

“Luck is what happens when preparation meets or makes, recognizes, and acts on opportunity.”

ACADEMIC EXCELLENCE BY DESIGN

The Track Record and the Capabilities of the TIMBUKTU ACADEMY

<http://www.phys.subr.edu/timbuktu.htm>

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The following, summary description of the design, operation, and results of the Timbuktu Academy speaks to its track record and related capabilities in generating academic excellence by design for individuals and entire schools. The exemplary turn-around of Forest Heights Elementary and of Prescott Middle School and the quantum leaps in ACT scores of summer, pre-college, high school participants are key bases the referenced track record and capabilities of the Timbuktu Academy as per the facts. The Academy approaches teaching, mentoring, and learning in a rigorously scientific manner – so as to remove guessing and hits and misses out of these processes.

Established in 1990-91, with funding from the Louisiana Board of Regents and the National Science Foundation (NSF), the Timbuktu Academy was expanded in 1993 following its funding by the Department of the Navy, Office of Naval Research (ONR). This establishment followed a review of the planetary literature in science and other fields (i.e., psychology, education) with a direct bearing on teaching and learning. The objectives of the Academy are (a) to produce high quality Bachelor’s degree holders in science, technology, engineering, and mathematics (STEM), (b) to send an above-national-average percentage of these alumni to the successful pursuit of graduate degrees in *STEM* fields, with emphasis on the Ph.D., and (c) to render educational and research services to the community at large, including the pre-college, federal, corporate, and other communities. The Academy is named after the former University of Timbuktu, in Mali, West Africa. Timbuktu is on the left bank of the majestic Niger River the same way Southern University and A&M College in Baton Rouge (SUBR) is on the left bank of the mighty Mississippi. As such, the Academy cannot afford to be second to any other such program, however pretentious this assertion may be. It is carrying the “*baton*” of intellectual excellence from the 14th to the 16th Century University of Timbuktu.

From 1993 to 2015, the Academy has engaged 100 to 200 precollege students in first rate, academic enrichment programs and activities during the summer, every year. In the last seven years, emphasis has been placed on middle school programs as opposed to the

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elementary and high school ones. To date, well over 2390 precollege students, from the elementary to the high school levels, have immensely benefited from the research-based, scientific approach of the Academy. Indeed, unlike many programs on the planet, including successful ones, *the Academy is grounded in the sum of current knowledge pertaining to the creation of educational, research, and professional value-added.* Its paradigm, first written in 1992, amply buttresses this claim to a rigorous, scientific approach. Additionally, the development and implementation of the 10-Strand Systemic Mentoring Model of the Academy, at the college level, partly earned for it the 2002 US Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring (US-PAESMEM). Of course, the quantity and quality of its results (in terms of student achievements) played a key role in the earning of this prestigious award. In fact, it should be noted that the Director of the Academy received the US-Presidential Award for Excellence, in its inaugural year of 1996, for his mentoring work and results.

The dramatic enhancements in students’ academic achievements, as spelled out below, have accompanying lagniappes. Indeed, closing academic achievement gaps, when done properly, is often accompanied by a *celebration of efforts and of attendant results.* The Academy, through the Board of Regents’ Speaking of Science (SoS) has reached hundreds of Louisiana elementary and high school students and teachers with its contagious enthusiasm for superior learning. Just in the fall of 2015, we made ten (10) presentations to more than 600 students, teachers, and parents in the pre-college community. Another aspect of our celebration stems from our fielding of Science Bowl Teams, in collaboration with committed and dedicated parents as coaches. When our teams returned unranked and in third place from a national competition, in Baltimore, at the dawn of the 21st Century, we referred to the Law of Human Performance and doubled our preparation efforts. In both 2003 and 2004, our senior team won the coveted, national, 1st place in Indianapolis, Indiana, and in San Diego, California. The work of the parents, two of whom are ExxonMobil employees (Ms. L. Crawley and Mr. G. Ware), earned the Academy funding from the ExxonMobil Foundation. The Academy helped produce *National Merit and National Achievement Scholars* over the years. Since 2000, there has been 55 among its pre-college students who participated in its summer academic enrichment programs!

