

Considerations for Planning, Funding, and Operating Specialized Schools

The Gatton Academy of Mathematics and Science in Kentucky

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The Carol Martin Gatton Academy of Mathematics and Science in Kentucky welcomed its first classes in the fall of 2007. The mission of The Gatton Academy is to provide a residential program for bright, highly motivated Kentucky high school students interested in pursuing advanced careers in science, technology, engineering, and mathematics (STEM). The school seeks to provide its students with the companionship of peers; encourage students to develop creativity, curiosity, reasoning ability, and self-discipline that lead to independent thought and action; and aid students in developing integrity that will enable them to benefit society. In addition, The Gatton Academy nurtures future leadership, investing in economic benefits for Kentucky. This mission provided the impetus for the Kentucky General Assembly to allocate funding for tuition, room, and meals for 120 high school juniors and seniors to live and learn together (more recently the number was raised to 200 students). At the same time, The Gatton Academy students are college freshmen and sophomores who take only university classes with other students on the campus of Western Kentucky University (WKU) in Bowling Green, KY.

Fifteen states provide funding for a residential school focusing on science and mathematics. These schools represent two models—one is the university model, as the school is located on a university campus, and the other is an

independent school with its own campus. Table 8.1 provides the histories and locations of these schools, lists the model, and includes the schools' websites.

A University-Based Model

A university-based model, The Gatton Academy is an integral part of WKU and, as such, has access to all of the faculty, services, and amenities of a public institution of higher education. Instead of building a new residence hall, an existing dorm, Florence Schneider Hall, was retrofitted to be the dormitory and offices of The Gatton Academy. It houses the residential students and the residential staff. With two wings, each dedicated to a different gender, the residence hall has common areas for all students, as well as separate gathering places on each wing and a computer lab. The staff is located on the ground floor, making staff members easily accessible to students. Reenvisioning an existing residence hall (instead of purchasing land and building a standalone school) is just one of the benefits of the university-based model.

Instead of hiring a separate faculty as standalone residential schools do, The Gatton Academy relies on the WKU faculty. Students not only benefit from the expertise and experience of their professors and instructors, but they also participate in collegiate-level research endeavors led by these professors. Of course, this research, as well as the classes themselves, takes place in university-scaled laboratories. Utilizing existing university professors not only ensures qualified, cutting-edge instruction and research, but it is also tremendously cost-efficient.

Equally cost-efficient are the myriad amenities and services Gatton students receive as WKU students:

- **Health services:** Gatton students have access to health services for routine and emergency health care right on campus. Insurance is also an option.
- **Dining services:** WKU offers numerous eating options, from the cafeteria to the only Steak 'n Shake on a college campus. Academy students have meal plans furnished, so they can eat at any of the more than 20 restaurants.
- **Recreational services:** Gatton students have full access to the Preston Center, WKU's athletic and recreational center, complete with fitness areas, group fitness classes, a natatorium, indoor walking track, and more.
- **Enrichment and extracurricular services:** Gatton students may participate in any extracurricular activity or enrichment opportunity

TABLE 8.1
Basic Information About State Residential STEM Schools

School	Opening Year	Location	Model	Website
Alabama School of Mathematics and Science	1991	Mobile, AL	Autonomous	https://www.asms.net
Arkansas School for Mathematics, Sciences and the Arts	1993	Hot Springs, AR	Autonomous	http://www.asmsa.org
Craft Academy for Excellence in Science and Mathematics	2015	Morehead State University Morehead, KY	University	http://www.moreheadstate.edu/craft-academy
The Gatton Academy of Mathematics and Science in Kentucky	2007	Western Kentucky University Bowling Green, KY	University	https://www.wku.edu/academy
Georgia Academy	1997	Cochran, GA	University	https://www.mga.edu/georgia-academy
Illinois Mathematics and Science Academy	1986	Aurora, IL	Autonomous	https://www.imsa.edu
The Indiana Academy for Science, Mathematics, and Humanities	1990	Muncie, IN	Autonomous	https://academy.bsu.edu
Kansas Academy of Mathematics and Science	2009	Fort Hays State University Hays, KS	University	https://www.fhsu.edu/kams
Louisiana School for Math, Science and the Arts	1983	Natchitoches, LA	Autonomous	https://www.lsmsa.edu
Maine School of Science and Mathematics	1995	Limestone, ME	Autonomous	https://www.mssm.org
The Mississippi School for Mathematics and Science	1987	Columbus, MS	Autonomous	http://www.themsms.org

TABLE 8.1. Continued.

