moderate Amount ❒ Quite a Bit ❒ A Great Deal

5. What has been your favorite thing about the DRITA program this year?

YOUR EXPERIENCES WITH TECHNOLOGY

6. Typically, how many days *per week* do you use a computer <u>outside of school</u>? (Pick one.)
❒ 0 days ❒ 1 day ❒ 2 days ❒ 3 days ❒ 4 days ❒ 5 days ❒ 6 days ❒ 7 days

7. Since starting the DRITA program, which of the following computer resources have you used <u>on your own time</u> (that is, not as part of a school assignment or as part of DRITA). (*Check all that apply*.)
❒ Search engines (Google, Yahoo, Ask, etc.)
❒ Email
❒ Instant Messaging
❒ Computer games (including online)
❒ Chat rooms
❒ Photo editing software
❒ Blogs
❒ Wikis

❒ Map Web sites (mapquest, googlemaps, etc.) ❒ Programming software
❒ MySpace ❒ Facebook
❒ E-commerce/shopping (shopping, purchasing music, e-auction, etc.)
❒ I have not used any of these on my own time.

8. Since you started the DRITA program, which of the following have you done <u>on your own time</u> (that is, not as part of a school assignment or as part of DRITA)? (*Check all that apply*.)

❒ Installed software ❒ Built a robot
❒ Installed a peripheral ❒ Computer programming
❒ Created computer animation ❒ Networked computers
❒ Created a web page ❒ Installed hardware
❒ Designed a computer game ❒ Created a virtual environment
❒ I have not done any of these activities on my own time.

9. How strongly do you agree or disagree with each of the following statements?

	Strongly disagree	**Disagree**	**Not sure**	**Agree**	**Strongly agree**
I like science.	❒	❒	❒	❒	❒
I enjoy learning science.	❒	❒	❒	❒	❒
Science is boring.	❒	❒	❒	❒	❒
I am good in science.	❒	❒	❒	❒	❒
I enjoy learning about technology.	❒	❒	❒	❒	❒
I like using new technology.	❒	❒	❒	❒	❒
I am good at using technology.	❒	❒	❒	❒	❒
Learning about technology is boring.	❒	❒	❒	❒	❒

10. How likely are you to do the following:

	Class is Not Offered at my School	**Very Unlikely**	**Unlikely**	**Possibly**	**Likely**	**Very Likely**
Take advanced science classes this year in school	❒	❒	❒	❒	❒	❒
Take advanced math classes this year in school	❒	❒	❒	❒	❒	❒
Take engineering classes this year in school	❒	❒	❒	❒	❒	❒
Take advanced technology classes this year in school	❒	❒	❒	❒	❒	❒

11. Does your high school offer advanced placement (AP) technology classes?

❒ Yes ❒ No ❒ Don't know

If yes:

11a. What courses are offered?

12. If you are taking any advanced classes this year, please list them here. If you are not, please type "None."

13. Do you plan to pursue an advanced high school diploma? (To earn an Advanced Studies Diploma, students must earn at least 24 standard units of credit and at least nine verified units of credit.) ❒ Yes ❒ No ❒ Don't know

If yes:

13a. Have you started taking the extra classes you will need to earn your advanced diploma? ❒ Yes ❒ No

If yes:

13b. What classes have you taken?

If no:

13c. When do you plan to begin taking the classes you will need to earn your advanced diploma?

LOOKING FORWARD

These next questions are about your future plans.

14. Please respond to the questions in the table below.

	Not at all	A little	Somewhat	Very	Extremely
How confident are you that you will earn a high school diploma?	❒	❒	❒	❒	❒
How interested are you in attending a 4-year college?	❒	❒	❒	❒	❒
How prepared do you feel to apply to the college(s) of your choice?	❒	❒	❒	❒	❒
How confident are you that you can get accepted into the college(s) of your choice?	❒	❒	❒	❒	❒

14. Do you plan to go to college?

❒ Yes – I plan to attend a 4-year college.
❒ Yes – I plan to attend a 2-year college.
❒ No.
❒ I haven't decided.

If no:

Why don't you plan to attend college? (textbox)

If yes:

14a. How likely are you to do the following:

	Very Unlikely	Unlikely	Possibly	Likely	Very Likely
Take science classes in college	❒	❒	❒	❒	❒
Take math classes in college	❒	❒	❒	❒	❒
Take engineering classes in college	❒	❒	❒	❒	❒
Take technology classes in college	❒	❒	❒	❒	❒

14b. How has the DRITA course helped you prepare for college?

14e. Which colleges/universities are you interested in attending?

15. What is the *one job* you want to have *the most* when you are 30 years old? (Write only one)

1.

16. How far do you think you will need to go in school to be able to do this job? (Pick one)

❒ High school degree
❒ Some vocational or technical education
❒ 2-year college degree
❒ 4-year college degree
❒ Master's degree
❒ Professional degree
❒ Ph.D. or M.D.
❒ I don't know

17. What are *three* different classes you will have to take in school to do this job? If you can't think of three, type "I don't know" in the extra spaces.

a.

b.

c.

18. How likely are you to do the following:

	Very Unlikely	Unlikely	Possibly	Likely	Very Likely
Pursue a career in science	❒	❒	❒	❒	❒
Pursue a career in math	❒	❒	❒	❒	❒
Pursue a career in engineering	❒	❒	❒	❒	❒
Pursue a career in technology	❒	❒	❒	❒	❒

19. As you think about your future career plans, in what ways has the DRITA program helped prepare you for what you want to do?

20. Now that you have taken some DRITA courses, which of the following do you think you might like to use in a future job? (Check all that apply)

❒ Networking skills
❒ Programming skills
❒ Animation skills
❒ Web design skills
❒ Robotics skills
❒ Geographic Information Systems (GIS) skills

❒ Other; _____

21. How interested are you in learning more about each of the following?

	Not Interested	Somewhat Interested	Not sure	Interested	Very Interested
Multimedia	❒	❒	❒	❒	❒
Web Design	❒	❒	❒	❒	❒
Programming	❒	❒	❒	❒	❒
Networking	❒	❒	❒	❒	❒
Hardware	❒	❒	❒	❒	❒
Animation	❒	❒	❒	❒	❒
Gaming Design	❒	❒	❒	❒	❒
Robotics	❒	❒	❒	❒	❒
GIS	❒	❒	❒	❒	❒

FEEDBACK ABOUT DRITA

22. Please write one or two sentences to tell us what you thought about the GIS course you took this summer. What did you like?

22b. What didn't you like?

23. Now please share your feedback about the Summer Internship. What did you like about that experience?

23b. What didn't you like?

24. As your final year in the DRITA program, what do you think of the program overall? Please also share any final suggestions you have to help improve the program.

Appendix E: 2009 End of Year Survey – Cohort 2

DRITA 2009
Year 2 Feedback Survey – Cohort 2

Name _____

FEEDBACK ABOUT DRITA

1. If you were describing the DRITA program to a friend, what one or two sentences would you use to tell them what the program is about?

2. How much have you enjoyed DRITA this year?

❒ Not at all ❒ A Little ❒ A Moderate Amount ❒ Quite a Bit ❒ A Great Deal

3. How have you benefited from being part of the DRITA program this year? (*Check all that apply*.)

❒ I have had fun.
❒ I have had a positive educational experience.
❒ I learned about technology.
❒ I gained skills to use in a career.
❒ I became more interested in technology.
❒ I was able to spend time with friends.
❒ I was able to make new friends.
❒ I learned about career options.
❒ Other (*please describe*) _____
❒ None of the above

4. How much have you learned from the program this year?

❒ Nothing ❒ A Little ❒ A Moderate Amount ❒ Quite a Bit ❒ A Great Deal

5. What has been your favorite thing about the DRITA program this year?

YOUR EXPERIENCES WITH TECHNOLOGY

6. Typically, how many days *per week* do you use a computer <u>outside of school</u>? (Pick one.)

❒ 0 days ❒ 1 day ❒ 2 days ❒ 3 days ❒ 4 days ❒ 5 days ❒ 6 days ❒ 7 days

7. Since starting the DRITA program, which of the following computer resources have you used <u>on your own time</u> (that is, not as part of a school assignment or as part of DRITA). (*Check all that apply*.)

❒ Search engines (Google, Yahoo, Ask, etc.)
❒ Email
❒ Instant Messaging
❒ Computer games (including online)
❒ Map Web sites (mapquest, googlemaps, etc.)
❒ MySpace
❒ Chat rooms
❒ Photo editing software
❒ Blogs
❒ Wikis
❒ Programming software
❒ Facebook

❒ E-commerce/shopping (shopping, purchasing music, e-auction, etc.)
❒ I have not used any of these on my own time.

8. Since you started the DRITA program, which of the following have you done <u>on your own time</u> (that is, not as part of a school assignment or as part of DRITA)? (*Check all that apply*.)

❒ Installed software
❒ Installed a peripheral
❒ Created computer animation
❒ Created a web page
❒ Designed a computer game
❒ Built a robot
❒ Computer programming
❒ Networked computers
❒ Installed hardware
❒ Created a virtual environment
❒ I have not done any of these activities on my own time.

9. How strongly do you agree or disagree with each of the following statements?

	Strongly disagree	Disagree	Not sure	Agree	Strongly agree
I like science.	❒	❒	❒	❒	❒
I enjoy learning science.	❒	❒	❒	❒	❒
Science is boring.	❒	❒	❒	❒	❒
I am good in science.	❒	❒	❒	❒	❒
I enjoy learning about technology.	❒	❒	❒	❒	❒
I like using new technology.	❒	❒	❒	❒	❒
I am good at using technology.	❒	❒	❒	❒	❒
Learning about technology is boring.	❒	❒	❒	❒	❒

YOUR FUTURE EDUCATION PLANS

10. How likely are you to do the following:

	Class is Not Offered at my School	Very Unlikely	Unlikely	Possibly	Likely	Very Likely
Take advanced science classes this year in school	❒	❒	❒	❒	❒	❒
Take advanced math classes this year in school	❒	❒	❒	❒	❒	❒
Take engineering classes this year in school	❒	❒	❒	❒	❒	❒
Take advanced technology classes this year in school	❒	❒	❒	❒	❒	❒

11. Does your high school offer advanced placement (AP) technology classes?

❒ Yes ❒ No ❒ Don't know

If yes:

11a. What courses are offered?

