The Effect of Programming Learning Center on Students in First Year Computer Programming Sequence

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Abstract

Engineering Technology students whether freshmen or otherwise tend to find their first sequence of computer programming courses quite a challenge. To increase the success rate for these students, the author started a learning center for computer programming called the Programming Learning Center (PLC). The PLC started its operation in the fall of 2001. The center had a major impact on students taking their first programming sequence. Freshmen students as well as students from other classes have participated in the PLC activities. The PLC proved to be successful for both day and evening students. The center offered walk-in hours for students as well as seminars during the lunch hour on various topics. This paper discusses the impact of the center on students' learning and success in their first computer programming sequence. The center can be duplicated to serve students in other disciplines.

Introduction

Several Engineering Technology programs require a sequence of courses in computer programming. In particular, computer science technology, computer engineering technology or information technology programs require students to take a sequence of 2 or 3 classes in computer programming in their first year. Students with no prior experience in computer programming find this sequence a challenge, especially if they are freshmen.

The use of learning centers to help undergraduate students overcome academic challenges has been successful for some time, especially in the area of Mathematics or Physics. The Math/Physics learning center at the College of Applied Science has been providing walk-in services for the engineering technology students in the college for many years. However, with computer programming becoming a requirement in different engineering technology programs and the start of degree programs in the area of computing technology, a need has been realized to help students who are in computer programming classes.
The Programming Learning Center (PLC)

The Programming Learning Center (PLC) was established in the fall of 2001 as collaboration between the Center for Information Technology and Community Development (CITCD) and the department of Math, Physics and Computing Technology at the College of Applied Science. The PLC aspires to make learning computer programming exciting and a valuable experience to students. When students appreciate the value of what they learn, they are more likely to succeed.

The PLC sponsors two main activities. The first is a series of seminars delivered by faculty members and representatives from the industry. This seminar series introduce students to different aspects of computer programming and its application in industry. The second activity is a walk-in learning center, where students can receive assistance in their class projects or have an opportunity to discuss and learn about different concepts of computer programming. The learning center is staffed by junior or senior students who are proficient in computer programming. Faculty members also spend some time in the learning center.

The PLC was one of the recipients of a Success Challenge grant from the state of Ohio to help students succeed in college. The state provided the university with funds to help student succeed. The university then administered internal request for proposals to awards this funding. The PLC received $19K from the University to help first year students succeed in their computer programming sequence. The grant provided funding for the staff and the seminar activities.

The seminar events were conducted during the lunch hour with light lunch provided. Since the majority of the technology students in the college do work part-time outside the college, we had to make an effort to show students how useful the seminar could be. The most effective mean to encourage student to attend these non-credit seminars is the class instructor. Depending on the topic of the seminar, some instructors will incorporate the seminar into their class through extra credit assignments. In other times, the seminar will address a programming concept that was found to be difficult for students. Since these seminars were not part of the curriculum, the cooperation of the instructors who teach the programming classes was essential for its success.

With cooperation from the instructors in the programming classes, an orientation to the learning center was planned as part of the class. Students will come to the learning center, meet the staff, and learn about the operating hours and the help they can receive from the center.

The PLC occupies a small area in the computer lab. Being in the computer lab made it easy for students to interact with the center and relieved the author from the need to secure budget to buy computers and furniture. Our experience shows that students seek help while they are working on their project not before they start. Being in the lab makes it convenient for the students to find the help they need.

A database was created to store records that show the use of the center. The emphasis of this database was to record the questions that students ask and the answers given to them by the staff. During the seminars, students’ satisfaction survey was conducted to evaluate
the seminar contents and delivery. Some of the students’ comments on the activities of the PLC were: “This is long overdue” “Now I understand what we had in the class” and many others that show how needed the center is.

As part of the success challenge grant that was awarded, an evaluation plan was developed to evaluate the use of the PLC for the year 2002-2003. The evaluation plan would answer the following questions:

1- How many students visited the center and how many times during one quarter?
2- How many students finished their programming sequence in the first year?
3- How many students receive a grade of C or more in their programming courses?
4- How many students attended the PLC seminars?
5- How did the PLC affect students’ experience in the University?

The tools used for the evaluation of the center were the PLC database to evaluate the walk-in service and survey to evaluate the seminar events. Data about students’ performance before the existence of PLC was not available for comparison.

In the year 2002-2003, a total of 118 distinct students and 6 distinct faculty members participated in the PLC activities. Many of these students participated in more than one activity. The walk-in service for the PLC was offered 40 hours/week during the fall, winter and spring quarters. Four seminars were conducted; two in the fall, one in the winter and one in the spring.

The walk-in service of the learning center attracted about 40% of the students whereas the seminars attracted 60%. The majority of students attend only one activity for the PLC while 31% attended several activities. Students from 5 engineering technology majors participated in the activities.

The activities of the PLC encouraged the participation of female students. Although the percentage of female students in a typical engineering technology college is not large, about 30% of the students participating in the activities were female students. This may indicates that female students are more likely to need assistance or more likely to participate in activities than male students.

Students' exit surveys indicated that the activities of the PLC made an impact on their learning experience. For the PLC walk-in activity, students commented on the effect of the help they received and how it made them able to do better in their courses. One of the students wrote

"Thanks to all the help that I received from the staff in the PLC. They were a big help in my Data Structures class. With their help I was able to write a C program that performed an airplane simulation using random numbers, stacks and queues. They were a big help when I did a C++ program for another project. I am very appreciative of all their help".

For the seminars, students and faculty found a forum outside the classroom to interact and communicate. The guest speakers for the seminar helped the students to better plan for
their career. There is no doubt that the project did have considerable impact on the students who participated in it. Some students wrote in their evaluation

“We as IT students need more seminars relating to the business end. Diversity is an excellent investment”

“The seminar makes you think what you should do in the future”

It should be noted here that there were no negative comments on both the PLC and the seminars. This is expected since students are not required to participate in the PLC activities. They come to the tutoring help only if they need help and they come to the seminar only if the topic is interesting to them. The absence of negative comments indicates that the delivery of the activities met students’ expectations.

With the help of the PLC, 50% of first year computer science technology students did finish their programming sequence on time. This is compared to 2.4% in the previous year when the PLC was not available.

The PLC initially aimed at making the service available to the students so they are more likely to utilize it. This included both make it available at convenient times as well as make the students aware of its existence. The project did achieve its goal from that aspect. The walk-in service was made available from noon – 7pm M-F as well as 1-5pm on Saturday and Sunday during all three quarters. The seminars were organized during the lunch hour where no classes are held and lunch was provided. Four ads in the students' campus newspaper were placed every quarter to inform them about the service. Posters and brochures were posted and distributed every where on campus.

A survey that was conducted by the college first year experience team found that more than 50% of the computer science technology students work more than 25 hours/week in addition to their full academic load. This does not give them any opportunity to participate in activities even if it is available and they need it. We realized that most students come to campus for the class and leave immediately to attend to their other duties and responsibilities. This raised a new question as we investigate students’ success, the need for students to work off campus? How can we address this in a way that helps students succeed? The team of the Programming Learning Center is investigating different ways to accommodate these students.

In conclusion, in technology programs where there is a requirement of computer programming sequence for first year students or older students, there is a need for a learning center that provides assistance with computer programming as well as help students appreciate the value of computer programming for the industry and community. The Programming Learning Center at the College of Applied Science was successful in helping first year students and to bring the industry prospective to academic live through its informal seminar series.

References
Curriculum, Rochester, NY


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