School	Opening Year	Location	Model	Website
North Carolina School of Science and Mathematics	1980	Durham, NC	Autonomous	http://www.ncssm.edu
Oklahoma School of Science and Mathematics	1990	Oklahoma City, OK	Autonomous	http://www.ossm.edu
South Carolina Governor's School for Science and Mathematics	1988	Hartsville, SC	Autonomous	https://www.scgssm.org
Texas Academy of Mathematics and Science	1988	University of North Texas Denton, TX	University	http://tams.unt.edu

Note. Adapted from “State Residential STEM Schools: A Model for Accelerated Learning” by Julia L. Roberts and Corey Alderdice, in *A Nation Empowered: Evidence Trumps the Excuses That Hold Back America’s Brightest Students* (Vol 2., p. 139), by S. G. Assouline, N. Colangelo, J. VanTassel-Baska, & A. Lupkowski-Shoplik (Eds.), 2015, Iowa City: The University of Iowa, The Connie Belin & Jacqueline N. Blank International Center for Gifted Education and Talent Development. Copyright 2015 by The Connie Belin & Jacqueline N. Blank International Center for Gifted Education and Talent Development. Adapted with permission.

offered through WKU except for NCAA sports and Greek social organizations. Students have served as presidents of student-professional organizations, played in the marching band, belonged to university clubs, and one was even Big Red, WKU's award-winning mascot.

- **Technology:** As WKU students, Gatton students may access computer labs across campus as well as computer repair. They also have full access to the state-of-the-art library, complete with digital periodicals, journals, DVDs, and more.

As part of the university, The Gatton Academy also taps into many services offered through WKU, which saves the budget tens of thousands of dollars each year:

- **Custodial services:** WKU provides building service attendants who clean the entire building.
- **Support services:** The Gatton Academy has access to special event planners, graphic designers, public relations specialists, the police department—any service provided by the university. Gatton also has a development officer who oversees fundraising, gifts, and endowments.

From university personnel to services, The Gatton Academy and its students benefit greatly from the university-based model for a residential academy.

The Beginning

A small proposal submitted to the Kentucky Council of Higher Education in 1997 marked the beginning of a 10-year advocacy journey that led to the opening of The Gatton Academy. As with many advocacy plans, there were times of encouragement and others fraught with disappointment. What held steady through the advocacy was the location for the residential school at WKU, due to the history of The Center for Gifted Studies providing programming for children and young people, and the College of Education and Behavioral Sciences offering graduate coursework in gifted and talented education.

Three incentives proved important in gaining the support of superintendents across the Commonwealth. First, students' state assessment scores would be counted with those at the high schools from which they came, their "sending schools." The second was that funding for the students would remain with their sending high schools, with The Gatton Academy receiving separate funding. Third, The Gatton Academy offered an option for students who were ready for more advanced learning than the sending high schools could provide.

Together, these important considerations combined to sell the concept of a residential school with a focus on math and science to school officials across the state, as well as to legislators.

Once funding was secured, planning began. One year was devoted to planning, getting the word out across the state about this new residential school, and recruiting the first classes of students (that was the one year there was a new class of juniors and seniors). That planning year was also the time for the renovation of Florence Schneider Hall, the designated home for The Gatton Academy. This building is located in the center of the WKU campus, an ideal location.

The planning year also was the time for building the philosophical foundation of The Gatton Academy. The Center for Gifted Studies led the way in hiring the core staff needed for marketing and recruiting future students, a task that was challenging, as there were no former students to tell their stories or parents who could assure other parents of the positive experiences that The Gatton Academy had provided their young people. One could not walk inside the building, as it was in construction mode. In spite of these obstacles, recruiting continued, and the staff was actively involved in planning for the arrival of students in the fall of 2007. For the first year only, a class of juniors and a class of seniors entered The Gatton Academy together, as funding was available for 120 students. The first classes of Gatton Academy students came to a beautiful building retrofitted for them with a staff dedicated to ensuring that learning at advanced levels was important, as was the development of the whole individual. The philosophy and mission were in place to guide decisions well into the future.

How The Gatton Academy Operates

The Gatton Academy's university-based model ensures the program is able to focus in specific ways to support students' academic, social, and emotional needs. Students' academic needs are met by their full immersion into university classes for all of their courses. This provides a level of challenge that students typically have not encountered before. Their acceleration into college provides a challenge both in the level of content and independent learning required by the type of instruction typical of the college level. Students' social-emotional needs are met by the programming and support network provided by Gatton staff and a residential community specifically designed for high-ability high school students.

