

**Dual Enrollment Access in Mathematics using the Flipped Format to  
Increase Student Achievement (DEAMFISA)**

Evaluation Report for Academic Year 2015-2016



**OHIO**  
UNIVERSITY

Voinovich School of  
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## Acknowledgements

The Voinovich School of Leadership and Public Affairs conducted this evaluation of the Dual Enrollment Access in Mathematics using the Flipped Format to Increase Student Achievement (DEAMFISA) project. Senior Project Manager, Margaret Hutzal, is the project manager and Assistant Professor, Marsha Lewis, Ph.D. consults on evaluation design and some data analysis. Student Research Associates Nikole Baker and Phoenix Crane assisted with interviews and summaries of interviews. The Voinovich School wishes to thank Shawnee State University, all of the participating schools and The Ohio Department of Education for commitment to student achievement and support of this evaluation.

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## Executive Summary

The Dual Enrollment Access in Mathematics using the Flipped Format to Increase Student Achievement (DEAMFISA) Straight A grant and this evaluation conducted by Ohio University's Voinovich School of Leadership and Public Affairs are funded by the Ohio Department of Education. The principal aim of the project is to increase student achievement through access to Flipped dual enrollment mathematics courses. In 2013/2014 20 high school teachers received professional development in the Flipped format for course delivery and received support to acquire the credentials necessary for teaching dual credit courses. Dual credit courses include both high school and college credits. This evaluation report primarily focuses on the activities and short term outcomes for the 2015/2016 academic year.

## Primary Findings

<ul style="list-style-type: none"><li>• In the 2015/2016 academic year 11 of the teachers credentialed through the Straight A grant, offered 36 dual enrollment mathematics courses through Shawnee State University (SSU).</li></ul>
<ul style="list-style-type: none"><li>• Two hundred and forty-two students (at least 96 unduplicated individual students) received 787 college mathematics credits in 2015/2016 via dual enrollment mathematics courses taught by DEAMFISA straight A grant credentialed teachers.</li></ul>
<ul style="list-style-type: none"><li>• Of the thirteen original districts, 10 have at least one of the original participating teachers offering dual enrollment mathematics courses as of the 2015/2016 academic year.</li></ul>
<ul style="list-style-type: none"><li>• The majority of interviewed teachers report that the project has had a positive effect on their teaching and mathematics content knowledge.</li></ul>
<ul style="list-style-type: none"><li>• Teachers continue to offer Flipped dual enrollment mathematics courses and identify many benefits of the Flipped model.</li></ul>

## Methodology

- Interviews with nine teachers and six administrators (principals, guidance counselors, or superintendents) in the participating districts.
- Review of dual enrollment data provided by Shawnee State University for the participating school districts.
- Analysis of baseline post-secondary enrollment data from the Ohio Department of Education.

## Introduction

Portsmouth City Schools was the lead applicant for this Straight A grant funded project. Shawnee State University and 12 additional school districts participate in the partnership. Ohio University's Voinovich School of Leadership and Public Affairs serves as the external evaluator for the Dual Enrollment in Mathematics using the Flipped Format to Increase Student Achievement (DEAMFISA) Straight A grant funded project. The project and evaluation are funded by the Ohio Department of Education. The two proposed goals of the project are:

- Increasing the achievement of high school students in the Southern Appalachian region of Ohio by giving them the opportunity to learn mathematics at a college level through "Flipped" dual enrollment courses.
- The secondary goal is to increase the number of dual credit opportunities in the region by supporting area math teachers seeking to earn the credentials to offer dual credit courses with the resources necessary to start the master's in mathematics program at Shawnee State University (offered in an accessible format allowing teachers to continue their current teaching responsibilities).

In 2013/2014 local high school teachers received professional development in the Flipped format for course delivery and received support to acquire the credentials necessary for teaching dual credit courses. Dual credit courses include both high school and college credits. This evaluation report provides information from prior years but focuses on the activities and outcomes for the 2015/2016 academic year.

## Student Achievement

In the 2015/2016 academic year, students were awarded 787 college mathematics credit hours. Specifically, in August 2016 aggregate data (by high school) on student enrollment in dual enrollment courses, course completion and number of credits received was obtained from Shawnee State University. Ten school districts offered dual enrollment mathematics courses through Shawnee State University in the 2015/2016 academic year. The total student enrollment was 249 of whom, 242 completed the courses and received college and high school credit.