Did the Timbuktu Academy directly work with schools? Yes, it did more work with schools than can be adequately described on a few pages. The reader is urged to consult its web site to learn about its affiliate PIPELINES project that introduced the international GLOBE program to over 60 teachers in Louisiana, with emphasis on East Baton Rouge Parish. Through this program, SUBR and EBRPSS signed a memorandum of understanding (MOU) in 2000-01 that served to engage over ten (10) schools in the Parish in this hands-on, mind-on, and reform-imbued science and mathematics education and research program. **Forest Heights Elementary**, one of these schools, earned the International GLOBE Star School status thanks to the hard work of Ms. Calloway and Ms. Brown, supported by SUBR and a dynamic principal (Ms. Carolyn Garret). (Names are provided in part to permit verification.) Through the above MOU and work, over \$200,000 were spent on EBRP schools, in terms of (a) new computers in schools for GLOBE data entry and analysis, (b) GLOBE equipment sets, (c) stipends paid to teachers for their

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participation in workshop training and follow-up meetings and activities, (d) training costs directly benefiting EBRP, and (e) travel support for teachers to attend conferences, etc.

From Failing to Exemplary Academic Growth at Forest Heights Elementary School

Can the Timbuktu Academy work with *an entire school* to disseminate and to replicate the above success of the Academy? Emphatically yes. Key individuals at the Academy have already done so, very successfully! Indeed, the work of the these individuals, through the above referenced PIPELINES project, demonstrated at Forest Heights Elementary that, *with research knowledge and know-how, basic resources, and competent, dedicated, and courageous leadership, high achievements are within the reach of every child.* [Unlike the popular “belief” approach, even in many national blueprints, this assertion is a paraphrase of the Law of Human Performance. Hence, at the Academy, *it is not a belief, it is the law, a scientific one.*] We did not have any authority whatsoever over the personnel at Forest Heights Elementary. The school already had many dedicated teachers who were simply yearning for adequate support (in know-how and on the home front, from parents, etc.) It had a leader (Principal Carolyn Garret) whose competence, dedication, and courage (CDC of leadership) guaranteed that contents, approaches, etc., unambiguously determined by research to be necessary were simply to be followed, whether that pleased anyone or not. *She is the one who met Dr. Bagayoko in front of the school System building and expressed to him the fact she direly needed help as she could not live with the low and declining scores of the students and the school.*

Key activities of turning around Forest Heights elementary included the following **(1)** a workshop with teachers on the topic of the Law of Human Performance and its applications in teaching and learning, **(2)** a workshop with teachers to revise the School Improvement Plan (SIP) to include key elements discussed in the first workshop, including regular, graded homework assignments, **(3)** three meetings with parents, with 30 minute addresses by the Academy Director on the critical role of parents (and a role no one else can play), **(4)** a pep rally with 4th to 5th grade students to promise a field trip to Orlando (all expenses paid) for all those who will complete all their homework assignments, **(5)** regular conversations with the principal to advise on the handling of some matters (including a teacher who planned to stop assigning homework because many students were not completing them (at the beginning)), **(6)** the provision of extensive duplication services to enable the assignment of homework as prescribed, and **(7)** paying for the salary of a mathematics teacher that the school district planned to take away for funding reasons!

A key and indisputable outcome of these efforts has been the Exemplary Academic Growth of Forest Heights Elementary School (with over a \$60,000 reward from the State). A related key success was the large number of students (two full bus loads) who completed all their homework throughout the year. The above academic growth is partly a result of this high homework completion. Yes, our NASA grant paid entirely for the field trip to Disney World in Orlando called the **Earth Science Expedition**. Oh, yes, these students maintained science journals describing the scenery, the flora, the fauna, the relief, on their way to and from

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Orlando and took notes about the very many shows they attended and games they played. Sliding from inclines into water is driven by gravity forces!