12. If you are taking any advanced classes this year, please list them here. If you are not, please type "None."

13. Do you plan to pursue an advanced high school diploma? (To earn an Advanced Studies Diploma, students must earn at least 24 standard units of credit and at least nine verified units of credit.) ❒ Yes ❒ No ❒ Don't know

If yes:

13a. Have you started taking the extra classes you will need to earn your advanced diploma? ❒ Yes ❒ No

If yes:

13b. What classes have you taken?

If no:

13c. When do you plan to begin taking the classes you will need to earn your advanced diploma?

14. Please respond to the questions in the table below.

	Not at all	A little	Somewhat	Very	Extremely
How confident are you that you will earn a high school diploma?	❒	❒	❒	❒	❒
How interested are you in attending a 4-year college?	❒	❒	❒	❒	❒
How prepared do you feel to apply to the college(s) of your choice?	❒	❒	❒	❒	❒
How confident are you that you can get accepted into the college(s) of your choice?	❒	❒	❒	❒	❒

14. Do you plan to go to college?

❒ Yes – I plan to attend a 4-year college.
❒ Yes – I plan to attend a 2-year college.
❒ No.
❒ I haven't decided.

If no:

Why don't you plan to attend college? (textbox)

If yes:

14a. How likely are you to do the following:

	Very Unlikely	Unlikely	Possibly	Likely	Very Likely
Take science classes in college	❒	❒	❒	❒	❒
Take math classes in college	❒	❒	❒	❒	❒
Take engineering classes in college	❒	❒	❒	❒	❒
Take technology classes in college	❒	❒	❒	❒	❒

14b. How has the DRITA course helped you prepare for college thus far?

14c. What information would you like to learn about applying to college?

14d. What concerns do you have about applying for college?

14e. Which colleges/universities are you interested in attending?

YOUR FUTURE CAREER PLANS

15. What is the *one job* you want to have *the most* when you are 30 years old? (Write only one)

1.

16. How far do you think you will need to go in school to be able to do this job? (Pick one)

❒ High school degree
❒ Some vocational or technical education
❒ 2-year college degree
❒ 4-year college degree
❒ Master's degree
❒ Professional degree
❒ Ph.D. or M.D.
❒ I don't know

17. What are *three* different classes you will have to take in school to do this job? If you can't think of three, type "I don't know" in the extra spaces.

a.

b.

c.

18. How likely are you to do the following:

	Very Unlikely	Unlikely	Possibly	Likely	Very Likely
Pursue a career in science	❒	❒	❒	❒	❒
Pursue a career in math	❒	❒	❒	❒	❒
Pursue a career in engineering	❒	❒	❒	❒	❒
Pursue a career in technology	❒	❒	❒	❒	❒

19. What other jobs are you interested in learning about as part of the DRITA program?

LOOKING FORWARD

As you may know, the next DRITA workshop series is focused on college and careers. Later in the year you will also have the chance to take new technology workshops. The information you provide in this section will be used to help plan for these experiences.

20. Now that you have taken some DRITA courses, which of the following do you think you might like to use in a future job? (Check all that apply)

❒ Networking skills
❒ Programming skills
❒ Animation skills
❒ Web design skills
❒ Robotics skills
❒ Other; _____

21. How interested are you in learning more about each of the following?

	Not Interested	Somewhat Interested	Not sure	Interested	Very Interested
Multimedia	❒	❒	❒	❒	❒
Web Design	❒	❒	❒	❒	❒
Programming	❒	❒	❒	❒	❒
Networking	❒	❒	❒	❒	❒
Hardware	❒	❒	❒	❒	❒
Animation	❒	❒	❒	❒	❒
Gaming Design	❒	❒	❒	❒	❒
Robotics	❒	❒	❒	❒	❒

22. What would you like to learn from DRITA this year that you have not learned in other technology or DRITA classes?

23. Please write one or two sentences to tell us what you thought about the Robotics course you took this summer. What did you like?

23b. What didn't you like?

24. Now please share your feedback about the Summer Internship. What did you like about that experience?

24b. What didn't you like?

25. Please share any final suggestions you have for the coming year.

Appendix F: 2009 End of Year Survey – Cohort 3

DRITA 2009
Year 1 Feedback Survey – Cohort 3

Name _____

FEEDBACK ABOUT DRITA

1. If you were describing the DRITA program to a friend, what one or two sentences would you use to tell them what the program is about?

2. How much have you enjoyed DRITA thus far?

❒ Not at all ❒ A Little ❒ A Moderate Amount ❒ Quite a Bit ❒ A Great Deal

3. How have you benefited from being part of the DRITA program thus far? (*Check all that apply*.)

❒ I have had fun.
❒ I have had a positive educational experience.
❒ I learned about technology.
❒ I gained skills to use in a career.
❒ I became more interested in technology.
❒ I was able to spend time with friends.
❒ I was able to make new friends.
❒ I learned about career options.
❒ Other (*please describe*) _____
❒ None of the above

4. How much have you learned from the program thus far?

❒ Nothing ❒ A Little ❒ A Moderate Amount ❒ Quite a Bit ❒ A Great Deal

5. What has been your favorite thing about the DRITA program thus far?

YOUR EXPERIENCES WITH TECHNOLOGY

6. Typically, how many days *per week* do you use a computer <u>outside of school</u>? (Pick one.)

❒ 0 days ❒ 1 day ❒ 2 days ❒ 3 days ❒ 4 days ❒ 5 days ❒ 6 days ❒ 7 days

7. Since starting the DRITA program, which of the following computer resources have you used <u>on your own time</u> (that is, not as part of a school assignment or as part of DRITA). (*Check all that apply*.)

❒ Mapping web sites (MapQuest, Yahoo! Maps, etc.)
❒ Photo editing software
❒ Programming software
❒ Chat rooms
❒ Email
❒ Blogs
❒ Instant messaging
❒ Wiki's
❒ Computer games (including online)
❒ E-commerce sites (shopping, purchase music, e-auction, etc.)
❒ Online search engine (Google, Yahoo, Ask, etc.)
❒ I have not used any of these on my own time.

8. Since you started the DRITA program, which of the following have you done <u>on your own time</u> (that is, not as part of a school assignment or as part of DRITA)? (*Check all that apply*.)

❒ Created computer animation
❒ Built a robot
❒ Created a virtual environment
❒ Designed a computer game
❒ Computer programming
❒ Network two computers together
❒ Installed software
❒ Installed hardware (hard drive, memory, sound card, etc.)
❒ Installed a peripheral (scanner, printer, etc.)
❒ Created a web page
❒ I have not done any of these activities before.

9. How strongly do you agree or disagree with each of the following statements?

	Strongly disagree	**Disagree**	**Not sure**	**Agree**	**Strongly agree**
I like science.	❒	❒	❒	❒	❒
I enjoy learning science.	❒	❒	❒	❒	❒
Science is boring.	❒	❒	❒	❒	❒
I am good in science.	❒	❒	❒	❒	❒
I enjoy learning about technology.	❒	❒	❒	❒	❒
I like using new technology.	❒	❒	❒	❒	❒
I am good at using technology.	❒	❒	❒	❒	❒
Learning about technology is boring.	❒	❒	❒	❒	❒

10. Next, how strongly do you agree or disagree with each of the following statements?

	Strongly disagree	Disagree	Not sure	Agree	Strongly agree
Math is useful for solving everyday problems.	❒	❒	❒	❒	❒
I am good in math.	❒	❒	❒	❒	❒
I think I will take advanced math classes in high school.	❒	❒	❒	❒	❒
I like math.	❒	❒	❒	❒	❒
I won't need to know about math when I grow up.	❒	❒	❒	❒	❒
Engineering is boring.	❒	❒	❒	❒	❒
It would be fun to be an engineer.	❒	❒	❒	❒	❒
I think I will take engineering classes in college.	❒	❒	❒	❒	❒
I might pursue a career in engineering.	❒	❒	❒	❒	❒
Most people my age think engineering is cool.	❒	❒	❒	❒	❒

10. How likely are you to do the following:

	Class is Not Offered at my School	Very Unlikely	Unlikely	Possibly	Likely	Very Likely
Take advanced science classes this year in school	❒	❒	❒	❒	❒	❒
Take advanced math classes this year in school	❒	❒	❒	❒	❒	❒
Take engineering classes this year in school	❒	❒	❒	❒	❒	❒
Take advanced technology classes this year in school	❒	❒	❒	❒	❒	❒

11. Does your high school offer advanced placement (AP) technology classes?

❒ Yes ❒ No ❒ Don't know

If yes:

11a. What courses are offered?

12. If you are taking any advanced classes this year, please list them here. If you are not, please type "None."

13. Do you plan to pursue an advanced high school diploma? (To earn an Advanced Studies Diploma, students must earn at least 24 standard units of credit and at least nine verified units of credit.) ❒ Yes ❒ No ❒ Don't know

If yes:

13a. Have you started taking the extra classes you will need to earn your advanced diploma? ❒ Yes ❒ No

If yes:

13b. What classes have you taken?

If no:

13c. When do you plan to begin taking the classes you will need to earn your advanced diploma?

EDUCATION

14. Please respond to the questions in the table below.

	Not at all	A little	Somewhat	Very	Extremely
How confident are you that you will earn a high school diploma?	❒	❒	❒	❒	❒
How interested are you in attending a 4-year college?	❒	❒	❒	❒	❒
How prepared do you feel to apply to the college(s) of your choice?	❒	❒	❒	❒	❒
How confident are you that you can get accepted into the college(s) of your choice?	❒	❒	❒	❒	❒

15. Do you plan to go to college?

❒ Yes – I plan to attend a 4-year college.
❒ Yes – I plan to attend a 2-year college.
❒ No.
❒ I haven't decided.

If no:

Why don't you plan to attend college?

If yes:

15a. How likely are you to do the following:

	Very Unlikely	Unlikely	Possibly	Likely	Very Likely
Take science classes in college	❒	❒	❒	❒	❒
Take math classes in college	❒	❒	❒	❒	❒
Take engineering classes in college	❒	❒	❒	❒	❒
Take technology classes in college	❒	❒	❒	❒	❒

15b. How has the DRITA course helped you prepare for college thus far?

15c. What information would you like to learn about applying to college?

15d. What concerns do you have about applying for college?

15e. Which colleges/universities are you interested in attending?

CAREERS

The next questions are about types of jobs and career fields you are interested in pursuing.

