

**Evaluation of Developmental and College Preparatory Mathematics  
Florida Community College at Jacksonville**

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This report summarizes specific findings from a consulting evaluation conducted by Dr. Barbara S. Bonham and Dr. Hunter R. Boylan on September 27 and 28, 2007. During this visit, the consultants visited all of the campuses of Florida Community College at Jacksonville (FCCJ) and interviewed administrators, students, faculty, and staff involved in the FCCJ developmental mathematics education effort. The consultants also reviewed a great variety of program reports, planning documents, evaluation reports, syllabi, and other materials provided before, during, and after their visit.

Based on this initial evaluation, the consultants provided a summary of observations and recommendations to Dr. Donald Green and Dr. Nancy Yurko on November 1, 2007. After review of our summaries and observations, Dr. Green sent a letter to the consultants on December 19, 2007 requesting that we address seven “points” in a final report (see Appendix II - separate file). The following comments represent our reply to that request.

It is our opinion that all of the points are inter-related and should be considered as essentially parts of the same issue. We have, therefore, organized our comments accordingly but noted the points relevant to the discussion below.

**Point One - *FCCJ needs a comprehensive plan for developmental mathematics that will include a review of course content, teaching methodology, faculty development, technology, and support service integration.***

**Point Five - *We must address the fact that the majority of our faculty are using teaching methods (lecture) that the research clearly points out is the least effective.***

**Point Six - *We must provide training that assists the faculty in learning how to use the best practices and use the best of personal communications, group work, technology, and services such as tutoring. The new model needs to permeate the institution.***

**Point Seven - *We must strive hard to communicate effectively, stay positive, and focus on our main goal = the success of our students.***

### **Observations and Discussion**

Roueche and Roueche (1999) argue that a seamless transition between various levels of developmental courses as well as between the highest levels of developmental courses and the initial levels of college courses is essential if developmental mathematics efforts are to be successful. There is little evidence that such a seamless transition exists at FCCJ and it has been our experience that, when pass rates in either developmental or college level courses are low, it is often because there is a “disconnect” between one level of courses and the next level. This lack of a seamless transition may account for the poor performance of students enrolled in some mathematics courses.

Although there are random efforts to match the syllabi and requirements of developmental courses with college level courses, the quality of these efforts varies from campus to campus. Furthermore, there appears to be no consistent, systematic, institution-wide effort to insure that the exit standards of one level of developmental mathematics are consistent with the entry

standards of the next level or that the exit standards in developmental mathematics are consistent with the entry standards for college level courses.

Although those involved in teaching developmental math courses tended to be well qualified and committed to student learning, they did not always use teaching techniques consistent with this commitment. For instance, Gabriner and associates (2007) and Smittle (2003) advocate the use of active learning instructional techniques as being most effective for developmental students. Grubb and associates (1999) agree and argue that the widespread use of active learning techniques is essential to the success of developmental students. But based on observations and interviews, it appeared that most faculty members at FCCJ do not use active learning techniques or, if they do, do not use them on a regular and systematic basis. This was true at each of the campuses we visited. Although there were some excellent examples of the use of active learning in some developmental classes on practically every campus, these examples were the exception.

Most instructors of developmental courses, particularly adjuncts, rely on lectures to communicate essential course material. There are few efforts to actively engage developmental students in learning. Although it is relatively easy to understand and implement active learning techniques in most disciplines we observed only a handful of faculty members using these techniques. This suggests the need for additional reading and training for faculty teaching developmental courses at FCCJ. Fortunately, there are many

books and articles available that address the active engagement of students in learning as well as other effective strategies for developmental students.

Although many developmental mathematics faculty members use technology in a variety of ways, there was no systematic approach observed in the use of technology. Apparently faculty use whatever technology they wish in whatever ways they consider appropriate. As a result, it is difficult to evaluate the efficacy of technology utilization or to plan for training of faculty and acquisition of hardware and software.

Like most community colleges FCCJ has a diverse population of developmental students. This diversity is not only apparent in ethnicity but also in age and culture. Unfortunately, we saw little evidence that instructors were using culturally responsive teaching techniques. These are techniques that honor the various cultures of students in the classroom, create safe environments for student expression, encourage discussion of cultural responses to content and issues, and embed culturally relevant materials into course content (Gay, 2000, Wlodkowski & Ginsberg, 2003). The use of these techniques not only contribute to making diverse students more comfortable in classes but they also contribute to improved academic engagement and performance for these students (Gabriner and associates, 2007).

During the course of our visit, several questions were raised with regard to the use of technology in developmental mathematics. We consistently responded by pointing out that, to date, no one has been successful using technology as the sole means of providing instruction to developmental

students. This lack of success is due, in our opinion, to the fact that most developmental students do not have the vocabulary, reading skills, or independent study strategies necessary for success in online or other completely technology based courses.