One measure of the success of the project is the percentage of students enrolling in post-secondary education after leaving high school. Baseline (2013 high school graduates) data on student enrollment in college within two-years of leaving high school shows 33.3% to 76% of students in the participating districts enrolling in college. These data will continue to be collected and reported as a longer term outcome measure of the DEAMFISA project. The percentage of baseline college enrollment for all participating districts is included in Appendix 1.

Administrators note that by taking these courses, students have the ability to gain self-confidence, practice learning college material, relieve some financial burden, and earn the credit for their hard work. For example, *“To have that opportunity and to have a measure of success before graduation, is huge,” “The project has also helped ensure that students receive a rigorous course load, and we want to challenge our juniors and seniors, and we want to prepare them for college,”* and *“They can get a head start saving themselves some money and their family some money, too.”*

Another topic discussed frequently in the interviews is student confidence related to college success. Five of the interviewed teachers recognized increased confidence in their students saying, *“... it definitely has increased because it kind of shows the kids that ‘hey, I can do this.’”* Other teachers noticed how important it was for this program to instill confidence in first-generation college students. One teacher explained:

*“... especially in our area, you have students who their parents didn’t go to college, their grandparents didn’t go to college, their great grandparents didn’t go to college... And then if they also have these college classes under their belt, and they were successful in them, they can think ‘hey, if I was successful in these college classes, what’s stopping me from going on to college and being more successful there too?’”*

As a result, the dual enrollment classes give students a belief in themselves that they are capable of taking college classes and succeeding in them. With more high school students thinking about becoming a first-generation college student, the dual enrollment program provides the opportunity of a college education to wider variety of students, in spite of economic, familial, or personal factors. One teacher explained, *“I have had a lot of students who are lower income that I would have not foreseen them going and they chose to go,”* while another stated, *“...it gave my students the opportunity to be able to receive the college credit here because most of them would not have attended the college.”* With that, three of the interviewed teachers believed the dual enrollment classes at their school has increased student enrollment in college after high school.

## Teacher Credentialing

Many of the initially credentialed teachers continue to provide dual enrollment mathematics courses for numerous area high school students. Twenty teachers from 13 school districts were invited to participate in the DEAMFISA project. Of those 20 teachers, 15 were credentialed and taught dual enrollment mathematics courses in 2014/2015 and 11 continued to teach dual enrollment mathematics courses with Shawnee State University (SSU) in the 2015/2016 academic year.



Of nine interviewed teachers, two have successfully completed the entire Mathematics Master's program at SSU, four are in the process or planning to complete the Mathematics Master's program, and three of the interviewed teachers do not plan on completing Mathematics Master's program. One reason teachers provided for not pursuing their Mathematics Master's at Shawnee State University was that they had already completed a Master's program in another area.

Teachers discussed how the Mathematics Master's courses affected their teaching. Five of the interviewed teachers stated that they felt more prepared to teach their students and that the Mathematics Master's courses deepened or refreshed their understanding of the most difficult subjects in mathematics, like statistics and geometric proofs. One teacher explained that the Mathematics Master's courses, "*... just broadened my understanding; I have deeper understanding, more theoretical, of some of the math. I feel like that has helped me a little bit and in my explanation, as far as day to day.*" Additionally, three of the interviewed teachers felt more prepared to teach college or upper-level courses because of what they learned in the Mathematics Master's courses. One teacher was excited for this opportunity saying, "*I get to teach these, you know, upper level classes where ... I tend to get higher achieving kids ...*" while another suggested, "*... you know if I wanted to go in and jump to college ... it gives me other options and ways to teach as opposed to just teaching Algebra 1 or Calculus.*" On the other hand, three of the interviewed teachers saw no impact in their teaching after taking Mathematics Master's courses and

therefore did not necessarily feel more prepared to teach their students. One teacher mentioned:

*“... in terms of the actual Master’s degree I wouldn’t say that the Master’s degree in math has helped my teaching practice because it’s been more so ... driven towards just a Master’s degree in math, not focusing on math education or any techniques of teaching math.”*

## Dual Enrollment Courses

The project has successfully allowed districts to continue to offer dual enrollment mathematics courses. Dual enrollment data obtained from SSU includes 15 year-long and 21 single semester (Fall or Spring) dual enrollment mathematics courses taught in the 2015/2016 academic year.