16. How likely are you to do the following:

	Very Unlikely	Unlikely	Possibly	Likely	Very Likely
Pursue a career in science	❒	❒	❒	❒	❒
Pursue a career in math	❒	❒	❒	❒	❒
Pursue a career in engineering	❒	❒	❒	❒	❒
Pursue a career in technology	❒	❒	❒	❒	❒

17. What is the *one job* you want to have *the most* when you are 30 years old? (Write only one)

1.

18. How far do you think you will need to go in school to do this job? (Pick one)

❒ High school degree
❒ Some vocational or technical education
❒ 2-year college degree
❒ 4-year college degree
❒ Master's degree
❒ Professional degree
❒ Ph.D. or M.D.
❒ I don't know

19. List *three* different classes you will have to take in order to do this job? If you can't think of three, type "I don't know" in the extra spaces.

a.

b.

c.

20. Now that you have taken some DRITA courses, which of the following do you think you might like to use in a future job? (Check all that apply)

❒ Networking skills
❒ Programming skills
❒ Animation skills
❒ Web design skills
❒ Other; _____

21. What other jobs are you interested in learning about as part of the DRITA program?

LOOKING FORWARD

As you may know, the next DRITA workshop series is focused on college and careers. Later in the year you will also have the chance to take new technology workshops. The information you provide in this final section will be used to help plan for these experiences.

22. How interested are you in learning more about each of the following?

	Not Interested	Somewhat Interested	Not sure	Interested	Very Interested
Multimedia	❒	❒	❒	❒	❒
Web Design	❒	❒	❒	❒	❒
Programming	❒	❒	❒	❒	❒
Networking	❒	❒	❒	❒	❒
Hardware	❒	❒	❒	❒	❒
Animation	❒	❒	❒	❒	❒
Gaming Design	❒	❒	❒	❒	❒
Robotics	❒	❒	❒	❒	❒

23. What would you like to learn from DRITA this year, that you have not learned in other technology or DRITA classes?

24. Starting in January, the DRITA program will be offering the same courses that you completed last year to a new group of ninth graders. What suggestions would you make for how to improve each course?

Saturday Sessions _____

_____.

C++_____

_____.

Animation_____

_____.

25. Please share any final suggestions you have for the coming year.

Appendix G: 2009 Parent Feedback Survey – Cohort 1

DRITA 2009
Parent/Guardian Feedback Survey – Year 3 – Cohort 1

1. Your Name _____

2. Your DRITA student's name _____

3. In your opinion, how much has your student enjoyed DRITA?
❒ Not at all ❒ A Little ❒ A Moderate Amount ❒ Quite a Bit ❒ A Great Deal

4. What do you think your student has gained from this program? (*Check all that apply*.)
❒ Had fun
❒ Had a positive educational experience
❒ Learned about technology
❒ Learned about college options
❒ Gained skills to use in a career
❒ Became more interested in technology
❒ Was able to spend time with friends
❒ Was able to make new friends
❒ Became more interested in college
❒ Learned about career options
❒ Other (*please describe*) _____
❒ None of the above

5. Throughout the DRITA program, students and parents attended College and Career workshops. Was your student able to attend any of the sessions this year?
❒ Yes ❒ No

If yes, continue with #6 . If no, skip to #7.

6. What do you think your student gained from going to the College and Career workshops?

7. Were you able to attend any of the College and Career workshops this year with your student?
❒ Yes ❒ No

If yes, continue to # 8. If no, skip to #9.

8. How have these workshops helped you to begin preparing your student for college?

9. As part of DRITA this year, students went on a college tour to the James Madison University (JMU). Was your student able to go on the JMU tour? ❒ Yes ❒ No

If yes, continue with #10 . If no, skip to #13.

10. What do you think your student gained from going on the college tour with DRITA?

11. We know that some family members also participated in the JMU tour. Were you able to go on the tour with your student? ❒ Yes ❒ No

If yes, continue to # 12. If no, skip to #13.

12. How was the JMU tour most helpful to you?

13. During the one-week Geographic Information Systems (GIS) course this summer, how often did your student do each of the following: (*Check one response for each item.*)

	Never	**Once during the GIS course**	**Two or three times during the GIS course**	**Three or four times during the GIS course**	**Every day of the GIS course**
Talk about the technology used that day	❒	❒	❒	❒	❒
Mention that s/he had fun	❒	❒	❒	❒	❒
Complain about something that happened during the day	❒	❒	❒	❒	❒
Mention that s/he did *not* want to go back	❒	❒	❒	❒	❒
Share materials/projects from that day	❒	❒	❒	❒	❒
Ask you questions about what s/he did that day	❒	❒	❒	❒	❒
Try to do similar kinds of activities at home	❒	❒	❒	❒	❒

14. Please take a moment to tell us how your student described his/her experiences in the GIS course.

15. During the 70-hour internship your student completed this summer, how often did he/she: (*Check one response for each item.*)

	Never	Once or twice during the internship	Three or four times during the internship	Five or six times during the internship	Almost every day of the internship	Every day of the internship
Talk about the technology used that day	❒	❒	❒	❒	❒	❒
Mention that s/he had fun	❒	❒	❒	❒	❒	❒
Complain about something that happened during the day	❒	❒	❒	❒	❒	❒
Mention that s/he did *not* want to go back	❒	❒	❒	❒	❒	❒
Share materials/projects from that day	❒	❒	❒	❒	❒	❒
Ask you questions about what s/he did that day	❒	❒	❒	❒	❒	❒
Try to do similar kinds of activities at home	❒	❒	❒	❒	❒	❒

16. Please take a moment to tell us how your student described his/her internship experiences.

17. Over the course of the entire program, what DRITA activity do you think your student enjoyed the most?

18. What DRITA activity has been the most beneficial for your student this year?

19. Overall, how has the DRITA program meet your expectations?

❒ Has not met my expectations
❒ Has met my expectations
❒ Has exceeded my expectations

20. Please explain your rating.

21. In your opinion, what changes have you seen in your student as a result of being in the DRITA program?

22. What suggestions do you have for improving the DRITA program?

23. Please share any final comments you have about your student's experiences with DRITA.

Thank You!

Appendix H: 2009 Parent Feedback Survey – Cohort 2

DRITA 2009
Parent/Guardian Feedback Survey – Year 2 – Cohort 2

1. Your Name _____

2. Your DRITA student's name _____

3. In your opinion, how much has your student enjoyed DRITA thus far?
❒ Not at all ❒ A Little ❒ A Moderate Amount ❒ Quite a Bit ❒ A Great Deal

4. What do you think your student has gained from this program thus far? (*Check all that apply*.)

❒ Had fun
❒ Had a positive educational experience
❒ Learned about technology
❒ Learned about college options
❒ Gained skills to use in a career
❒ Became more interested in technology
❒ Was able to spend time with friends
❒ Was able to make new friends
❒ Became more interested in college
❒ Learned about career options
❒ Other (*please describe*) _____
❒ None of the above

5. As part of DRITA this year, students and parents attended a College and Career workshops. Was your student able to attend this session? ❒ Yes ❒ No

If yes, continue with #6 . If no, skip to #7.

6. What do you think your student gained from going to the College and Career workshops?

7. Were you able to attend the College and Career workshops with your student?
❒ Yes ❒ No

If yes, continue to # 8. If no, skip to #9.

8. How have these workshops helped you to begin preparing your student for college?

9. **As part of DRITA this year, students went on a college tour to the University of Virginia (UVA). Was your student able to go on the UVA tour?** ❒ Yes ❒ No

If yes, continue with #10 . If no, skip to #14.

10. **Was this the first college tour that your student has gone on?** ❒ Yes ❒ No

11. **What do you think your student gained from going on the college tour with DRITA?**

12. **We know that some family members also participated in the UVA tour. Were you able to go on the tour with your student?** ❒ Yes ❒ No

If yes, continue to # 13. If no, skip to #14.

13. **How was the UVA tour most helpful to you?**

14. **During the one-week Robotics course this summer, how often did your student do each of the following:** (*Check one response for each item.*)

	Never	**Once during the Robotics course**	**Two or three times during the Robotics course**	**Three or four times during the Robotics course**	**Every day of the Robotics course**
Talk about the technology used that day	❒	❒	❒	❒	❒
Mention that s/he had fun	❒	❒	❒	❒	❒
Complain about something that happened during the day	❒	❒	❒	❒	❒
Mention that s/he did *not* want to go back	❒	❒	❒	❒	❒
Share materials/projects from that day	❒	❒	❒	❒	❒
Ask you questions about what s/he did that day	❒	❒	❒	❒	❒
Try to do similar kinds of activities at home	❒	❒	❒	❒	❒

15. **Please take a moment to tell us how your student described his/her experiences in the Robotics course.**

16. During the 70-hour internship your student completed this summer, how often did he/she: (*Check one response for each item.*)

	Never	Once or twice during the internship	Three or four times during the internship	Five or six times during the internship	Almost every day of the internship	Every day of the internship
Talk about the technology used that day	❒	❒	❒	❒	❒	❒
Mention that s/he had fun	❒	❒	❒	❒	❒	❒
Complain about something that happened during the day	❒	❒	❒	❒	❒	❒
Mention that s/he did *not* want to go back	❒	❒	❒	❒	❒	❒
Share materials/projects from that day	❒	❒	❒	❒	❒	❒
Ask you questions about what s/he did that day	❒	❒	❒	❒	❒	❒
Try to do similar kinds of activities at home	❒	❒	❒	❒	❒	❒

17. Please take a moment to tell us how your student described his/her internship experiences.

18. What DRITA activity do you think your student enjoyed the most this summer?

19. What DRITA activity has been the most beneficial for your student this year?

20. So far, how has the DRITA program meet your expectations?

❒ Has not met my expectations
❒ Has met my expectations
❒ Has exceeded my expectations

21. Please explain your rating.

22. What suggestions do you have for improving the DRITA program?

23. Please share any final comments you have about your student's experiences with DRITA.

Thank You!