However, technology can enhance the learning of mathematics when used appropriately, specifically as a *supplement* to classroom or other face-to-face instruction. Technology refers to the use of graphing calculators, online labs, spreadsheets, software programs, etc. “Technology can be used to learn mathematics, to do mathematics, and to communicate mathematical information and ideas” (AMATYC, 2006, p. 55).

In addition to these uses, however, consideration should be given to use of technology out of the classroom. Students and faculty can communicate through e-mail, chat rooms, or websites. The technology enables educators to address the diverse learning styles of students and teaching styles of teachers. It goes well beyond using software programs to deliver tutorials, provide practice, and test students.

The literature in the field of developmental mathematics consistently argues for the integration of classrooms and laboratories as a means of improving the effectiveness of developmental instruction (Boylan, Bliss, & Bonham, 1997; Boylan, 2002; McCabe, 2000; Roueche & Roueche, 1999). The amount and quality of integration of classrooms and laboratories varied from campus to campus. At some campuses, there was strong communication and coordination between classrooms and laboratories. Laboratory managers

regularly worked with instructors to identify ways in which their efforts could support instruction, instructors served office hours in laboratories and were actively engaged in training tutors, and laboratory assignments were built into course syllabi. At other campus, there appeared to be relatively little communication between laboratory and instructional personnel and little to no coordination of laboratories and classrooms.

Generally speaking, those engaged in the provision of support services were well-trained and highly committed to serving students. And there appeared to be at least two campuses with particularly strong learning assistance programs. However, there appeared to be an inadequate amount of communication and cooperation between student development and academic affairs professionals. Again, there were some excellent examples of communication and cooperation at some levels and at some campuses but these were neither systematic nor widespread.

There is little wrong with the organization and delivery of support services at FCCJ. The problem is with the coordination and integration of these support services as well as the resources available to them. Unfortunately, given the financial situation of Florida community colleges, there is little likelihood of providing the necessary increases in funding that might strengthen the college's support services through additional staff or equipment in the near future. Instead, improvement will have to come through greater coordination of services, increased communication between

faculty, advisors, and support service providers, and more precise assessment and targeting of specific services to specific students.

It must be noted that there is a great deal of innovation taking place at FCCJ. However, as good as these innovative efforts are, they tend to be piecemeal, disjointed, and disconnected from institutional planning.

We observed pockets of excellence at all campuses, in all subject areas, and in all programs. It appeared, however, that these pockets of excellence were random, uncoordinated, ill-supported, and unlikely to be “upscaled” to the institution as a whole.

### **Recommendations**

1. Developmental mathematics faculty in all subject areas should initiate curriculum reviews with an emphasis on insuring that a seamless transition exists between:
  - Adult education courses and introductory developmental mathematics courses,
  - Each level of developmental mathematics courses and the next level, and
  - The highest level developmental course and the college level course in that subject area.
2. All faculty teaching developmental mathematics courses, including adjuncts, should develop plans for integrating active learning techniques into their instructional activities. There are a variety of books and articles that address active learning and other important instructional

- techniques. It is recommended that faculty members establish reading and study groups to explore some of these publications and identify ways in which they might utilize more active learning techniques in their teaching. A listing of these publications is provided in Appendix I.
3. Because adjunct faculty provide such a large percentage of developmental instruction on the FCCJ campus, it is recommended that a team of campus administrators meet to “brainstorm” and identify innovative ways of rewarding adjunct faculty for participating in faculty development. These rewards need not necessarily be monetary. For instance, adjunct faculty might be rewarded by being given:
    - a. a choice of courses to teach,
    - b. a choice of class schedules,
    - c. reserved parking areas, or
    - d. book store or cafeteria credits.
  4. It is also recommended that faculty teaching developmental mathematics courses identify workshop topics and leaders to provide professional development activities at FCCJ. The administration of the college should then assign the necessary funds to bring these workshop leaders to run workshops and training programs for faculty. It is recommended that at least one external presenter be brought to campus each semester to work with developmental faculty. In addition, workshops may also be held using current faculty from FCCJ who are using innovative active learning approaches in their classes. Faculty

reading and discussion and workshops on culturally responsive teaching are particularly recommended.

5. Faculty development workshops are not necessarily effective unless they are combined with follow-up activities designed to help faculty implement whatever techniques are being explored. For this reason it is recommended that no one be brought to campus to run professional development workshops until there is a follow-up plan in place to insure that what is presented in these workshops is actually used. Some examples of follow-up activities include:

- Asking faculty members to describe how they have integrated active learning techniques in their classes as part of their annual performance review,
- Developing “innovation groups” of small teams of faculty who commit to using active learning techniques in their classes, sharing their experiences, and improving their implementation,
- Using peer evaluations designed to assess and improve the use of active learning techniques among participating instructors, or
- Implementing an “Active Learning Institute” where faculty members using these techniques showcase their activities for others.