According to three interviewed administrators, the number of students enrolled in dual enrollment courses compared to non-dual enrollment courses has increased. For example, one administrator mentioned that their school’s dual enrollment courses have higher enrollment than non-dual enrollment courses. They responded, *“Our Pre-Calculus classes have less -- enrollment because they’re taking stats and taking dual enrollment classes.”* Administrators also stated, *“We’ve had fewer students elect to go to College Credit Plus classes off campus,”* and *“We have actually less students in post-secondary options at Shawnee State, as far as physically going to the college.”* Of the six administrators, all reported that because of the offered courses, students are more likely to remain at school to earn college credit rather than drive to a separate college. As a result, the dual enrollment offers more opportunity to students who may not have been able to leave the high school to attend dual credit courses on a college campus.. For example, administrators reported, *“That’s been the biggest advantage, that we can keep those in house now, and otherwise the kids probably wouldn’t have participated in it at all,”* and *“This project itself has expanded our numbers of students staying at the high school to take courses as an alternative to driving to college for CCP classes.”* Each administrator indicated that students now have the opportunity to receive college credit for courses. By taking these courses, students have the ability to gain self-confidence, practice learning college material, relieve some financial burden, and earn the credit for their hard work. Responses include *“To have that opportunity and to have a measure of success before graduation, is huge,”* *“The project has also helped ensure that students receive a rigorous course load, and we want to challenge our juniors and seniors, and we want to prepare them for college,”* and *“They can get a head start saving themselves some money and their family some money, too.”*

However, three administrators also reported some difficulty with strict college requirements. One stated that students *“have to make sure they can go through the process and qualify to get the credit. Now they can take the class and not receive the credit, so they’re still getting that benefit of it, but a majority of them, there’s only a few that are not getting the credit because they may have not met the quota [sic:*

*criteria] for that class.” While these students gain experience and confidence working with college material, they are financially and academically disadvantaged because they are not receiving the college credits. Another administrator stated that for some unknown reason “This year Shawnee State declined a bunch of those kids.” Some of the students who were previously earning dual enrollment college credits are no longer receiving those credits because Shawnee State altered their criteria.*

While a majority of the teachers suggested the program was increasing student enrollment because of the many benefits it offers, one interviewed teacher discussed a decrease in student dual enrollment due to a miscommunication with Shawnee State in terms of acceptance. This teacher mentioned that the college mistakenly denied students who actually qualified for dual enrollment, leading to an overall decrease in student enrollment for the district. This teacher stated:

*“... then we had a lot of students that went down there to take the placement test, receiving denial letters that actually were acceptance because their scores were good enough. So, it was a lot of paperwork that just wasn’t good.”*

Additionally, two interviewed teachers noticed that the acceptance requirements changed, which may have influenced a change in student enrollment in the dual credit program. The requirements changed from using the students’ grade point average (GPA) to using a placement test or the students’ ACT scores as qualifications. One teacher explained this change:

*“The first year they did not have to take a placement test to get into the program ... they used their grade point average and ... whether or not they had an algebra II credit. And, this past year they ended up having to take the placement test in order to—or ACTs score—in order to become accepted into the program. ... I don’t believe that it was communicated well with the students that that’s what they had to do this year.”*

In some districts, the miscommunication of the requirements of enrolling in dual credit classes were not clearly communicated, which ultimately led to less students enrolling in the program.

## Flipped Courses

In the 2015/2016 academic year, three administrators reported that flipped courses have been very beneficial to both students and teachers. Responses include *“The flips’ been crucial for us, you know the kids can watch their videos and things in the evening and do their short and assigned listening and come in the next day and actually get the direct instruction from their teachers”* and *“They are still flipped and we actually are doing that for some of our Algebra classes, to try to help our kids out a little bit. This is a trial run for us, and our teachers love it and the kids actually they like it too.”* In addition, one

administrator reported that flipped courses provided a *“different opportunity for kids that exposed them to something different than a traditional classroom.”*

The interviewed teachers mentioned some of the benefits that the flipped format offered to their classroom and students. Four teachers mentioned that they enjoyed the increased one-on-one class time with students stating, *“I am able to, um, get more one-on-one time with my students during class time instead of teaching to the whole group.”* Two teachers noticed the faster pace that their classes adopted explaining, *“I think they allowed things to move at a quicker pace because typically with that level of mathematics I would be using the majority of the class time as lecture time.”* Four discussed the benefit of having more time for discussion and practice during class as a direct result of their flipped format DE courses. One teacher stated:

*“The benefits to me are we give the students much more time in class to practice ... where the students get guided practice so if they’re working on something and they’re not really sure ... [how] to do the problems, they don’t have to wait ‘til the next day to ask me ... It just seems to be more efficient practice time.”*

Of the materials developed in 2014 for the Flipped dual enrollment courses as part of the Straight A grant, the interviewed teachers stated that they used most if not all of them with responses like *“I’ve used a majority of them.”* Some of the teachers even decided to develop more videos for their students to either supplement or completely replace the existing ones with others suggesting that the original videos needed some updating. One teacher stated, *“I felt like we needed to take in the couple sessions and learn how to make the videos.”* Three of the interviewed teachers suggested that more time should be spent on developing the videos in the classes instead of rushing through the process with one teacher stating, *“So I wasted a lot of time at the beginning making the videos because I was unsure of how, you know, to use the equipment. Like, I felt like we needed a couple of sessions of here’s how we use the equipment to make these videos.”* Many of the interviewed teachers have flipped at least one of their dual enrollment mathematics courses explaining, *“College Algebra and my Trig class are almost ... exclusively flipped. We used all of the materials; we watch all of the videos outside of class, come in, and practice in class.”* However, seven teachers chose not to exclusively flip at least one of their dual enrollment mathematics courses, and instead, these teachers integrated the flipped online format with the traditional teaching format. Despite the benefits, there are still difficulties with the dual enrollment Flipped courses that should be recognized. One of the biggest difficulties, which five of the interviewed teachers discussed, was motivating the students to watch the videos on their own time and *“Getting the students to watch the videos, and take notes, and pay attention to the videos. Trying to get them ... to treat it like you are*

*actually in the classroom.*” Some teachers suggested this to be a result of the students disliking the videos made with different teachers’ lectures.

## Conclusion

The DEAMFISA project continues to impact the two proposed goals of increasing the achievement of high school students through "Flipped" dual enrollment mathematics courses and increasing the number of dual credit opportunities in the region by supporting mathematics teachers through the credentialing process. The teacher credentialing afforded numerous high school students continued access to dual enrollment courses and receipt of college credits. Teachers also continue to use the Flipped course materials developed in the first year of the project. While there were some challenges related to Flipped courses and changes in SSU student acceptance criteria, overall the project is perceived positively by administrators and teachers. They believe the impact on students is very positive.

## Appendix 1 Baseline College Enrollment

DEAMFISA - Percent of 2013 high school graduates enrolled in college within 2 years of high school				
District IRN	District Name	Students in the 2013 4 Year Graduation Cohort Enrolled in College within 2 Years of Graduation	2013 4 Year Graduation Cohort Denominator	Percent of 2013 4 Year Graduation Cohort Enrolled in College within 2 Years of High School
044123	Hillsboro City	80	181	44.2
044461	New Boston Local	17	31	54.8
044669	Portsmouth City	52	102	51.0
047928	Dawson-Bryant Local	58	104	55.8
049122	Eastern Local	27	65	41.5
049155	Western Local	18	54	33.3
049619	Green Local	22	47	46.8
049627	Minford Local	55	94	58.5
049635	Northwest Local	45	100	45.0
049650	Washington-Nile Local	60	109	55.0
050005	Manchester Local	96	127	75.6
061903	Adams County Ohio Valley Local	122	314	38.9

The 2016 Report Card contains a new measure reflecting the percentage of students who were enrolled in a 2- or 4-year college for at least 60 days within two years of high school graduation for schools and districts. This information is gathered through the National Student Clearinghouse Research Center (NSC; <http://nscresearchcenter.org/>).

Institutes of Higher Education (IHE) across the nation submit their enrollment data to NSC, and these data are matched with Ohio Department of Education (ODE) student data. In 2016, ODE received two years of college enrollment data for the 2013 graduation cohort (those students who entered 9th grade four years prior to the cohort year – i.e., freshmen in 2010 for the 2013 cohort), and three years of college enrollment data for the 2012 graduation cohort (those students who entered 9th grade five years prior to the cohort year – i.e., freshmen in 2009 for the 2012 cohort). For the 2016 Report Card, the denominator of the college enrollment measure is students in the 2013 4-year and 2012 5-year graduation cohorts. Because the graduation date for each student in the graduation cohort is unique (i.e., students may graduate early, on time, or late), a college enrollment deadline of Sept. 30 two years after the 4-year cohort graduation year and three years after the 5-year cohort graduation year was established to give time for students to graduate over the summer and enroll in college.