Appendix I: 2009 Parent Feedback Survey – Cohort 3

DRITA Saturday Sessions 2009
Parent/Guardian Feedback Survey Year 1 – Cohort 3

1. **Your Name** _____

2. **Your DRITA student's name** _____

3. **In your opinion, how much has your student enjoyed DRITA thus far?**
   ❒ Not at all ❒ A Little ❒ A Moderate Amount ❒ Quite a Bit ❒ A Great Deal

4. **What do you think your student has gained from this program thus far?** (*Check all that apply*.)
   ❒ Had fun
   ❒ Became more interested in technology
   ❒ Had a positive educational experience
   ❒ Was able to spend time with friends
   ❒ Learned about technology
   ❒ Was able to make new friends
   ❒ Gained skills to use in a career
   ❒ Learned about career options
   ❒ Other (*please describe*) _____
   ❒ None of the above

5. During the Basic IT Skills (BITS) Saturday Sessions, how often did your student do each of the following: (*Check one response for each item.*)

	Never	**Once during the Saturday Sessions**	**Two or three times during the Saturday Sessions**	**Three or four times during the Saturday Sessions**	**After every Saturday Session**
Talk about the technology used that day	❒	❒	❒	❒	❒
Mention that s/he had fun	❒	❒	❒	❒	❒
Complain about something that happened during the day	❒	❒	❒	❒	❒
Mention that s/he did *not* want to go back	❒	❒	❒	❒	❒
Share materials/projects from that day	❒	❒	❒	❒	❒
Ask you questions about what s/he did that day	❒	❒	❒	❒	❒
Try to do similar kinds of activities at home	❒	❒	❒	❒	❒

6. Over the Saturday Sessions, which activity do you think your student enjoyed the most?

7. During the Animation and C++ Summer Courses, how often did your student do each of the following: (*Check one response for each item.*)

	Never	Once during the Summer Courses	Two or three times during the Summer Courses	Three or four times during the Summer Courses	After every Summer Courses
Talk about the technology used that day	❒	❒	❒	❒	❒
Mention that s/he had fun	❒	❒	❒	❒	❒
Complain about something that happened during the day	❒	❒	❒	❒	❒
Mention that s/he did *not* want to go back	❒	❒	❒	❒	❒
Share materials/projects from that day	❒	❒	❒	❒	❒
Ask you questions about what s/he did that day	❒	❒	❒	❒	❒
Try to do similar kinds of activities at home	❒	❒	❒	❒	❒

8. Over all the Summer Courses, which activity do you think your student enjoyed the most?

9. So far, how has the DRITA program meet your expectations?

❒ Has not meet my expectations
❒ Has met my expectations
❒ Has exceeded my expectations

Please explain your rating.

10. Please share any final comments you would like to share about your student's experiences with DRITA.

Thank You!

Appendix J: 2009 College and Career Workshop Feedback Survey – Cohort 1

2009 DRITA Cohort 1
College Visit and College & Career Workshop Feedback Survey

College Visits

The first set of questions are about the college visits that you took to the University of Virginia (UVA) and James Madison University (JMU) last fall and spring.

1. Did the college visits influence your desire to attend a 4-year school? [radio button]

Yes
No

If so, why? If not, why not? [textbox]

2. Which did you enjoy more: the college visits in the spring or the fall? [radio button]

Spring
Fall
I didn't enjoy any of them.

3. Did the college visit in the *fall* influence which courses or after-school activities you chose for the following semester? [radio button]

Yes
No

4. Did the college visit in the *spring* influence which courses or after-school activities you chose for the following semester? [radio button]

Yes
No

5. Which of these colleges would you be interested in attending after you graduate high school? *(Please check all that apply.)* [check box]

University of Virginia
James Madison University
None of the Above

6. What other colleges would you be interested in visiting? [textbox]

College and Career Workshops

This second set of questions is about the College and Career workshops that you have had so far.

7. Overall, how helpful have the College and Career workshops been to you? *(Check one.)* [radio button]

Not at all
A Little
Somewhat
Very
Extremely

8. How helpful has the information that you have received on each of the following been to you?
[radio buttons]

	Not at all	A Little	Somewhat	Very	Extremely
The admissions process					
Curriculum planning					
Standardized testing					
College access					
Ways to pay for college					

9. What topics about college would you like more information about? [text box]

10. In your opinion, how helpful are the one-on-one sessions to discuss your PSAT scores and your high school curriculum? *(Check one.)* [radio button]

Not at all
A Little
Somewhat
Very
Extremely

11. What, if anything, would make the one-on-one counseling sessions more helpful to you? [textbox]

12. After attending the College & Career Workshop sessions, do you feel more or less likely to attend college than before you attended the sessions?
(Check one.) [radio button]

More likely than before the sessions
About the same as before the sessions
Less likely than before the sessions

Thank you for taking this survey!

Appendix K: 2009 College and Career Workshop Feedback Survey – Cohort 2

Cohort 2
College & Career Feedback Survey 2009

College Visits

The first set of questions are about the college visit that you took to the University of Virginia (UVA) last fall.

1. Did the college visit influence your desire to attend a 4-year school? [radio button]
Yes
No

If so, why? If not, why not? [textbox]

2. Did the college visit to UVA influence which courses or after-school activities you chose for the following semester? [radio button]
Yes
No

3. After visiting UVA, do you feel less or more *likely* to attend UVA than before you attended the sessions? *(Check one.)* [radio button]
Less likely than before the visit
About the same as before the visit
More likely than before the visit

4. What other colleges would you be interested in visiting? [textbox]

College and Career Workshops

This first set of questions is about the College and Career workshops that you have had so far.

5. Overall, how helpful have the College and Career workshops been to you? *(Check one.)* [radio button]
Not at all
A Little
Somewhat
Very
Extremely

6. Please briefly list three new things that you learned during the sessions. If you didn't learn anything new, please write "nothing."
[text box 1]
[text box 2]
[text box 3]

7. How helpful has the information that you have received on each of the following been to you? [radio buttons]

	Not at all	A Little	Somewhat	Very	Extremely

The admissions process					
Curriculum planning					
Standardized testing					
College access					
Ways to pay for college					

8. What topics about college would you like more information about? [text box]

9. In your opinion, how helpful are the one-on-one sessions to discuss your PSAT scores and your high school curriculum? *(Check one.)* [radio button]
Not at all
A Little
Somewhat
Very
Extremely

10. What, if anything, would make the one-on-one counseling sessions more helpful to you? [textbox]

11. After attending the College & Career Workshop sessions, do you feel less or more *likely* to attend college than before you attended the sessions? *(Check one.)* [radio button]
Less likely than before the sessions
About the same as before the sessions
More likely than before the sessions

12. After attending the College & Career Workshop sessions, do you feel less or more *confident* that you can attend college than before you attended the sessions? *(Check one.)* [radio button]
Less confident than before the sessions
About the same as before the sessions
More confident than before the sessions

13. After attending the College & Career Workshop sessions, do you have less or more *desire* to attend college than before you attended the sessions? *(Check one.)* [radio button]
Less desire than before the sessions
About the same as before the sessions
More desire than before the sessions

Thank you for taking this survey!

Appendix L: 2009 Student Interview – Cohort 3

DRITA Student Interview
Summer 2009

As you know, the DRITA program was designed to help students gain technology skills in several areas that will help them be prepared for college or future jobs. So far, you have attended several Saturday Sessions, completed a course on C++, and you are just finishing up your course on animation.

We want to ask you some questions about your impressions of the program so far, and what you think you have learned. We're trying to figure out if the program is giving you the skills that you need, so if you can't answer a question it's okay – that just means that the DRITA team might want to give all of you some more experiences with a certain skill. All your responses will be kept confidential, so feel free to be completely honest in your responses.

Saturday Session Questions

First of all, tell me what you thought about the Saturday Sessions.

Probe: What did you like and what didn't you like?

One of the things you did in your Saturday Sessions was build a network cable – you can see that we have the materials to build a cable here. If you were on a job interview and somebody asked you whether you could build a network cable, what would you tell them?

- ❒ That I could do it
- ❒ That I could *not* do it
- ❒ I might be able to do it

If they *could* or *might* be able to do it:

Go ahead and use the materials here to show me how to build one. If you can, tell me what you are doing as you go along. [Interviewer will check off steps as they are completed]

- ❒ Estimate how much cable you will need for your run and cut it
- ❒ Strip cable ends about 2 inches of the cable sheath

❒ Untwist the pairs - - don't untwist them beyond what you have exposed, the more untwisted cable you have the worse the problems you can run into.

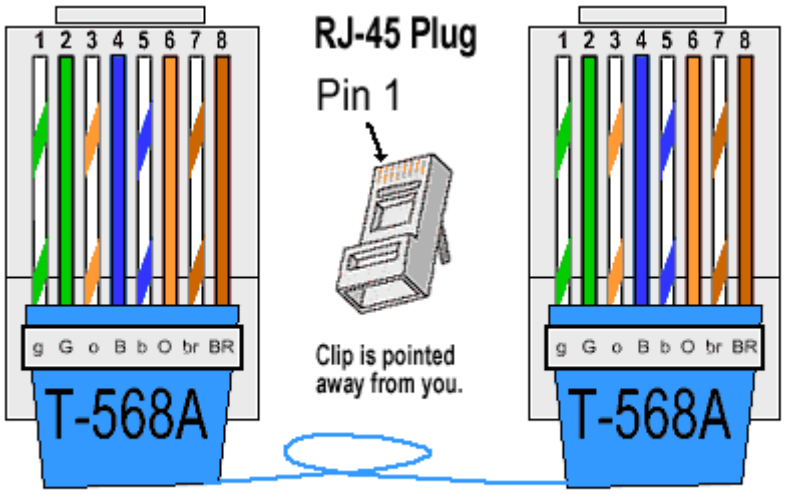
❒ Trim ends so they are even -- about 1/2" to 3/4" left exposed from the sheath.

❒ Insert the wires into the connector, visible to end -- make sure each wire is fully inserted to the front of the RJ45 end and in the correct order. The sheath of the cable should extend into the RJ45 end by about 1/2" and will be held in place by the crimp.

❒ Crimp the wires

❒ Repeat the above steps for the each end

❒ Test the cable to verify the proper connectivity of the cable.



Great – thanks for doing that. You may have noticed that the cable you just built is a 568a/568b cable. Why is it important to know what model of cable you are making?

❒ Correct answer: So the person on the other end of the building/hallway/wall/room knows what model they need to follow so your cable will work. So they can match in other words.

❒ Other answer:

Now let's talk about something else you did in your Saturday Sessions. I know you spent some time evaluating Web sites and thinking about Web design. Do you think you would still be able to do a thorough evaluation of a Web site's design?

❒ Yes
❒ No
❒ Maybe

If *yes* or *maybe*:

[Take student to the following Web site: http://www.wired.com/]

Take a look at this Web site. How is it laid out? That is, what can you tell me about the use of columns and rows in it's design?