6. Although the use of technology as a substitute for face-to-face instruction has not proven to be effective for developmental students, there are many ways in which technology can be profitably used in

- developmental education (Golfin, Jordan, Hull, & Ruffin, 2005). It is recommended that a team of faculty teaching developmental courses be charged with developing a long-term plan for technology acquisition and utilization. This plan should identify what hardware and software is currently working best for developmental students as well as ways in which its use might be improved. It should identify and recommend the most efficacious ways of using current hardware in software to serve developmental students. It should also plan for the acquisition of new hardware and software to be phased in over time as resources permit.
7. It is recommended that laboratory managers and instructors from developmental mathematics courses meet during the summer of 2008 to identify ways in which laboratories can be better integrated into developmental instruction and plan to improve this integration in the 2008-2009 academic year. At the end of this year, the most successful integration strategies should be identified, described, and disseminated to all campuses of FCCJ.

***Point Two - There is a need for a strong leader to build support for the plan and insure it is carried out responsibly.***

### **Observations and Discussion**

The research in the field of developmental education consistently emphasizes the need for strong coordination of developmental education (Boylan, Bliss, & Bonham, 1997; McCabe, 2000; Schwartz & Jenkins, 2007). Such coordination is essential if developmental educators are to communicate with one another effectively, identify and solve teaching and learning

problems, develop and implement systematic plans, and collaborate in serving students.

Unfortunately, the developmental mathematics effort across the institution at FCCJ is, essentially, without leadership. There are department chairs and learning center directors who certainly do the best they can to coordinate developmental mathematics activities under their purview. But there is no one who has been designated to serve specifically as the college-wide manager of developmental mathematics or even specific coordinators designated on individual campuses with the sole responsibility for developmental mathematics. One of the major reasons that so much of the developmental mathematics effort at FCCJ appears to be random and disconnected is that no one is specifically in charge of the college-wide developmental mathematics effort. Furthermore, there are few “champions” for developmental mathematics at individual campuses. Developmental mathematics is simply one of many responsibilities for campus level administrators.

### **Recommendations**

1. It is strongly recommended that an administrator be appointed to serve as the college-wide coordinator for developmental education including developmental mathematics. This administrator should serve at the vice presidential level and, although he or she may have other duties, it should be clearly understood by superiors and subordinates alike that developmental mathematics is the primary duty of the individual holding

this position. In short, developmental mathematics should not simply be added to the individual's current responsibilities. Instead, current responsibilities should be re-assigned so that the individual will actually have the time necessary to manage what is a very substantial college-wide developmental mathematics effort.

2. It is recommended that the duties of this individual include, but not necessarily be limited to:
  - a. ensuring that the needs of developmental mathematics are considered in the resource allocation process,
  - b. ensuring that developmental mathematics has adequate physical facilities,
  - c. developing and implementing a college-wide plan for acquiring and deploying hardware and software to be used in developmental mathematics,
  - d. ensuring that the exit standards from one level of developmental mathematics are consistent with the entry standards of the next level and that the exit standards of developmental mathematics are consistent with the entry standards of the first level credit-bearing college courses,
  - e. coordinating the integration of developmental mathematics support services and courses,
  - f. establishing and implementing the formative and summative evaluation of developmental mathematics courses and services,

- g. ensuring that appropriate faculty and staff are provided with evaluation information for formative purposes,
  - h. coordinating professional development activities for developmental educators, and
  - i. monitoring the quality of instruction that takes place in developmental mathematics classrooms.
3. It is also recommended that each campus of Florida Community College - Jacksonville appoint a developmental mathematics liaison. The purpose of this liaison position is to work with the college-wide coordinator of developmental mathematics to ensure that adequate communication takes place between the central administration and the individual campuses of FCCJ. It is further recommended that release time be provided to enable the campus developmental mathematics liaisons to perform their tasks appropriately.

***Point Three - The plan must address and ensure ongoing systematic evaluation enhancements.***

### **Observation and Discussion**

A strong evaluation plan is a well documented component of effective developmental education programs (Casazza & Silverman, 1996; Maxwell, 1997). Furthermore, formative evaluation involving faculty and staff is a critical component of a strong developmental education evaluation plan (Boylan, 2002, McCabe, 2000). FCCJ and the State of Florida both collect a great deal of data on developmental education. However, most of this data is

provided to administrators and very little of it is shared with faculty so that they can use it for program revision and improvement.

It is recommended that the designated liaisons from each FCCJ campus meet with the institutional research officer to identify the types of data that would be most useful to faculty and staff for formative evaluation. Examples of such data might include but not be limited to:

- a. pass rates in developmental mathematics courses,
- b. completion rates in developmental mathematics courses,
- c. retention rates from semester to semester and year to year for developmental mathematics students,
- d. points of departure for students who drop out before the end of the semester, and
- e. pass rates in follow-up courses for those who have passed the highest level of developmental mathematics in that subject.

