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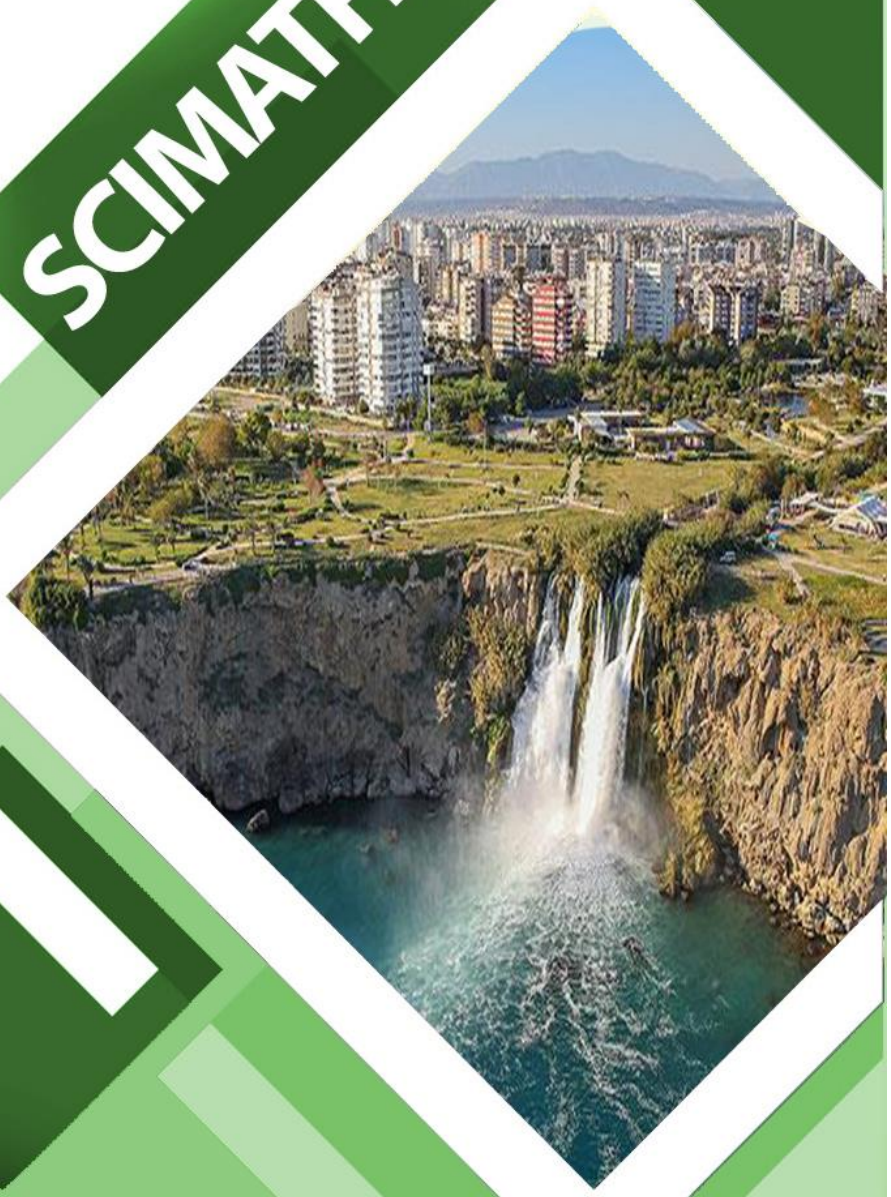

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February 28 – 02 March 2019

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KEYNOTES

Prof. Dr. Asaf Varol
Chair of Department of Software Engineering
College of Technology, Firat University (Turkey)

Keynote Title: "Digital Transformation"