❒ Top: 2 columns, 2 rows
❒ Middle: 3 columns, 7 rows or they could view it as 3 columns and 1 big row
❒ Bottom: This will probably change looking at the content, but I would just look for 2 columns there.

❒ Partial answer from above:

❒ Other answer:

What are the notable characteristics of this site's design? [Check those that are mentioned]

❒ White background and black text (most common style)
❒ Big bold titles to catch the eye
❒ Intriguing pictures to catch interest
❒ For the most part, a simple layout
❒ Use of graphics on the page (graphics are homemade so to speak: text headers, the WIRED logo at the top, logos, symbols and design aspects)
❒ Use of images on the page (images are of course from cameras and scanners and there are lots of these on the page.
❒ (Advanced) static content – nothing is changing (ads, scrolling text, embedded video, etc.)

C++

This week you are finishing your C++ course. What did you think about that course?

Probe: What did you like and what didn't you like?

Now let's talk about the programming you did in your C++ course. We have some code here about getting a triangles measurement. Do you think you could open the code file?

❒ Yes
❒ No
❒ Maybe

If *yes* or *maybe*:

Go ahead and open the C++ problem file in the shared DRITA folder.

❒ Student was able to open both files.
❒ Student was able to open game project file only.
❒ Student was able to open code file only.
❒ Student was not able to open either file.

If *no:*

Okay, let me open the files and then I'll ask you a different kind of question.

For all:

This code has some errors. If you were in a job interview and somebody asked you to fix the errors, do you think you could do it?

- ❒ Yes
- ❒ No
- ❒ Maybe

If *yes* or *maybe*:

Great. What I'd like you to do is to fix the errors. [Check all that apply.]

- ❒ Change % to #
- ❒ Enclose the <iostream>
- ❒ Add area1; after return
- ❒ Add double base; before cout
- ❒ Add ; after cout statement
- ❒ Move {curly} to the end

Now can you show me what you would do to build and fix any errors in your code? [Check the appropriate box below. Then note the result of using this code below]

- ❒ Student was able to run "Follow menu Build > Rebuild Solution."
- ❒ Student was not able to run "Follow menu Build > Rebuild Solution."

Record the result of the "Follow menu Build > Rebuild Solution" here.

- ❒ There were no errors.
- ❒ Student was able to fix errors without the hint.
- ❒ Student was able to fix errors with the hint.
- ❒ Student was not able to fix errors.

Great. Now can you run the program so we can see if it works?

- ❒ Student was able to run the game without the hint.
- ❒ Student was able to run the game with the hint.

Animation

My final questions are about the animation course you are doing this week. What are your opinions about the animation course?

Probe: What do you like and what don't you like?

As a result of taking the course, would you comfortable trying to create a computer model of an object, like a rocking chair, for example?

- ❒ Yes

❒ No
❒ Maybe

If *yes* or *maybe*:

Can you please go into the shared drive and pull up the file for an object you created this week that could be animated? Can you tell me the different steps you needed to take to make this object?

❒ Start with a cube
❒ Extruded the same cube many times to begin to flesh out the pieces of the rocking chair such as the legs, arm rests and back supports.
❒ Scaled the same cube many times to begin to flesh out the pieces of the rocking chair such as the legs, arm rests and back supports.
❒ Moved the same cube many times to begin to flesh out the pieces of the rocking chair such as the legs, arm rests and back supports.
❒ Duplicated the same cube many times to begin to flesh out the pieces of the rocking chair such as the legs, arm rests and back supports.
❒ A few of the pieces have slightly more shape to them than just a basic cube... such as the rocking bars, and the decorative headpiece at the top... these pieces would have to have edge loops added to them so that the vertices can be moved around to create those shapes.
❒ The chair is simply made out of several basic cubes.

Notes about the object:

Do you think you would be able to animate the object?

❒ Yes
❒ No
❒ Maybe

If *yes* or *maybe*:

Go ahead and try to animate the object. If you can, tell me what you are doing as you go. [Check the steps that students mention as they animate the object. At the end, note if they were successful.]

❒ First off... the chair is made out of several different pieces. All of those pieces will have to be combined into one solid piece so that it can be animated as a whole chair.
❒ Then the center pivot of the chair should be positioned somewhere on the floor between the two rocker bars.

Finally all that is left to do is to...

- ❒ Rotate the chair back and set a key at the beginning of the timeline
- ❒ Rotate the chair forward and set a key in the middle of the timeline
- ❒ Rotate the chair back to the first position and set another key at the end of the timeline
- ❒ The student should be able to hit play at this point and watch the chair rock.

- ❒ Check here if student was able to make object move.
- ❒ Check here if student was not able to make object move.

What are the kinds of jobs that you could do with animation skills?

- ❒ Make cartoons
- ❒ Make movies
- ❒ Design graphics for product boxes

Appendix M: 2009 Cohort 1 Focus Group Protocol

DRITA COHORT 1 FOCUS GROUP
2009 (YEAR 3)
June 23, 2009, noon-1

Introductions

Hi to all. My name is Lori/Miriam and I work with Goodman Research Group. It's nice to see you all again. You probably remember me from the first two years of visiting the DRITA program. Over the years we've asked you to fill out surveys about your perceptions of the DRITA program. Today, we are hosting a discussion group to get more detailed feedback about your DRITA experiences, since some things are easier to ask about in person than in surveys.

We would like to hear from you in your own voices because your ideas as a group will be extremely helpful for knowing what has worked well and what didn't work well during the three years you have been in the program. Your feedback is confidential, and we do not use names in reporting what we learn.

We are tape recording to be sure we have all your ideas. Your feedback will contribute to the story of the first cohort of the DRITA program!

Before we begin, we just want to go over some quick ground rules. I think we've all been in school long enough to know them. But just as a reminder:

(1) PLEASE LISTEN TO US AND EACH OTHER

(2) PLEASE SPEAK ONE AT A TIME

(3) WE ASK TO HEAR FROM ALL OF YOU. If one person isn't speaking up, we might call on you. We don't do this to pick on you, it's just to make sure everyone gets a chance to be heard.

Do you have any questions? Let's get started…

DRITA Impacts

First, we'd like to hear about how DRITA has influenced various parts of your life.

1. In what ways has DRITA made a difference in your life? *(Probe for changes in career, interest in college, interest in Science, Technology, Engineering or Math)*

2. Would you say your attitude toward Science, Technology, Engineering or Math fields has changed since you started the program? If so, in what ways? And, which parts of the program contributed the most to this change?

3. Would you say your attitude toward going to college has changed since you started the program? If so, in what ways? And, which parts of the program contributed the most to this change?

4. What have you enjoyed the most about this program?

5. What have you enjoyed the least?

6. In your opinion, has the program prepared you for your future? If so, in what ways? What skills has the program provided you with? *(Probe for workforce skills, basic knowledge in IT, job etiquette, etc)*

7. Think back to your first day of the program. How are your feelings about the program now different from what they were when you first started the program?

DRITA Program Components

Now we have some questions about specific parts of the program, like the course, the internships and the college visits.

8. So far you should have taken courses in BITS, C++, Animation, Robotics and today you start GIS. What have you liked or disliked about the DRITA courses?
    a. Have you used the knowledge from these DRITA courses in other DRITA activities (like internships) or in your personal life? If so, in what ways?

9. What did you think of your course instructors?

10. What did you think of your Year 2 Internship? What did you like or dislike about it?

11. What do you think of your current internship (Year 3)? How does it compare with Year 2? What do you like or dislike about it?
    a. Has either the internship or your courses helped you develop an interest in an IT profession? If so, which one(s)?

12. How do the courses compare with the internship experiences? Do you feel like you used what you learned in the courses during your internship?

13. What did you think of the college visits?
    a. Were you satisfied with the schools you visited or would you prefer different schools? If so, which schools?
    b. Would you consider attending one of the colleges you visited? Why or why not?

14. The program also offered a MathLab and tutoring services. For those of you who used either of these services, how helpful were they?
    a. How could they have been more helpful?
    b. For those who didn't use them, why didn't you?

Moving Forward

Finally, I have last few questions about how the DRITA program might proceed in the future.

15. If you had to create another program with DRITA's same purpose and goals, which parts would you keep from this program to put in the new one?

    a. Which would you take out?

    b. What would you add? *(Probe for STEM-related courses or internship options)*

16. If the program were to continue up until the end of your first year in college, what supports/activities would you want the program to offer you?

Appendix N: 2009 Cohort 2 Focus Group Protocol

DRITA COHORT 2 FOCUS GROUP
2009 (YEAR 2)
June 22, 2009, noon-1

Introductions

Hi to all. My name is Lori/Miriam and I work with Goodman Research Group. It's nice to see you all again. You probably remember me from my visit to the program last year. Over the years we've asked you to fill out surveys about your perceptions of the DRITA program. Today, we are hosting a discussion group to get more detailed feedback about your DRITA experiences, since some things are easier to ask about in person than in surveys.

We would like to hear from you in your own voices because your ideas as a group will be extremely helpful for knowing what has worked well and what didn't work well during the two years you have been in the program. Your feedback is confidential, and we do not use names in reporting what we learn.

We are tape recording to be sure we have all your ideas. Your feedback will contribute to the story of the first cohort of the DRITA program!

Before we begin, we just want to go over some quick ground rules. I think we've all been in school long enough to know them. But just as a reminder:

(4) PLEASE LISTEN TO US AND EACH OTHER

(5) PLEASE SPEAK ONE AT A TIME

(6) WE ASK TO HEAR FROM ALL OF YOU. If one person isn't speaking up, we might call on you. We don't do this to pick on you, it's just to make sure everyone gets a chance to be heard.

Do you have any questions? Let's get started…

DRITA Impacts

First, we'd like to hear about how DRITA has influenced various parts of your life.

17. In what ways has DRITA made a difference in your life? *(Probe for changes in career, interest in college, interest in Science, Technology, Engineering or Math)*

18. Would you say your attitude toward Science, Technology, Engineering or Math fields has changed since you started the program? If so, in what ways? And, which parts of the program contributed the most to this change?

19. Would you say your attitude toward going to college has changed since you started the program? If so, in what ways? And, which parts of the program contributed the most to this change?

20. What have you enjoyed the most about this program?

21. What have you enjoyed the least?

22. Think back to your first day of the program. How are your feelings about the program now different from what they were when you first started the program?