Table 8.2 provides an overview of The Gatton Academy's staff titles and responsibilities. Although some staff members provide services similar to those in a typical high school, such as the director filling a role similar to that of a principal, most staff members fill highly specialized roles, such as the assistant director of residential life. All staff members focus on supporting students in their academic, social, emotional, and personal growth.

Academics

The Gatton Academy focuses on STEM education. The admissions process is designed to identify students with strengths and interests in these areas. The core academic requirements, then, also focus on these content areas. The core curriculum is designed to ensure students receive high-level instruction in mathematics and multiple science fields. Figure 8.1 summarizes course requirements. Students are registered for the individually appropriate levels of mathematics and science courses based on courses they completed at their previous high schools and their performances on the ACT, SAT, and AP exams.

Gatton students are considered both high school and college students. They receive a high school diploma upon graduation and earn a minimum of 60 college credit hours. Therefore, they must meet all of the state high school graduation requirements. The state graduation requirements students have remaining when they enter The Gatton Academy vary greatly by student. Students' transcripts from their sending schools are audited to determine which graduation requirements have been met. Students are given the freedom to choose if they would like to meet their remaining requirements through WKU courses or on their own through other means, such as online through their sending schools during winter breaks or summers.

Students are required to enroll in a minimum of 12 hours each semester, which is full-time status at WKU, and they are allowed to take a maximum of 19 hours a semester. All Gatton students are enrolled in a one-hour seminar course each semester, except their last semester of their senior year. The seminar courses, taught by Gatton staff, focus on noncognitive skills, or soft skills, that are important for long-term success. Topics include study skills, how to approach professors for help, community values, stress management, health and wellness, perseverance, and planning for college.

The Gatton Academy offers three significant academic enrichment opportunities that are possible due to the university-based model: research, study abroad, and STEM+ Critical Languages. The university has a focus on providing undergraduate research opportunities, which benefits Gatton students.

TABLE 8.2
Gatton Academy Staff

Title	General Responsibilities
Executive Director	Oversight of the school; advocacy
Director	Administration and oversight of the school, including budget, personnel, student discipline
Assistant Director for Admissions and Public Relations	Oversight of the admissions process, recruitment, media relations, social media, website
Coordinator of Alumni Relations and Recruitment*	Alumni network and events; recruitment
Assistant Director for Academic Services	Oversight of registration, transcripts, academic support programs, research, study abroad, STEM + Critical Languages
Coordinator of Academic Services	Academic support and intervention; course registration; transcripts
Coordinator of Academic Opportunities*	Research Internship Grant (RIG) program; internships; academic and research competitions
Assistant Director for Counseling Services	Oversight of mental health services, college counseling, wellness programming
Coordinator of College Counseling	College counseling
Counselor*	Mental health services and wellness programming
Assistant Director for Residential Life	Oversight of the residential program, discipline, safety and security, building maintenance
Coordinator of Student Activities*	Extracurricular competitions, clubs, weekend activities, residential programming
Residential Counselor (7 originally, 8 after expansion)	Residential supervision of students, residential community development, student support

* Positions added as part of the expansion. Please see page 117 regarding the expansion.

Gatton staff work with students to identify university faculty who have active research projects related to students' interests. Workshops are offered to teach students how to approach faculty about joining research projects or to propose new projects. Student involvement in research may last a semester or continue throughout their 2 years at the Academy. It is equally as valuable for students to discover subjects or fields they love as it is to identify those that are not the right fit. Although participating in research is not a requirement at The Gatton Academy, more than 80% of students participate for one semester or longer while enrolled.

The Gatton Academy strives to prepare students to become leaders in the state and beyond. They must be ready to navigate an increasingly connected and global society. The Gatton Academy has developed several study abroad programs exclusively for Gatton students, although Gatton students may also

The Gatton Academy Curriculum Requirements

Mathematics—Three courses, through Calculus II

Science—Five courses and corresponding labs

- Biology
- Chemistry
- Physics
- Computer Science
- A sequential course in one of the above

Computational Problem Solving—One course, cotaught by mathematics and computer science professors

STEM Electives—Three courses, any course determined by The Gatton Academy to be STEM or STEM-related (two STEM+ Critical Language courses may be used to meet two of these requirements)

English—Two courses, one each year

Courses to meet remaining state high school pre-college graduation requirements

FIGURE 8.1. The Gatton Academy curriculum requirements.

