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Interview Article

An interview with Ipek Saralar-Aras: early mathematical scientists

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Abstract

Mathematical giftedness is a talent area that is rarer than other talent areas. In this regard, understanding mathematical giftedness is very important. Within the framework of these issues, I conducted this interview with a researcher and expert who is also a skilled mathematician. I present to you highly useful and practical information, especially for researchers who are followers of JEGYS. I asked all the questions that could be posed concerning the training of gifted young mathematicians.

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Michael F. Shaughnessy: First, can you tell us a bit about yourself and your education and experience?

Ipek Saralar-Aras: Certainly. I hold a PhD in Education from The University of Nottingham, where I conducted research from 2017 to 2020. Prior to that, I completed my MA in Learning, Technology, and Education at the same institution. My academic journey began with a BSc in Elementary Mathematics Education at Middle East Technical University, Ankara, Turkey, followed by an MSc in Elementary Science and Maths Education. I also have a solid foundation in languages, having achieved an advanced level in English from SC International Languages, Brighton, UK, in 2012, and studied German at Middle East Technical University in 2010. My educational background is complemented by practical experience, including teaching roles at various levels, from elementary to high school, and have also worked as a research assistant at the University of Nottingham and part time lecturer at the Middle East Technical University. My passion lies in identifying and nurturing the mathematical talents of students, helping them reach their full potential.

Michael F. Shaughnessy: How did you first get involved in math and working with mathematically gifted?

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Ipek Saralar-Aras: My interest in mathematics and working with mathematically gifted students began during my post-doctoral studies when I had the opportunity to participate in a research project focused on identifying and supporting gifted learners in mathematics through my study with Prof. Dr. Mine Işıksal Bostan. This experience sparked my curiosity and passion for understanding the unique needs and challenges of gifted students and inspired me to pursue further studies and work in this area. At the time, I also discovered that my son exhibited a remarkable aptitude for music, displaying a keen interest in rhythm and melody. This personal experience not only deepened my understanding of giftedness but also fueled my dedication to exploring various facets of exceptional abilities. It underscored the interconnectedness of talent across different domains and reinforced my commitment to supporting and nurturing gifted individuals in all their diverse forms of expression.

Michael F. Shaughnessy: What should teachers look for in terms of mathematical insight?

Ipek Saralar-Aras: I think teachers should look for a deep understanding of mathematical concepts, the ability to make connections between different mathematical ideas, creativity in problem-solving, and a willingness to explore new approaches and perspectives. Mathematical insight often manifests itself in the ability to see patterns, generalize concepts, and apply mathematical reasoning to real-world situations..

Michael F. Shaughnessy: How can assessment and establishing an individualized plan for each mathematically gifted student be critical?

Ipek Saralar-Aras: I'm relatively new to the world of gifted education. As a newcomer to the field of gifted education, my perspectives are informed by a burgeoning understanding of its principles and practices. While I do not lay claim to expertise in this domain, my evolving insights prompt me to offer opinions grounded in an emergent comprehension of the subject matter. For me, assessment plays a crucial role in identifying the strengths, weaknesses, and learning needs of mathematically gifted students. By conducting comprehensive assessments, teachers can gain insights into students' mathematical abilities, interests, and learning styles, which can inform the development of individualized education plans tailored to their specific needs and goals. These plans can include advanced coursework, enrichment activities, acceleration options, and specialized support services to ensure that gifted students are appropriately challenged and supported in their mathematical learning journey

Michael F. Shaughnessy: Explain how a variety of instructional methods could aid gifted learners of mathematics.

Ipek Saralar-Aras: To the best of my knowledge, gifted learners of mathematics benefit from a variety of instructional methods that cater to their diverse learning needs and interests. This may include problem-based learning, inquiry-based learning, project-based learning, collaborative learning, independent study, and the use of technology-enhanced instruction. These methods provide opportunities for gifted students to engage in deep exploration, critical thinking, and creative problem-solving, allowing them to develop their mathematical talents.

Michael F. Shaughnessy: Describe how enrichment and grouping benefit gifted learners.

Ipek Saralar-Aras: I believe that enrichment activities and flexible grouping arrangements are essential components of effective programming for gifted learners in mathematics. Enrichment activities provide opportunities for gifted students to explore advanced topics, pursue independent projects, and participate in competitions and extracurricular activities that extend their mathematical knowledge and skills beyond the standard curriculum. Flexible grouping allows gifted students to work with peers who share similar interests and abilities, providing opportunities for collaboration, peer support, and intellectual challenge.

Michael F. Shaughnessy: In what ways can grade-skipping (or acceleration) and technology allow students to work with advanced concepts?

Ipek Saralar-Aras: Grade-skipping or acceleration may allow mathematically gifted students to progress through the curriculum at a faster pace, enabling them to work with advanced concepts and engage in more challenging coursework that is commensurate with their abilities. Technology plays a crucial role in facilitating accelerated learning by providing

access to online resources, digital simulations, virtual learning environments, and adaptive software that offer personalized instruction and enrichment opportunities tailored to students' individual needs and interests.

Michael F. Shaughnessy: What encompasses a nurturing environment for the development of mathematically gifted students?