DRITA Program Components

Now we have some questions about specific parts of the program, like the course, the internships and the college visit.

23. So far you should have taken courses in BITS, C++, Animation, Robotics and today you start GIS. What have you liked or disliked about the DRITA courses?

24. What did you think of your course instructors?

25. What do you think of your current internship (Year 2)? What do you like or dislike about it?

26. How do the courses compare with the internship experiences? Do you feel like you used what you learned in the courses during your internship?

27. What did you think of the college visit?
    a. Were you satisfied with the school you visited? If not, which other schools?

28. The program also offered a MathLab and tutoring services. For those of you who used either of these services, how helpful were they?
    a. How could they have been more helpful?
    b. For those who didn't use them, why didn't you?

Moving Forward

Finally, I have a last few questions about how the DRITA program might proceed in the future.

29. If you had to create another program with DRITA's same purpose and goals, which parts would you keep from this program to put in the new one?

    c. Which would you take out?

    d. What would you add? *(Probe for STEM-related courses or internship options)*

Appendix O: 2009 Focus Group Protocol for Parents of Cohort 1 Students

Protocol for Parents of Cohort 1 DRITA Students

Held at College & Career Day, June 19, 2009

Lorraine Dean, Research Consultant, and Miriam Kochman, Research Assistant of Goodman Research Group, Inc., will each conduct a one hour, semi-structured focus group with parents of Cohort 1 DRITA students. With the parent's consent, the discussions will be tape-recorded. Name tags will be used to identify participants.

I. Welcome/Overview/Survey

1 **GRG Introduction:** *My name is Lori/Miriam. I am with Goodman Research Group, an education research group in Cambridge, Massachusetts. We are the evaluators of the DRITA program.*

2 **Participant Introduction:** *Could we go around the room/table and have everyone say their name? I'd also like you to put on a nametag so that I can use your names during our discussion. And, I'm also sending around a sign-in sheet so that I can remember who was here.*

1 **Statement of Purpose:** *The purpose of the discussions today is for us to take 30-45 minutes to hear about your experiences as parents of the first cohort of DRITA students. We'll summarize what we hear, and what you say will be used to help improve the program for future DRITA students and parents. I want you to know that what you say in this discussion is confidential; we will not use your individual names in our report to the museums.*

2 **Request to Tape-record:** *I'd like to tape this discussion so that I can listen to what you say and remember it without taking lots of notes. I'm the only one who would listen to the tape. Does anyone object to taping?*

3 **Ground Rules:** *Okay, a few ground rules before we get started. First, in some ways your experiences might be the same, but in other ways they might be different. I want to hear everyone's perspective, so please speak up if your experience is different than someone else's. Also, I want to hear from everyone, so if some people are talking a lot and other people aren't talking much, I might ask you if you have something to say.*

Let's get started!

General Impressions

First, I'd like to start off by hearing about your general impressions of the program over the past 3 years.

1. What are your general impressions of the DRITA program?

2. What do you feel are the strongest parts of the program?

3. What are areas of the program that need work?

Perceptions about Changes in DRITA Students

Your child is part of the first cohort ever of DRITA students. So far your child has: participated in courses on Basic IT Skills, Robotics, Animation, and C++; went on college tours; attended College & Career Workshops, Saturday Sessions and a Tech Expo to show off their work; and have been in an internship for Networking, Robotics, Computer Hardware or Graphic Design. Thinking back to when the program started 3 years ago…

4. Which elements of the program has your child been most excited about in the past 3 years?

5. Do you think your child's attitude toward Science, Technology, Engineering and Math changed over the past 3 years? If so, how?

6. What changes, if any, have you seen in your child's academic performance over the past 3 years?

    a. Has your child used DRITA's MathLab or tutoring services? If so, how helpful were those programs?

7. In what ways, If at all, has the program influenced your child's desired career path?

College and Career Workshops

Next I have a few questions on the College and Career Workshops you and your child have attended together.

8. In what ways, if at all, has the program influenced your child's desire to go to college?

9. Compared to 3 years ago, how confident is your child that he or she can go to college? *(If increased, probe about influence of program)*

10. For those who attended any of the College and Career workshops, how helpful were the College and Career Workshops for your own personal knowledge?

11. What did you think of the format of the sessions?

    a. Probe: Do you like that parents and students are separated? Is there enough time to cover all of the material? Do you have the opportunity to have all your questions answered?

Parent Involvement

We're over halfway done. Thanks for your cooperation so far. The next questions are about your involvement as a parent in the DRITA program.

12. Do you feel you are able to stay up-to-date about what's happening with DRITA?

    a. If at all, what would help keep you abreast of DRITA's upcoming events?

13. What do you think of the requirements for parent involvement? Was the program clear about what is expected of you has a parent? Was what they asked for reasonable to you?

14. What challenge have you faced in trying to support your student in this program over the past 3 years?

15. In what ways, if at all, could the program involve parents better?

Moving Forward

Finally, I have a few questions to hear your ideas on how the program should move forward.

16. If the program were to continue through your child's first year of college, what types of supports would you like the program to provide to you and your child?

Thank you for your time! Your answers are helpful to us and to the DRITA team.

Appendix P: 2009 BITS Content Assessment

BITS Assessment

1. **Computers talk in a digital language called ___.**
   - o DOS
   - o HTML code
   - o XML code
   - o binary code

2. **Windows XP is an example of a(n) –**
   - o graphics software
   - o operating system
   - o spreadsheet program
   - o word processing program

3. **When troubleshooting a computer problem start with ____.**
   - o control panel
   - o the software
   - o the cords and connections
   - o the hardware setup

4. **A student tells the teacher that his keyboard won't type. Which of the following steps would not help the teacher troubleshoot why the keyboard won't type?**
   - o Click an icon to see if a program will launch.
   - o Turn the monitor off and back on.
   - o Check to see if the keyboard is plugged into the computer securely and correctly.
   - o Press the caps lock key to see if the indicator light activates and deactivates when pressed.
   - o Plug the keyboard into another computer.

5. **What part of the computer is meant for storing files?**
   - o Memory
   - o CPU
   - o CD/DVD drive
   - o Hard drive

6. **This is a(n) ___?**

   - o speaker
   - o mouse
   - o digital camera
   - o USB storage device

7. **In relation to file size, put the following labels in order from smallest to largest.**

down arrow KB
down arrow up arrow GB
down arrow up arrow TB

down arrow up arrow B
down arrow up arrow MB
up arrow b

8. C**hoose the typical cable used to connect computers to a network.**
- Serial cable
- CAT 5
- USB cable
- IDE cable

9. **Security for a computer system should include all of the following except:**
- Anti-virus
- Spam
- Firewall
- Spyware

10. **From the list below, put a check in the box beside all the items that are considered to be storage devices.**
- Web site
- DVD
- Flash/USB
- Internet
- Windows
- Hard drive
- Server
- Floppy
- CD
- Memory

11. **What storage device is most convenient for transferring files from one place to another?**
- DVD
- USB/Flash
- Hard drive
- CD

12. **What item from the list would be the likely choice to back-up an entire computer system?**
- Hard drive
- CD
- USB
- DVD

13. **To save time, a person can select multiple files at once from a menu by using this keyboard key and a mouse click.**
- **Alt**
- Ctl
- Esc
- End

14. **IEEE 1394 is also known as __.**
- A wireless standard
- FireWire
- USB
- Internet Explorer

15. **When connecting a digital still camera to a computer, a person would probably us what type of cable?**
- FireWire
- IDE
- USB
- Ethernet

16. **When connecting a digital video camera to a computer, the preferred cable would be a ___.**
- Firewire
- IDE
- USB
- Ethernet

17. **Web pages are typically stored ___.**
- on servers
- on a web site
- on all of the above
- on the internet

18. **Web pages are written using a computer language known as ____.**
- ABC
- USB
- WEB
- HTML

19. **When creating web pages, it is critical to ___.**
- keep all files used for the pages in the same folder location
- pre-plan the sites layout, links, and colors
- all of the above
- think about what purpose the web page will serve

20. **A program used to display web pages is called ___.**
- all of the above are correct
- A web browser
- Firefox
- Internet Explorer

21. **GUI, pronounced goo-ee, stands for graphical user interface. What is a GUI?**
- a way to use computer programming to interact with the system
- an interface that allows graphics, menus, and a mouse to navigate the system
- a way to transfer pictures from computer to computer
- a gaming term used to describe competition between two users

22. **The ability to navigate from place to place in a website is capable because of items called ____.**
- URLs
- hyperlinks
- address bars
- frames

23. **Connecting two or more devices together to share information is called ____.**
- printing
- computing
- cabling
- networking

24. **(Blank) is the wiring standard for Ethernet networks.**
- 1024 G
- 568 A or B
- IEEE
- 268 A or B

25. **An IP address for a computer is most comparable to which of the following?**
- Social Security Number
- Phone number
- Zip code
- Birthday

26. **Each computer in the world can be uniquely identified by the manufacturer through its ___.**
- CPU
- IP Address
- NIC
- Mac address

27. **A MAC address of a computer is most comparable to which of the following?**
- date of birth
- cell phone
- Social Security Number
- Gender

28. **In terms of hardware for a computer, the letters NIC stand for ___.**
- Network Interface Card
- Network Internet Carrier
- Network Internet Card
- New Internet Computer

29. **Which of the following best describes the definition of a programming language?**
- A graphical user interface for making computations
- A language that computers render for running programs such as Word, Excel, and PowerPoint
- The way a computer connects to the internet
- A human created computer language used to write instructions for a computer

30. **Put a check in the box beside all of the items that are programming languages.**
- XML
- Access
- Flash
- Adobe
- C++
- HTML
- Publisher
- Java
- Visual Basic
- Excel

31. **What are the two most common types of programming errors?**
- Loop errors
- Inaccurate and Technical
- Procedural and Typos
- Syntax and Run Time

32. **Which of the following is not a basic term used when discussing programming languages?**
    - Methods
    - Loops
    - Variables
    - Token Rings
    - Functions

33. **Digital images are made up of tiny dots called ___.**
    - dots
    - points
    - pixels
    - cells

34. **Which of the following is NOT necessary to videoconference with a friend?**
    - Video conference software
    - Computer with internet access
    - DVD player
    - Webcam w/mic

Appendix Q: 2009 C++ Content Assessment

C++ Assessment

1. Which of the following are valid C++ identifiers?

[A] _grade
[B] return
[C] b234
[D] 3Numbers

2. A variable's scope

[A] determines where it can be used in a program.
[B] can be changed during run time
[c] should be assigned to zero at the end of the program
[D] must be declared before the main function.