participate in study abroad programs offered by WKU. The academy takes advantage of the university calendar, which includes an optional winter term of about three weeks. The academy has two study abroad programs that take place during this time each year. One faculty-led study abroad program takes students to Costa Rica to study biodiversity, for which students receive credit for a biology course. The second study abroad program takes students to Greece or Italy; the destination alternates each year. This program is focused on culture, history, and art, and is not credit-bearing. The third study abroad program occurs during the summer and takes place in London and Grantham, England. It is a faculty-led program for which students receive three English credits. In order to make study abroad affordable for students, the cost of programs is subsidized by the academy's budget and additional needs-based scholarships. More than 80% of Gatton students travel on at least one Gatton-specific study abroad program while at the academy, and many students participate in multiple programs.

STEM+ Critical Languages is the third enrichment opportunity offered by The Gatton Academy. Currently, the program includes Arabic, Chinese, and Russian. These languages have been designated as critical by the United States Department of State, languages vital to national economic and security interests but which are not commonly taught. Students in this program take four semesters of intensive language instruction. In addition to their courses, students participate in monthly STEM+ talks specific to their world languages. These talks include cultural activities as well as scholarship opportunities.

Extracurricular Options

As both high school and college students, Gatton students are eligible for internships and competitions at both levels. They are encouraged to apply for a variety of internship opportunities, particularly those that provide living expenses in addition to internship experiences. Gatton staff support students as they prepare their applications for these competitive opportunities. Students have also participated in internships at various universities and research labs across the nation. In addition, Gatton staff work to build relationships with businesses across the state to develop internship opportunities specifically for Gatton students.

The undergraduate research opportunities in which Gatton students participate facilitate their preparation for research competitions, such as the Siemens Competition in Math, Science, and Technology. Students participating in research are also encouraged to submit their work for the Regeneron Science Talent Search (formerly sponsored by Intel). These are research competitions for high school students. Gatton students are also supported in preparing submissions for the Barry M. Goldwater Scholarship, which is for college sophomores interested in pursuing research in science, engineering, or mathematics. Gatton seniors are considered along with other WKU students for the university's four nominations. The National Security Language Initiative for Youth (NSLI-Y) program allows students to spend a summer immersed in learning a language and becoming familiar with a culture. Gatton students have been awarded the opportunity to study Arabic in Morocco, Russian in Moldova, and Korean in South Korea, among others, through the NSLI-Y program. Gatton students have been quite successful in their applications for each of these competitions.

Gatton students have a wide array of opportunities to participate in extracurricular activities. They may participate in activities offered by WKU, at their sending high schools, and at The Gatton Academy. Students interested in continuing with athletic activities are encouraged to get involved with WKU's extensive intramural and club sports program. Gatton offers a wide array of clubs and interest groups, which are all student-led. These range from high school speech and debate to a service organization that provides enrichment at a local elementary school.

Student Support

Students at The Gatton Academy experience a number of challenges all at once. They are accelerated academically into a rigorous environment where they will need to study and ask for help for the first time. They are immersed in an environment where there are others as academically talented as they are, or more so. They have moved away from home 2 years earlier than their age-mates and must develop independent living skills and navigate with a roommate. For gifted and talented and high-ability students who tend to experience things intensely, any one of these challenges might present a need for support. All of them at once can be overwhelming. The academy has developed an extensive system of support to address the students' psychological, academic, and social needs.

Gatton staff provide direct counseling and mental health services for students, including individual responsive services and preventative programming. When students begin to realize they may not get an A, they often question their abilities and their identities, asking themselves, "If I am not the person who knows the answer without effort, then who am I?" Short-term individual counseling can help students work through this. Occasionally students may have mental health issues, such as anxiety or depression, that come to light. This is not unlike the similar occurrence in college freshmen. For some students, support from Gatton staff may be all that is needed for students to develop strategies to deal with these issues. For others, the Assistant Director of Counseling Services may refer students to an external clinician or other professional for more intensive intervention.

The Gatton Academy provides a system of academic support in addition to psychological support. Students who have rarely, if ever, experienced an academic challenge are often slow to accept they must develop new skills when suddenly experiencing academic difficulty. The academy has established a community focused on support rather than competition. Students are discouraged from comparing grades and test scores. There is no honor roll or class rank. Students learn that each of them has strengths that contribute to the community and that each of them needs help with something. To establish the habit of studying, all incoming juniors are required to log study hours for the first few weeks of classes. In addition, the academy provides tutors specifically for Gatton students who are available 5 days a week within the residence hall. Students simply need to approach a tutor to ask for help. For students who are unaccustomed to asking for help, accessing help needs to be as easy as possible.