It is pivotal to note that Forest Heights Elementary was dramatically turned around with the same principal, the same teachers, the same students, and the same parents – contrary to some beliefs that some magical leadership or always new teachers or new students are what is needed to turn a school around. At the Timbuktu Academy, we know better than that, scientifically as opposed to anecdotally, the importance of these critical players notwithstanding. The principal, the teachers, and staff are the ones who did the work at school and in the classrooms. Our contributions have included the seven (7) activities specified above and that are critical in enabling the school staff. For instance, while the Timbuktu Academy personnel clearly succeeded in persuading parents to redouble their efforts in supporting regular and timely attendance, studying at home and completing homework, and in “being in touch and in accord with the teachers,” we doubt that school or school system personnel could be so successful. The dynamics of the situation has it that parents will tend to see these individuals as trying to place the burden on them as opposed to doing their job! Many parents described to us the excitement and commitment to learning (and homework completion) their children exhibited from 2000-01 to 2003 and beyond. In 2003, the school became an Academy of Excellence, a magnet school with emphasis on performing arts. With the School, we reactivated a PTA and that then rose to the occasion!

The Scientifically Designed and Executed Reconstitution of Prescott Middle School

In the spring of 2005, we worked with the East Baton Rouge Parish School System to write the reconstitution plan for Prescott Middle School. This plan was approved by the Louisiana Board of Elementary and Secondary (BESE) without debate. BESE had previously turned down an earlier reconstitution plan to which I did not contribute and that did not have a single reference. Our work in the implementation of this plan entails several workshops with teachers (on the Law of Human Performance and Applications, Cognitive Condensation and the implementation of “less is more,” the scientific basis of reading and application to the acquisition of fluency and comprehension, and on a problem solving paradigm).

The reconstitution plan of Prescott provided for a Community Involvement Coordinator. This person (Ms. Wanda Crump) handled the logistical issues related to getting the parents connected to Prescott. She planned the Parent Meetings at most of which Dr. Bagayoko spoke in ways similar to his address to parents of Forest Heights Elementary students.

Our activities at Prescott also included regular conversations with the Principal, monthly meeting with the Deputy Superintendent, the Principal, and the department heads to discuss various aspects of the implementation, i.e., curriculum pacing, results of EduSoft diagnostics, when administered, attendance issues, and the need to minimize suspensions (and expulsions). A positive behavior system was instituted.

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In 2005-06, the School Performance Score of Prescott was supposed to increase by no less than 8.6 points, as set by BESE. **It actually jumped by 11.2, well above the 8.6.** The significance of this feat is difficult to fathom when one does not know that Prescott was consistently and persistently going down in the performance score and that its scores were among the lowest in the state. In addition to low scores, Prescott was infamous in terms of discipline problems of all kinds. One of our earlier contributions, in the fall of 2005, consisted of advising the Principal never to assemble the late or misbehaving students in any single place. This advice followed when she called me one day to come see a totally unruly group of students. Group dynamics and peer pressure considerations were behind this recommendation whose implementation brought almost immediate improvements to the discipline problems at Prescott. We also redoubled our efforts of not granting center-stage to a student because he/she is misbehaving (in or outside class) while granting the earned attention to those behaving properly and tending to their learning.

Here again, our capabilities to reach teachers, parents, students, and others to the point where they grasp the essence of scientifically established precepts and to motivate them to engage in positive and long term actions (behavior modification) has been proven. **These capabilities can be put to work in selected Recovery School District (RSD) schools where, as usual, the expected results will be obtained – by design.** We illustrate below our past track record and capabilities as they relate to “closing academic achievement gaps” or avoiding them altogether at the high school level.

Quantum Leaps in ACT and SAT Scores, by Design

The web site of the Timbuktu Academy provides adequate information on its paradigm, programs, activities, and results. In 1997, in preparation for dissemination and replication of its fail-safe, scientific approach in the school systems, the Academy established a special academic enrichment program, Challenge 2000 (or simply Challenge), where the 20 to 40 student participants have vastly different levels of academic preparedness. Needless to add that this design was to simulate the reality in many public school classrooms! From 1997 to present, based on our scientific approach, students from the various levels of preparedness have continued to make quantum leaps in standardized test scores! In 2004, 2005, and 2006, the ACT scores of the high school participants of the six-week, residential, summer academic enrichment programs registered jumps of 2.47, 3, and 3, respectively, in their ACT scores. These students took the actual ACT before the start of the programs and took the ACT after the programs (the first time it is offered). The differences between the average post-test and the pre-test scores are the jumps in question. To appreciate fully the magnitude of these quantum leaps, one only needs to recall that a typical high school year (i.e., 36 weeks) only increases the ACT score by 2.5 points. Essentially, our results above mean that our performance is 6 times higher than that of a typical high school, when calculated on the same time scale. The respective numbers of high school student participants in 2004, 2005, and 2006 were 32, 38, and 45, respectively. In 2007, we conducted another experiment where 10 students participated in the summer programs and in the Saturday Learning Olympiads in August and September, before the October ACT test. The average ACT scores of these students jumped

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from 19 to 23, i.e., by 4 points. The ACT scores of these students, at the beginning of the programs, are generally spread out (from low to high scores). As noted above, our approach allows all the students to make significant gains, by design.