Bio. He completed his German Language Education between 1972 and 1973 in Germany. He finished his Machine Engineering Training Course in 1975 in Kassel/Germany with the support of IAESTE grant. He completed his BSc. study at Firat University/Turkey where he was the honored student (highest GPA among students) at the Department of Mechanical Engineering, and he started his MSc. study at the Institute for Nuclear Energy of Istanbul Technical University (ITU) in 1977. He had started as an Engineer at ITU Research Reactor in 1978, and after finishing his master study he had begun to work as a Research Assistant at Firat University in 1979. Between 1981 and 1982 he completed his dissertation experiments at Karlsruhe University in Germany with DAAD scholarship and later earned his PhD from Karadeniz Technical University (KTU) in 1983. He joined academic studies in the field of Computer Systems at Indiana and Purdue Universities in the USA via World Bank scholarship. He was promoted to Associate Professor in Energy Education in 1991. He established first local University Television Broadcasting System at Firat University. This system has been broadcasting continually since 1991. He was appointed for the position of Director of Revolving Funds Management of Technical Education College between 1991 and 1996. In 1992, he joined Salford and Bradford Universities in UK for academic studies on computer aided education and design. In 1995, he was invited to Oklahoma State University in the USA to have studies on Vocational and Technical Education, and Informatics. He was promoted to "Full Professor" in the field of Computer Systems Education in 1997. He used DAAD scholarship to work on a project in the field of Robotics at Bremen University/Germany in 1998. Between 1998 and 1999, he took the charge to combine the revolving funds management at Firat University. Specifically, he prepared the regulations and directives related with revolving funds management.

He served as the member of National Informatics Committees at Higher Education Council of Turkey (HECT) between 1999 and 2002. Between 2000 and 2004 he was the founder Dean of Communication College. Between 2003 and 2005, he taught different courses titled Analysis-Engineering Systems, Advance Mechatronics, Pro/Engineer (Solid Modeling), and Statics at West Virginia University in the USA. He was the founder vice president of Siirt University between 2007 and 2008. He held also the Dean of College of Education at Siirt University at the same time. He was Firat University's coordinator for the "East Anatolia Development Project" that supported by Ministry of Development of Turkey between 1998 and 2001. Prof. Dr. Asaf Varol was the Director of the Revolving Funds Management of Firat University between 2008 and 2012. He has been serving as the Chair of Software Engineering Department at Firat University since 2011. He taught Introduction to Digital Forensics and Information Assurance Course at Sam Houston State University in Fall 2013. He is the founder of the Department of Digital Forensics Engineering at Firat University that is the still unique and first in Turkey. He has established a dual degree program between Firat University and Sam Houston State University in 2012. He is the founder of the Association of Software and Cyber Security in Turkey (http://www.softcybersec.org) which aims to create and develop national software for up-to-date technologies and to defense country against cyber-attacks. He was founder of the International Symposium on Digital Forensics and Security (http://www.isdfs.org) in 2013. This symposium is organized by consortiums members of Sam Houston State University (SHSU-US), University of Arkansas at Little Rock (UALR-US), San Diego State University (US), Youngstown State University (US), Petru Maior University, Romania; Politechnic Institute of Cavado and Ave, Portugal, Firat University (TR), Gazi University (TR), Hacettepe University (TR), Balikesir University (TR), Baskent University (TR), HAVELSAN (TR), and Arab Open University (Lebanon). This symposium has been supported by IEEE since 2016. He was elected as External Quality Examiners of Higher Education Council of Turkey in 2017 and he evaluated the education system of Abant İzzet Baysal University in 2017. He graduated from the Master program in Public Administration at Sam Houston State University on May 13th, 2017. He is fluent in English and German languages. He is married to Nurhayat and have two sons with three grandchildren. He has published more than 300 journal papers, books, proceedings, and he has been a columnist at BT/Haber and Gunisigi Newspapers since 1997 where he has a dedicated column.

Prof. Dr. Osman Adıgüzel
Department of Physics, Firat University, 23169 Elazig, Turkey

Keynote Title: "Physical Aspects and Nanoscale Characterization of Successive Transformations in Shape Memory Alloys"

Bio; Dr. Osman Adiguzel was born in 1952, Nigde, Turkey. He graduated from Department of Physics, Ankara University, Turkey in 1974 and received PhD- degree from Dicle University, Diyarbakir-Turkey in Solid State Physics with experimental studies on diffusion less phase transformations in Ti-Ta alloys in 1980. He studied at Surrey University, Guildford, UK, as a post-doctoral research scientist in 1986-1987, and his studies focused on shape memory alloys. He worked as research assistant, 1975-80, at Dicle University, Diyarbakir, Turkey. He shifted to Firat University in 1980, and became professor in 1996, and He has already been working as professor. He published over 45 papers in international and national journals, He joined over 60 conferences and symposia in international and national level with contributions of oral or poster, and He supervised 5 PhD- theses and 3 M.Sc. theses. Dr. Adiguzel served his directorate of Graduate School of Natural and Applied Sciences, Firat University in 1999-2004. He received a certificate which is being awarded to him and his experimental group in recognition of significant contribution of 2 patterns to the Powder Diffraction File – Release 2000. The ICDD (International Centre for Diffraction Data) also appreciates cooperation of his group and interest in Powder Diffraction File. Scientific fields of Dr. Adiguzel are as follow: Martensitic phase transformations and applications to copper-based shape memory alloys, molecular dynamics simulations, alloy modeling, x-ray diffraction, and electron microscopy.