Ipek Saralar-Aras: To my understanding, a nurturing environment for the development of mathematically gifted students is one that values intellectual curiosity, fosters a growth mindset, celebrates diversity, and promotes a culture of excellence in mathematics. It provides opportunities for students to engage in challenging and meaningful mathematical tasks, receive personalized support and encouragement from teachers and peers, and participate in a variety of enrichment activities and extracurricular programs that stimulate their intellectual curiosity and passion for mathematics.

Michael F. Shaughnessy: What provisions are there in your country for mathematically gifted scientists?

Ipek Saralar-Aras: In my country, Türkiye, provisions for mathematically gifted scientists include specialized educational programs, summer camps, competitions, mentorship opportunities, and research internships offered by universities, research institutions, professional organizations, and government agencies. These programs aim to identify and nurture the talents of gifted students in mathematics and provide them with opportunities to pursue advanced study and research in STEM fields.

Michael F. Shaughnessy: How do you assist and counsel parents of mathematically gifted?

Ipek Saralar-Aras: I work as a national education expert so I do not have immediate access to the parents of mathematically gifted. As far as I know, in Türkiye, the assistance for parents are typically undertaken by teachers and academics in the field of gifted education. These professionals provide assistance and guidance to parents of mathematically gifted students by furnishing them with pertinent information and resources regarding gifted education, advocating for the educational and socio-emotional requirements of their children, engaging in collaborative efforts to formulate personalized educational strategies, and furnishing ongoing support to navigate the complexities and potentials of nurturing a gifted child. Additionally, they facilitate effective communication and cooperation among parents, educators, and other stakeholders to ensure that gifted learners receive the requisite support and enrichment opportunities for their holistic development

Michael F. Shaughnessy: Is there some relationship between intelligence and mathematically gifted?

Ipek Saralar-Aras: As an individual recently immersed in the realm of gifted education, I believe that while intelligence is certainly a factor in mathematical giftedness, it is not the sole determinant. Mathematically gifted individuals often possess a unique combination of cognitive abilities, including mathematical reasoning, spatial visualization, pattern recognition, and creative problem-solving skills, that enable them to excel in mathematics. However, giftedness is multifaceted and can manifest in various ways across different domains, so it's essential to consider a range of factors when identifying and supporting mathematically gifted students.

Michael F. Shaughnessy: Is there some relationship between personality and mathematical attainment?

Ipek Saralar-Aras: There is some evidence to suggest that certain personality traits, such as persistence, curiosity, openness to experience, and a willingness to take risks, may be associated with higher levels of mathematical attainment. Individuals who exhibit these traits are often more motivated, engaged, and resilient in their mathematical learning and are more likely to pursue advanced study and research in mathematics. However, personality is just one of many factors that can influence mathematical attainment, and the relationship between personality and mathematical ability is complex and multifaceted.

Michael F. Shaughnessy: Calculus I, II, III and IV seem to be the pinnacle of mathematics in the US Is this the same in Europe and your part of the world?

Ipek Saralar-Aras: In many European countries including Türkiye, calculus is indeed considered a cornerstone of advanced mathematics education, and courses in calculus are typically offered at the middle school, high school or undergraduate level as part of the standard mathematics curriculum. However, the structure and content of mathematics education may vary from country to country, and different educational systems may place varying degrees of emphasis on calculus and other branches of mathematics depending on their cultural, historical, and pedagogical priorities.

Michael F. Shaughnessy: What have we neglected to ask?

Ipek Saralar-Aras: One important question that you haven't asked is about my philosophy of gifted education and how it informs my approach to teaching and working with gifted students. My philosophy centers on the belief that every student has unique talents and potential that deserve to be recognized, nurtured, and celebrated. I believe in providing gifted students with challenging and enriching learning experiences that foster intellectual curiosity, creativity, and a love of learning, while also supporting their social-emotional well-being and personal development. I would also like to thank you for the opportunity to share my insights and experiences on working with gifted students. I appreciate your thoughtful questions and the chance to discuss this important topic. If you have any further inquiries or need additional information, please don't hesitate to reach out. Thank you again for considering me for this interview.

Biodata of Ipek Saralar-Aras

Dr. **İpek Saralar-Aras**, who has a bachelor's and master's degree in Mathematics Teaching from METU, completed her second master's degree in educational technologies in England. In the meantime, she started working as a research assistant at the University of Nottingham and continued her job until he completed his doctoral education. Saralar-Aras, who completed her doctorate in the field of technology use in mathematics education in England, has been working as a National Education Specialist at the Ministry of National Education, General Directorate of Innovation and Educational Technologies, Department of Educational Technologies and Projects, as of July 2, 2020. In addition, she continues to work as a part-time lecturer in METU Mathematics Teaching Department when needed**.**

Biodata of Author

Prof.Dr. **Michael F. Shaughnessy** is currently Professor of Educational Studies at Eastern New Mexico University in Portales, New Mexico USA. He has served as Editor in Chief of Gifted Education International and can be reached electronically at Michael.Shaughnessy@enmu.edu. His orcid i.d. is 0000 0002 1877 1319. His current research interests include talent development and intellectual assessment as well as the role of personality in giftedness, talent and creativity.