Academic Excellence in College and in Ph.D. Programs

The reader is urged to visit the web site (www.phys.subr.edu/timbuktu.htm) of the Timbuktu Academy for detailed information on the more than 200 college alumni of the Academy. These alumni were systemically mentored (and supported financially) by the Academy in collaboration with the Honors College at SUBR. They attend, succeed, and excel in graduate schools around the country, including (Caltech, Purdue, LSU, Cornell, Georgia Tech, University of Florida, Northwestern University (Indiana), University of Michigan, Rice University, University of Iowa, Cornell, etc.). **“Many talk about academic achievement gaps; at the Timbuktu Academy, we avoid and close them (if they exist on the arrival of a student at the Academy), unfailingly, by design.”**

Acknowledgments

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Illustrative Publications

1. *"The Dynamics of Student Retention: A Review and a Prescription,"* D. Bagayoko and Ella L. Kelley, Education Vol. 115, No.1, 31-39 (Fall, 1994).
2. *"Cognitive Condensation for Mastery Teaching and Learning,"* D. Bagayoko and E. L. Kelley, Education, Vol. 115, NO. 1, 19-25 (Fall 1994).
3. *"A Paradigm of Education: the Model of the Timbuktu Academy,"* W. E. Moore and D. Bagayoko, Education, Vol. 115, NO. 1, 11-18 (Fall, 1994).
4. *"Early Guidance Pays Off: Mentoring students in science, engineering and math promotes success."* Diola Bagayoko, Resource Magazine, American Society of Agricultural Engineering, published by the National Congress for Community Economic Development (NCCED), Vol. 5, No. 4, page 29, April, (1998).
5. *"A Problem Solving Paradigm,"* D. Bagayoko, E. L. Kelley, and S. Hasan. College Teaching, Pages 24-27, Winter 2000.

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6. *“Avoiding (or Closing) Academic Achievement Gaps”* by D. Bagayoko, S. Hasan, and R. L. Ford. Proceedings, 2001 LS-LAMP Conference (ISBN 0-9704609-4-5), Pages 54-56, 2001.
7. *“Closing Academic Achievement Gaps,”* D. Bagayoko. Challenge, Pages 1-2, Vol. 13, No. 1, Fall 2002.
8. *“School Improvement by Design: The Success of Prescott Middle School,”* D. Bagayoko, E. Vera, and H. Brister, J. Urban Education, Vol 4, No. 1, Pages 34-41, 2007.
9. *“A Significant Other for Effective Education: Making Adequate Time for Teaching and Learning,”* D. Bagayoko, L. Stubblefield, J. Reed, E. Kelley, and S. Hasan, J. Urban Education, Vol. 2, No. 1, Pages 42-56, 2005.
10. *“Mapping Phonics-Based Reading Skills onto the Categories of the Cognitive Domain: Implications for an Effective Approach to Teaching and Learning Reading.”* D. Bagayoko, L. S. Stubblefield, and S. Hasan. Accepted for Publication but held as proprietary information.
11. *“K-12 Outreach: The Model of the Timbuktu Academy.”* D. Bagayoko and L. Stubblefield. Invited article in the Proceedings of the 2005 Conference of the Science House, University of North Carolina. Page 15-21, 2006, ISBN No. 0-9704885-9-9.
12. *“The Philosophical Foundations of Systemic Mentoring at the Timbuktu Academy.”* D. Bagayoko. Science Next Wave, American Association for the Advancement of Science (AAAS). An online publication available at <http://nextwave.sciencemag.org/>, 2002. See also *“Basic and Advanced Research Training for the New Millennium: the Model of the Timbuktu Academy.”* D. Bagayoko, R. Bobba, E. L. Kelley, and S. Hasan. Journal of Materials Education, Vol. 24 (1-3), Pages 177-184, 2002.