3. Constants

[A] are variables whose values can't be changed.
[B] are identities with a fixed value
[C] must be defined before the main program
[D] can't be used in function

4. Which of the following objects and functions are used for Standard Input and Output in C++? Check all that apply.

[A] print
[B] cin
[C] cout
[D]getline

5. Using the following code snippet what is the value of "grade"?

```
int A=11, B=9, grade;
grade = A-- * B++;
```

[A] 20
[B] 99
[C] 32
[D] 100

6. What is the value of animal after the if statement is executed?

```
bool cat=true, dog=false;
bool animal;
if (cat && dog) {
animal = true;
} else
animal = false;
```

[A] true
[B] false
[C] dogcat
[D] catdog

7. A statement in a C++ program must end with

[A] a semicolon
[B] a period
[C] a coma
[D] a verb

8. What is the value of X after the loop has terminated?

```
int X = 0;
for (int n=10; n>0; n)
  {
X = n;
}
```

[A] 10
[B] 19
[C] 1
[D] 0

9. A function
[A] is a group of statements.
[B] must not be empty
[C] should at least contain one variable
[D] must be called from some point in the main function of the program.

10. The following function returns what value?

```
void addNumber (int a, int b) {
int c;
c = a + b;
return;
}
```

[A] Value of c
[B] Value of a
[C] Nothing
[D] Depends on the values passed in

11. An array

[A] is many elements of different types placed in contiguous memory locations
[B] is accessed by the array name and an index
[C]start with an index of 1.
[D] will shrank if it is subtracted by one.

12. Which of the following sequence is correct

[A] Coding->Compiling->Program Execution
[B]Debugging -> Compiling -> Program Execution
[C]Compiling -> Program Execution -> Fix Syntax Errors
[D]Coding -> Program Execution -> Compiling

13. A syntax error will occur if

[A] The program is infinite looping
[B] A variable is not initialized to zero
[C] a function is defined but not called
[D] a variable is define twice in the main function

14. Which of the following is true

[A] A C++ program must have exactly one main function
[B] A C++ program could have more than two main functions
[C] A C++ program must call the main function at least once
[D] A C++ program must define the main function before any other function

15. A variable declared inside a function is called

[A] local variable
[B] global variable
[C] function variable
[D] temporary variable

16, The C++ compiler compiles the source code (.cpp file) into

[A] obj files and then to an executable file.
[B] class files and then to an object file
[C] object files then class files
[D] binary files then to a class file

17. Let m and n be two integer variables defined already, which of the following statement are legal:

[A] m+n;
[B] m+3;
[C] 3=n+m;

[D] n+m=4;

18. We have the following class and object definition:

```
class x{
int y;
int z;
};
x w;
```

Which of the following are correct:

[A] w.y=1;
[B] x.y=1;
[C]y.z=1;
[D] x.w=1;

Appendix R: 2009 Animation Content Assessment

Questions for the DRITA Animation Course

1. What is the purpose of the Maya program?

    A. To create objects and animation in 3-D
    B. To paint pictures digitally
    C. To make Web pages
    D. To create cartoons

2. What key on the keyboard is used in conjunction with the mouse buttons to move around in the 3D space in Maya?

    A. Alt
    B. Ctrl
    C. Del
    D. Page Up

3. What is the purpose of changing camera views in Maya while modeling?

    A. Making sure things are line dup the way you want.
    B. Making sure you get an accurate view of the objects in the scene.
    C. Making sure you have the cameras set up in an interesting way for the final renders.
    D. All of the above.

4. What skills do you need to be a really good animator?

    A. Observation
    B. Knowledge of software
    C. Interest in drawing
    D. Creativity
    E. A and D are correct
    F. A, C, and D are correct

5. What key on the keyboard would you press to set an animation keyframe?

    A. A
    B. S
    C. K
    D. Y

6. A polygon is made up of three things… Edges, Vertices, and _____.

    A. Triangles

B. Quads
C. Faces
D. Primitives

7. What is overlapping action?

A. The small movements just before the main action.
B. The small movements just after the main action.
C. The small movements in an animation.
D. The small movements that take place at the same time as the main action.

8. Which ones of these is NOT one of the principles of animation?

A. Squash and Stretch
B. Timing
C. Modeling
D. Anticipation

9. True or False. When doing anything in Maya (modeling, animation, etc) you should always pull ideas off the top of your head without looking at references. It is important to do what you know and not what you see.

A. True
B. False

10. True or False. The best technique for polygon modeling is to take primitives and stack them together like Lego blocks instead of trying to create it out of a single primative.

A. True
B. False

11. What is the UValue for a motion path control?

A. How curved the motion path is
B. The start and the end of the motion path
C. How many CVs are on the motion path
D. What object is attached to the motion path

12. What key on the keyboard would you press to scale the size of an object up or down?

A. Q
B. W
C. E
D. R

13. When holding a critique is important to:

A. Simply share your feelings
B. Give feedback constructively
C. Focus on the things that need to be changed
D. Praise the project without finding any faults

14. Which principle is particularly important for making an animated character jump?

A. Overlapping action
B. Modeling
C. The motion path
D. All of the above

15. What is the first thing you need to decide when trying to make an animated character walk?

A. Deciding the pace of the walk you are creating
B. Model the walk path
C. Rigging the character's body
D. Texturing the character

16. What does the channel box do?

A. It helps you animate a character to make it move around.
B. It helps you texture a character to make it look more real.
C. It helps you set an object along a motion path.
D. It helps you type in values for an object's attributes.

17. What window do you open to start assigning textures to objects?

A. The hypershader
B. The outliner
C. The channel box
D. The texturer

18. Why do you want to avoid surface violating when modeling?

A. It makes your animation look less realistic.
B. It causes problems when you try to animate and texture a character.
C. It slows down the Maya program.
D. It makes your textures disappear.

Appendix S: 2009 Robotics Content Assessment

Questions for the DRITA Robotics Course

1. What is a robot?

a. A device used to store massive amounts of information
b. A device used to perform a particular task
c. A device used to perform computational analyses
d. A device used to run programs

2. What is a benefit of using robots?

a. They are easily manufactured and programmed.
b. They require little maintenance.
c. They can do tasks that people can't do.
d. They are inexpensive to build.

3. Robots are used for all of the following EXCEPT:

a. To mine coal
b. To dispose of bombs
c. To inspect sewers
d. To weld

4. What is the rotation amount for the servo module?

- 90° total
- 270° total
- 180° CCW and CW from starting point
- **90° CCW and CW from starting point**

5) In the programming of the motor modules, full forward speed is:

- 325
- **255**
- 360
- 500

6) If the robot is given the command to make a CCW “donut”, what are the values the controller module signal sends to the motors?

- R=360, L=0
- R=0, L=360
- **R=255, L=0**
- R=0, L= 255

7) What is the purpose of the clutch post?

- Prevent slippage
- Engage the motor
- **Prevent damage to motor gearing**
- Over speed protection

8) Given the 12-tooth, 36-tooth and the 60-tooth gears, if two gears are meshed with one mounted to the motor shaft and the other to the wheel shaft, what combination will resulting the greatest speed at the wheels?

- **12 tooth on wheel, 60 tooth on motor**
- 60 tooth on wheel, 12 tooth on motor
- 36 tooth on wheel, 60 tooth on motor
- 60 tooth on wheel, 36 tooth on motor

9) In which port should the receiver cable plug into the controller?

- A/D
- **RX1**
- RX2
- Serial

10) When PGRM Status light is blinking amber, it indicates:

- Program fault
- Program in Run mode
- Program ready mode
- **Programming enable mode**

11) What lights indicate robot in single operator mode and functioning properly? Select all that apply.

- **Batt Power**
- **Pgrm status**
- **Rx1 status**
- Rx2 status

12) What is the best choice of fastener for a joint that needs to move?

- Keps nut
- Flat washers
- **Nylok Nuts**
- Nylok washer

13) Robot is turned on and for the first 15 seconds will not respond to the remote. Why?

- Low battery
- Wrong channel crystal
- **Execution of Autonomous mode**
- CPU fault

14) What can be added to the robot to stop forward motion?

- **Bumper switch**
- Pivot bearing
- Lock plate
- Servo

15) Which programming language is used for the VEX robot?

- COBOL
- **Easy C**
- FORTRAN
- BASIC

16) In four-wheel drive mode, which motors are in unison with each other. Select all that apply.

- 2&8
- **3&8**
- **2&7**
- 3&7

17) What is the response of the robot when left and right motors are at value 127?

- Full forward
- Full reverse
- CCW loop
- **Stationary**

18) A Vexplorer motor cannot be used with a VEX controller. Why?

- VEX uses 2 pin, Vexplorer uses 3 pin
- **Vexplorer uses 2 pin, VEX uses 3 pin**
- Different voltages
- Different programming

Appendix T: 2009 GIS Content Assessment

Questions for the DRITA GIS Course

The acronym GIS stands for: (radio buttons)

A. Georeferencing Information Stations

B. Geocoding Image Systems

C. Geographic Information Systems [CORRECT ANSWER]

D. Geographic Image Systems

GIS is a way to: (radio buttons)

A. overlay different mapped features on top of each other to look at patterns of spatial phenomenon

B. use spatial and statistical methods to analyze attribute and geographic information

C. help a viewer visualize information

D. all of the above [CORRECT ANSWER]

Topology is: (radio buttons)

A. A measure of the surface of a mapped area

B. The relationship between geographical features [CORRECT ANSWER]

C. The vertical order of map layers

D. A map's theme

Lines of latitude appear: (radio buttons)

A. Horizontal [CORRECT ANSWER]

B. Parallel

C. Vertical

D. Diagonal

Which of the following is a type of geodatabase? (radio buttons)

A. Vector data

B. Raster data

C. Vector and raster data [CORRECT ANSWER]

D. Attribute data

What type of data are polygon, line and point data? (radio buttons)

A. Vector data [CORRECT ANSWER]

B. Raster data

C. Vector and raster data

D. Attribute data

Examples of metadata are: (radio buttons)

A. Information about who created the data, how the data was created and for what purpose

B. Information about whether there are restrictions on the data's use

C. All of the above [CORRECT ANSWER]

D. None of the above

What is the difference between spatial and attribute data? (radio buttons)

A. There is no functional difference; they are used for the same thing

B. Spatial data is in tabular form while attribute data is in map layers

C. Spatial data gives information about an actual location while attribute data gives information about features of that location [CORRECT ANSWER]

D. Spatial data gives information about an actual location while attribute data gives the latitude and longitude coordinates of the location

When a buffer is created around a geographic object, what is the resulting buffer's object type?

