The Land of ALICE: A Multi-Level, Multi-Site, Multi-Year Look at the Changing Evaluative Needs of ALICE

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Alice is a National Science Foundation ITEST programs designed to enhance the teaching and learning of computer programming and computer science. Developed by the Computer Science Department at Carnegie Mellon University, each program provides unique learning opportunities and evaluative opportunities. Alice is a computer programming software used by a variety of populations targeted at changing how faculty teach and students learn in computer information programs. The specific Alice evaluation through CEAC focuses on the use of Alice in three distinct community college locations – Blackwood, New Jersey, Pittsburgh, Pennsylvania, and McKinley, Texas. Each of the sites have unique evaluative needs, as well as a vested interest in the success of this program and the success of their students.
History of Evaluation

- Started in fall 2010
- Collaborative for Evaluation and Assessment Capacity (CEAC) created threefold evaluation process:
  - (1) Student experiences in Alice courses
  - (2) Faculty experiences teaching Alice courses
  - (3) Faculty experiences with Alice collaborative network
- Faculty use Alice at multiple levels in computer programming curriculum (Tiers)
- Stakeholders interested in differences between sites and tiers

The involvement of the Collaborative for Evaluation and Assessment Capacity with Alice began in the fall of 2010. At this time, CEAC created a threefold evaluation process for the program. The first, and most important, part of the evaluation process would be the surveying of student experiences in Alice courses. At the time, this process would use baseline and end of course surveys to determine student growth in computer programming skills during the semester and their satisfaction with the Alice program. Students would have various interaction with the Alice program, with some courses using it for a one day introduction, and others using it during the duration of the course. The second component of the evaluation was a survey of Faculty experiences teaching Alice courses. Surveys, distributed in the summer, would focus on the faculty member’s use of Alice in the previous academic year, the perception of the use of Alice, and the plans for using Alice in the future. In addition, interviews would be conducted with faculty and program personnel to determine their experiences with Alice. The final portion of the evaluation process included a look at faculty experience with the Alice collaborative network. This would be determined through the faculty surveys and interviews.

The main goal of the evaluation process was to determine how Alice was being used in the classroom and its benefits to students of computer programming. As mentioned previously, the program is used at three different levels of courses, or tiers, and there was particular interest in determining the utility of Alice to each tier. In addition, the stakeholders were interested in the disaggregation of data by tier and by site, determining the utility of the program for each respective community college.
The evolution of the Alice evaluation has been across all three levels of the evaluation. The student evaluation has experienced the most change and feedback throughout the process. One of the biggest evolutions has been the engagement between the program personnel and the evaluation team. What originated as a very hierarchical relationship has transformed into a collaborative relationship. Originally, the evaluation plan called for interviews with program personnel on a yearly basis. This evolved into annual collaborative meetings with all program personnel (from CMU and all three community colleges) and the evaluation team to alter the evaluation plan and reporting. From these meetings, various changes in the evaluation have occurred. The original plan for all students to respond to the same surveys with disaggregation occurring at the time of analysis has been replaced with a differentiation between students, by tier, for the initial surveying process. Tier one students now receive a different survey from the Tier two and three students, with a much different focus, based upon the length of experience with Alice. In addition, the faculty collaborative network was abandoned in favor of a collaboration between faculty and others during summer workshops with Alice for community college faculty members and k-12 educators interested in using Alice.
Current Evaluation