The university model presents challenges to monitoring students' academic progress. Unlike in high school, universities do not produce progress reports every few weeks, and parents and academy staff do not have ready access to stu-

dents' grades. In addition, grading varies from professor to professor in expectations, grading curves, and definitions for each letter grade. To accommodate for these challenges, the academy has developed several practices. All Gatton students are required to have their professors complete a form to document their grades and attendance at the end of the fifth week of classes. At the 11th week of class, a Gatton staff member directly contacts professors who are teaching Gatton students to request updated grades and attendance information. Students with multiple Cs or grades of D or below at either checkpoint are placed on an academic contract with specific requirements, such as additional study hours or attending professors' office hours. The contract also requires weekly meetings with Gatton staff members. Parents are sent a copy of their students' academic contracts and informed about the students' grades.

The Gatton Academy has strict attendance policies, as students who fail to attend classes regularly tend to have academic problems. However, attendance is very difficult to track in the university setting. Some professors take attendance for every class; others do not take attendance at all. Professors typically handle attendance through their grading policies. Gatton staff have worked to build relationships with professors across campus. Those who often have Gatton students in their classes are more likely to know the academy's attendance policy and to notify Gatton staff when students miss a class. Students with unexcused absences are placed on attendance contracts with restrictions to their residential privileges and requirements to meet with Gatton counseling staff. Subsequent absences are grounds for dismissal. Parents are informed in all of these cases.

The residential support needs of Gatton students are greater than those of typical college students. Although Gatton students integrate academically into WKU for their courses, research opportunities, and extracurricular activities, they primarily socialize within the Gatton community. Residential staff play a key role in supporting students. A residential counselor lives on each wing of the residence hall. These full-time professional staff members, who have completed bachelor's degrees, supervise the students on their wings. They plan wing activities and programs designed to build community and personal skills. The residential counselors meet with each student individually on a regular basis to check on how the student is doing academically, socially, and emotionally. In addition, they conduct curfew checks, maintain behavioral expectations in the building, and provide transportation for students. The residential program is designed to provide the programming and support 14- to 18-year-old students' need, while allowing them the freedom to develop independent living skills.

Developmentally appropriate recreational and social activities are important components of meeting students' social and emotional needs. Residential staff plan weekend activities for students as well as special events. Each week-

end, a variety of activities are planned for which students may sign up. In addition, the academy hosts a fall formal and prom each year. Like at any high school, Gatton's prom is a highlight of the year for students.

Expanding The Gatton Academy

The original goal was to have a school for 200 high school juniors and seniors; however, the initial funding provided for 120 students and maintaining the footprint of the building when it was retrofitted. After The Gatton Academy had achieved success both in terms of individual student achievements and the recognition of the school as the number one public high school in the United States by *Newsweek* and *The Daily Beast* in 2012, 2013, and 2014, it seemed time to build support for expanding the student numbers to the original goal. That, of course, required gaining additional financial support from the Kentucky General Assembly and finding private funds for expanding Florence Schneider Hall, which was a multiyear process.

The \$10 million expansion included additional rooms needed to accommodate 200 Gatton students, office space for new staff (see Table 8.2), and the Great Hall. The Great Hall is large enough to accommodate all 200 students plus staff for seminars and special occasions, as well as to serve as study space throughout the day and during the evening. In the fall of 2016, students and staff moved back into Schneider Hall, which is also home to The Center for Gifted Studies.

Summary

The Gatton Academy is a specialized school structured to meet the needs of bright, highly motivated students. By utilizing the university-based model, the school efficiently and effectively provides the academic opportunities of the highest level for talented students from across the state. Careful planning and the development of policies and practices that focus extensively on student support and community building have led to a highly successful school with exceptionally successful students. Students benefit from the opportunities and the support structure of the school, WKU benefits by attracting some of the highest ability students from across the state and integrating them into the university, and Kentucky benefits by ensuring some of its brightest students have the opportunity to develop to their fullest potential, enabling them to positively impact the state economically.

Questions for Reflection and Discussion

1. In considering the university model in developing and building a specialized school, which campus resources could be shared with a specialized school? What agreements would need to be established?
2. Which details of The Gatton Academy could possibly be replicated in designing a specialized school for high-ability learners in a different setting?
3. What are the advantages and disadvantages of utilizing the university model in establishing a specialized school compared to other models?
4. Who are the stakeholders that would need to be involved in supporting the establishment of a specialized school on a university campus?

Resources

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