A. Point

B. Polygon [CORRECT ANSWER]

C. Circle

D. Raster Grid

Area measurement (e.g., 28,137 square feet) of polygon objects is based on the following level of measurement: (radio buttons)

A. Nominal

B. Ordinal

C. Ratio [CORRECT ANSWER]

D. Interval

Which of these file extension types are used to store attribute information in ArcGIS? (radio buttons)

A. Database Files (*.dbf) [CORRECT ANSWER]

B. Tiff files (*.tiff)

C. Bitmap files (*.bmp)

D. Microsoft Works (* .wk)

Appendix U: 2009 Intern Evaluation Form

Evaluation of DRITA Interns

Name of student: _____

Location of internship: _____

Name of work supervisor: _____

Dates of Internship: _____

Please rate the intern on each item below using the following rating scale. Circle the letter of your rating. If unobserved, leave blank.

U	P	F	G	E
Unsatisfactory	**Poor**	**Fair**	**Good**	**Excellent**

1. Punctuality	U P F G E
2. Attendance	U P F G E
3. Demonstration of responsibility during internship.	U P F G E
4. Efficient/effective use of time to complete tasks.	U P F G E
5. Quality of work performed.	U P F G E
6. Approaches work with a positive attitude.	U P F G E
7. Completes work independently, when appropriate.	U P F G E
8. Met project goals set by Supervisor.	U P F G E
9. Ability of intern to grasp the nature of assigned problems.	U P F G E
10. Ability to use problem solving/critical thinking skills.	U P F G E
11. Ability to use technology in an effective way.	U P F G E

Please rate the intern on each item below using the following rating scale. Circle the letter of your rating. If unobserved, leave blank.

U	P	F	G	E
Unsatisfactory	**Poor**	**Fair**	**Good**	**Excellent**

12. Speaks effectively. U P F G E

13. Ability to listen to others. U P F G E

14. Overall ability of intern to work well with others. U P F G E

15. Demonstrates positive working relationships with peers. U P F G E

16. Demonstrates positive working relationships with Supervisor(s). U P F G E

17. Demonstrates respect for diverse perspectives. U P F G E

Overall performance of intern U P F G E

Recommended letter grade: (U-P-F-G-E): _____

Please describe the intern's strengths in the following areas.

Technical skills:

Social/soft skills:

Please describe the intern's areas for improvement in the following areas.

Technical skills:

Social/soft skills:

Please describe the work the intern performed by creating a list of tasks below. For example, a task list might include: programmed in C++, designed a Web page, created an animation. (If you supervised more than one intern and if all of your interns completed the same list of tasks please provide this list only once by answering this question on the first Evaluation Form you complete only.)

What do you think the student gained from this internship?

In what ways could the DRITA program have prepared the student to be more successful in the internship? Please provide recommendations for academic training that you would have liked for the student to have completed prior to the internship.

We are very interested in the development of our program and your recommendations are appreciated. What recommendations do you have regarding the DRITA Internship Program? (If you supervised more than one intern, please provide this information only once by answering this question on the first Evaluation Form you complete only.)

Appendix V: 2009 DRITA Instructor Phone Interview Protocol

2009 End of Year Interview
Instructors

Hello _____, this is Lori Dean/ Helena Pylvainen from Goodman Research Group. We met when I came to visit the DRITA program this past summer. It's nice to hear your voice again. Thank you for agreeing to chat with me. Today I would like to spend some time hearing from you about how some of the successes and challenges you have experienced this year. Just so you know, all of your responses will be kept confidential. Your name will not be associated with any of the answers you tell me or appear in any of our reports, so feel free to be as open as you like about the program's progress. Before we begin, do you have any questions for me?

1. Reflecting on the past year, overall, how do you think your DRITA course went?

    1a. What do you consider the biggest successes of how your course was implemented?

    1b. What about the biggest successes related to students and/or student outcomes?

2. In what ways did you modify your original plans for your course?

3. What changes have you made to your curriculum for the second year of students? (and do you plan to make additional changes for the coming year?)

4. What kinds of support did you receive from DRITA staff as you prepared for and implemented your course, and how helpful was the support?

    4a. How could DRITA staff have been more helpful to you?

    4b. Was there any support of resources that you would have liked to receive, but didn't?

5. What feedback do you have to share about the evaluation of your course and/or working with the GRG team?

    5a. How would you like to see the evaluation changed or improved this year?

6. What challenges did you face as part of your course?

6a. How did you respond to those challenges?

6b. Common challenges for a course like yours include gathering materials, having access to computer hardware and/or software needed, having enough time to cover the content, and student engagement. Were any of these issues challenges for your course, and if so, how did you respond to those challenges?

7. In what ways do you think your course could be improved?

8. What course content would you like to strengthen for this next year?

9. As you know, there are several educators working with DRITA students to teach courses in different content areas. Based on your experiences thus far, what lessons would you share with other instructors for how to implement a DRITA course?

Appendix W: 2009 DRITA Staff Phone Interview Protocol

2009 End of Year Interview
Key Staff

Hello _____, this is Lori Dean/ Helena Pylvainen from Goodman Research Group. We met when I came to visit the DRITA program this past summer. It's nice to hear your voice again. Thank you for agreeing to chat with me. Today I would like to spend some time hearing from you about how some of the successes and challenges you have experienced this year. Just so you know, all of your responses will be kept confidential. Your name will not be associated with any of the answers you tell me or appear in any of our reports, so feel free to be as open as you like about the program's progress. Before we begin, do you have any questions for me?

1. What have been the biggest successes of the program?

2. What were the most successful strategies you found for recruiting students?

    2a. How have you changed your recruitment strategies for Cohort 3, if at all?

3. What effect, if any, do you think the program has had on students thus far?

4. For this next question, I'm going to list the original goals of the project. For each, please let me know which project activities were conducted in the past year to address each goal. Then, I'd like you to provide a rating from 1-5 on how successful the project has been in achieving each goal to date. If the project has not yet had a chance to address a goal, that's fine, and after going through the ratings for the achieved goals, we can talk about plans you have for addressing the goal in the future.

	Activities To Achieve Goal	Rating 1 = Not at all Successful 5 = Extremely Successful
Increase students' competencies in a range of IT areas		
Increase students' abilities to perform effectively in the workplace		
Increase the percentage of African-American students graduating from high school		
Increase the number of students matriculating to 4-year colleges to pursue STEM		
Increase the percentage of girls/students of color with plans to pursue STEM studies		
Develop the IT workforce and career opportunities within the region		

5. Please describe your experiences in working with the rest of the DRITA team.

    5a. In what ways does the DRITA team work well together?

    5b. What are areas for improvement?

6. What challenges has the program faced thus far?

    6a. How have the project team responded to those challenges? If you have not had a chance to respond to a particular challenge yet, what plans do you have to respond to that challenge.

    6b. Other common challenges for programs like DRITA include finding good instructors to teach courses, developing and implementing appropriate activities for students, and involving parents. Were any of these issues challenges for the program last year, and if so, how did DRITA respond to those challenges?

7. What challenges, if any, have you experienced in retaining students in the program?

    7a. Please share any strategies that are in place for retaining Cohort 1 students this year.

8. In what ways do you think the DRITA courses (BITS, C++, Animation) could be improved?

    8a. Why do you think those changes are necessary?

9. What lessons did you learn for how to improve or streamline the implementation of the project?

    9a. What steps have been taken to learn from those lessons as the program continues?

10. What feedback do you have to share about the evaluation and/or working with the GRG team?

    10a. How would you like to see the evaluation changed or improved this year?

Appendix X: Number of Respondents in GRG Data Collection

Number of Respondents in GRG Data Collection for DRITA Program

The tables below report the number of respondents for each data collection activities for each curriculum year from 2006-2009 on individuals associated with the DRITA program. Tables 1 – 3 give the number of students or parents responding to data collection instruments or activities based on the Cohort of the student. Table 4 gives the number of course instructors, internship supervisors, externship supervisors, and program staff respondents for each program year because program administration feedback in a given year may apply across Cohorts of students. Dashes indicate that the instrument was not used for that Cohort or in that year.

Table 1
Number of Respondents for Data Collection for Year 1 DRITA Curriculum, by Cohort

	Cohort 1	Cohort 2	Cohort 3
Students	32	32	26
Animation Pre and Post Assessments	17	29	26
BITS Pre and Post Assessments	21	26	26
C++ Pre and Post Assessments	18	23	
Student Interviews	20	27	23
Year 1 Pre-Survey	32	32	24
Year 1 Feedback Survey	19	18	20
Parents			
Parent Feedback Survey - First Saturday Session	14	24	25
Parent Survey - End of Summer	22	23	--
Cohort 3 Parent Information Session Feedback Survey	--	--	19

Table 2
Number of Respondents for Data Collection for Year 2 DRITA Curriculum

	Cohort 1	**Cohort 2**
Students	21	27
Robotics Pre and Post Assessments	13	23
Year 2 Feedback Survey	19	12
Cohort 2 College & Career Workshop Feedback Survey	--	19
Parents		
Parent Feedback Survey - First Saturday Session	19	23
Parent Feedback Survey - End of Saturday Sessions	19	17

Table 3
Number of Respondents for Data Collection for Year 3 DRITA Curriculum

	Cohort 1
Students	21
GIS Pre and Post Assessments	12
Year 3 Feedback Survey	9
Cohort 1 College & Career Workshop Feedback Survey	18
Student Focus Groups	14
Parents	
Cohort 1 Parent Focus Groups in Danville	11
Parent Feedback Survey - End of Saturday Sessions	19

Table 4
Number of Program Administrator Respondents for Data Collection, by Program Year

	Year 1	Year 2	Year 3
Staff & Instructors			
DRITA Instructor Interviews	3	4	6
DRITA Staff Interviews	3	3	2
Internship Evaluation Forms	--	21	--
Group Internship Supervisor Interview	--	5	--
Externship Supervisor Evaluation Forms	--	--	24
Externship Supervisor Interviews	--	--	8