FCCJ may also wish to consider the use of student focus groups to obtain information that might be used for program improvement.

**Point Four - *Having a student success rate of 50% or less is not satisfactory to anyone.***

#### **Observation and Discussion**

The National Study of Developmental Education II (Gerlaugh, Thompson, Boylan, & Davis, 2007) provides the baseline data for developmental students on completion rates, pass rates, class size and grades in first college credit courses. This study found the pass rates for students completing developmental

mathematics at community colleges was lower than the pass rates for reading and writing developmental courses. In this study, sixty-eight percent of math students were successful in developmental mathematics courses. This was consistent with the NCES (1996) study that showed 66% passed in math.

Most researchers agree that the first semester in college is the most critical to student success (Hankin, 1997; McCabe, 2002; Skipper, 2005). The author estimates that, of those students who will drop out of college, 60% will do so in the first six weeks of their first semester. For this reason, it is important to “front load” services and interventions for developmental students during their first semester. Faculty, staff, and administrators need to develop a plan that identifies students most at risk of dropping out and insures the following:

- students are assessed and placed using a variety of cognitive and non-cognitive instruments,
- students are prohibited from taking a full-time load of courses until they have passed their developmental mathematics requirements,
- students are targeted for mandatory tutoring, special workshops, etc.,
- students are provided with strong and frequent and systematic academic advising and counseling,
- students are monitored carefully to assess their progress, and
- students are enrolled in paired courses and learning communities when available.

## Concluding Comments

Perhaps the biggest single problem with developmental mathematics at Florida Community College - Jacksonville is that there is a lack of planned and systematic focus on developmental mathematics. Specifically, there does not appear to be either college wide or a campus based plan for the revision, refinement, and improvement of existing developmental mathematics efforts. In addition and with the exception of some individual campus efforts, there is a general lack of cooperation and collaboration between academic and support services. This appears to result from the fact that no one has been specifically charged with the coordination of developmental mathematics either at the college level or the campus level. Consequently, there is no one to take leadership responsibility for the development of college-wide and campus based planning for developmental mathematics. These factors make it difficult for the college to obtain the economies of scale that might result from collaboration, cooperation, and integration.

There is also a lack of focus on professional development for those providing developmental mathematics courses and services. Some faculty and staff are quite well trained to teach developmental courses and provide support services. Others have no training at all to work with developmental students.

It also appears that many of the decisions made regarding developmental mathematics are grounded neither in research nor data. This is in spite of the fact that a great deal of literature and research exists to guide

any developmental mathematics improvement effort. Some examples of this research and literature are provided in Appendix I - "Readings Relevant to Developmental Education." The college could profit from applying the information contained in these and other resources to its own review and planning for developmental mathematics.

In spite of these shortcomings, Florida Community College - Jacksonville has the potential for designing and implementing a model developmental mathematics effort. The college is fortunate to have a cadre of well trained and highly committed developmental educators. There are faculty and staff who have been trained at the Kellogg Institute, have participated in graduate programs in developmental mathematics, and have been active in the National Association for Developmental mathematics and its Florida affiliate. There are others who, although they may lack formal training in developmental mathematics, are doing an excellent job of providing instruction and support services to developmental students. This cadre of professionals can form the nucleus of efforts to improve the quality of developmental mathematics at FCCJ.

The college also has some excellent learning assistance activities, some of them housed in first rate facilities. Although most campuses have an inadequate number of tutors available to meet the needs of students, the existing tutors are well trained. In fact, the college is to be commended for adopting the tutor training guidelines of the College Reading and Learning

Association. In addition to being trained at some level, the tutors interviewed expressed a genuine interest in helping students succeed.

The college appears to have been generous in its expenditures for technology although the addition of more varied learning software might be explored in collaboration with learning assistance and laboratory personnel. The availability of technology is important because it contributes to disadvantaged students learning how to use computers in college and thus reducing the “digital divide” between the advantaged and the disadvantaged in American society. This is another area where the college has the potential for becoming an exemplary model for helping at-risk and disadvantaged students.

Byron McClenney, the former President of the Community College of Denver consistently stresses the necessity for community colleges to have a “relentless focus” on excellence in developmental education (as quoted in Boylan, in press for 2008). This relentless focus on excellence means that faculty and administrators alike consistently ask how they can improve their efforts. The key to successful developmental mathematics lies not in finding a “magic bullet” or reorganizing developmental mathematics or implementing some popular innovation but in focusing on doing everything at every level as well as possible in laboratories, in classrooms, and in learning centers. We hope that the comments and recommendations provided here offer a basis for such a relentless focus at Florida Community College - Jacksonville.

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## Appendix I

### Readings Relevant to Developmental Education/Mathematics

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