• Tier One Course Evaluation
  o Satisfaction Survey

• Tier Two/Three Course Evaluation
  o Baseline Survey
  o End of Course Survey

• Faculty Evaluation
  o Summer Faculty Survey

• Program Evaluation
  o Interviews with Program Personnel
Currently, the evaluation consists of four different elements. The first, the Tier One Course Evaluations, use a brief satisfaction survey to evaluate the students’ introduction to Alice. These students typically receive a brief, one-class, introduction to Alice during their introductory-level computer science courses. This module is offered at two of the three community colleges, with specially-trained faculty members teaching the class period. The survey aims at finding student opinions of the basic introduction to Alice and their interest in continued study of Alice. The Tier One students previously responded to the same surveys as the higher level courses, but due to their limited exposure to Alice, the evaluation plan was altered.
The Tier 2/3 survey currently consists of two surveys, one offered in the first month of the semester to evaluate baseline computer programming abilities, proficiency with various computer programming concepts, and background academic history. The end of course survey, offered at the end of the semester, asks many of the same questions, with the intention of comparing differences in the self-reported proficiency and ability levels between the baseline and end of course models. In addition, the students are asked to respond to specific Alice questions aimed at providing feedback on the program and intentions for future use. Tier 2 students typically experience Alice for a short time during an Introduction to Programming course, while Tier 3 students experience Alice throughout an entire course which focuses on programming using Alice and Java. Two of the participating institutions have Tier 2 courses, and two of the participating institutions have Tier 3 students. Therefore, the evaluation never evaluates all of the institutions at one time, even though the Tier 2/3 survey is administered to both levels of courses, when disaggregated, all three institutions are never evaluated at the same level.
The faculty evaluation, now entering its second use, has evolved to include the experiences of K-12 educators at Alice-focused summer workshops. These surveys aim to understand the experience of all educators in Alice, inquiring about their background with Alice, if and how they use Alice in the classroom, their perception of student engagement with Alice, as well as the educators’ use of the Alice workshops, colleague networks, and Alice instructor materials. The needs of each participating institution vary greatly regarding the faculty evaluation, with a one institution focused purely on the use of Alice in the classroom, another focused on the evaluation of the Alice-specific workshops, while a third is most concerned with the collaborative network between educators and workshop facilitators.
Program Evaluation

• Interviews with Program Personnel
  o Creators of Alice program
  o Program personnel from three community colleges

Finally, an overall program evaluation is conducted with the Alice team at Carnegie Mellon University as well as the lead faculty members at each of the participating community college institutions. This portion of the evaluation is employed both formally and informally as a part of the iterative process of evaluation – to constantly work to remodel and reach the needs of the many interests in the Alice program.
Evolution of Analysis

• Disaggregation by stakeholder interests:
  o Site
  o Tier
  o Course
  o Computer programming skill level
  o Report
  o Version of Alice

• Changing needs of stakeholders and interests of the Alice program personnel

In addition to the evolution of the evaluation plan, there has also been an evolution of the analysis based on the needs of the stakeholder (community colleges and Alice program personnel). Original disaggregation by site and tier has led to exploring possible disaggregations by course, computer programming skill level, version of Alice, professor, and reporting year. These needs and interests have been communicated to the evaluation team by the stakeholders. Ultimately, it is the responsibility of the evaluation team to respect the needs of the client, but understand the need for careful data analysis and reporting – reporting what makes the most sense and what is the most informative for the program. Sometimes, what the client wants cannot be done with the data that is available – this also must be communicated in a sensitive way to the client/stakeholders.
Disaggregation

• Differences between sites:
  o Course offerings
  o Tiers
  o Version of Alice

• Differences between tiers:
  o Course offerings
  o Version of Alice

• Differences between reports:
  o Course offerings
  o Instructors
  o Use of Alice
  o Version of Alice
Throughout this presentation, I have reiterated the importance of being responsive to the needs of the stakeholders. The alice program is unique in the way that the evaluation team is included in guiding the process and helping the client and all stakeholder to find the most appropriate and informative level of evaluative materials. The program personnel and evaluation team are in constant contact, eliciting and providing feedback for the evaluation, as well as communicating various needs and interests for the evaluation activities.

The future of Alice will, undoubtedly, involve changes and evolutions to the evaluation process. We are approaching the end of the grant cycle, which will mean compiling an overall program evaluation and focusing on the big picture evaluative issues and findings over the numerous Alice reports. This will provide a new challenge to the evaluation team and provide new opportunities to engage in the collaborative relationship between stakeholders and evaluators.
Learning from Alice

Multiple States
+ Multiple Higher Education Levels
+ Multiple Course Levels
+ Multiple Years

Multiple Needs

Difficulty in responding to needs that are so varied

Difficulty in comparing across years when there have been so many changes.
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