Abstract: Shape memory alloys are stimulus responsive materials and take place in the class of smart materials exhibiting a peculiar property called shape memory effect. Thermal and stressing processes govern shape memory effect in bulk level in physical basis. Shape memory behaviour is performed thermally in a temperature interval on heating and cooling after deformation in low temperature phase condition. The origin of this phenomenon lies in the fact that the material changes its internal crystalline structure with changing temperature, by means of crystallographic transformations. Successive crystallographic transformations, thermal induced and stress induced martensitic transformations govern this behaviour in nanometer scale, with twinning and detwinning processes in crystallographic basis. Thermal induced martensitic transformation occurs

as martensite variants with lattice twinning in atomic scale, in materials on cooling below martensite finish temperature. Twinned martensite structures turn into detwinned martensitic structure by means of stress induced transformation by stressing material in martensitic condition. Twinned structures can be easily deformed through variant reorientation/detwinning process, in low temperature condition. Therefore, martensite is called soft phase and austenite is also called hard phase. Thermal induced martensitic transformation is lattice-distorting phase transformation and occurs as martensite variants with the cooperative movement of atoms by means of shear-like mechanism. Martensitic transformations occur by two or more lattice invariant shears on a {110}-type plane of austenite matrix which is basal plane or stacking plane for martensite, as a first step, and the transformed region consists of parallel bands containing alternately two different variants. In these alloys, the lattice of high temperature austenite phase has higher crystallographic symmetry than that of the low-temperature product phase.

Copper based alloys exhibit this property in metastable β-phase region, which has bcc-based high temperature parent phase structures martensitically turn into the complex stacking ordered structures with lattice twinning reaction on cooling. Lattice invariant shears are not uniform in copper-based shape memory alloys, and the ordered parent phase structures martensiticaly undergo the non-conventional complex layered structures on cooling. The long-period layered structures can be described by different unit cells, depending on the stacking sequences on the close-packed planes of the ordered lattice. The close-packed planes exhibit high symmetry and short-range order as parent phase. The unit cell and periodicity is completed through 18 layers in direction z, in case of 18R martensite, and unit cells are not periodic in short range in direction.

In the present contribution, x-ray diffraction and transmission electron microscope studies were carried out on two copper based CuZnAl and CuAlMn alloys. These alloy samples have been heat treated for homogenization in the β-phase fields. X-ray diffraction profiles and electron diffraction patterns reveal that both alloys exhibit super lattice reflections inherited from parent phase due to the displacive character of martensitic transformation. X-ray diffractograms taken in a long-time interval show that diffraction angles and intensities of diffraction peaks change with the aging time at room temperature, In particular, some of the successive peak pairs providing a special relation between Miller indices come close each other, and this result leads to the rearrangement of atoms in diffusive manner.

Prof. Dr. Joaquim Jorge
Department of Informatic, University of Lisbon
Editor-in-Chief, Computers & Graphics *(Indexed in SCI)*

Bio: Joaquim Jorge is Full Professor of Computer Science at Instituto Superior Técnico (IST/UTL), the School of Engineering of the Technical University of Lisboa, Portugal, where he teaches User Interfaces and Computer Graphics. He received PhD and MSc degrees in Computer Science from Rensselaer Polytechnic Institute, Troy, NY, in 1995 and a BsEE from IST/UTL in 1984. He was co-chair of Eurographics'98, which took place in Lisboa, Portugal. He has served as **general chair or program chair** for many conferences, including International Conference on CAD/Computer Graphics 2013 (Hong Kong), IUI 2012, INTERACT 2011, ECCE'2008 (Funchal, Madeira), CAe2008 (Portugal), WSCG 2006 (Plz, Czech Republic – program co-chair), EGVE'06 and EUROVIS'06 (Lisbon, Portugal May 2006) and EG SBM'05 (Dublin, September 05), SBM'04 (Grenoble, France, September 04), EGMM04 (Nanjing, PRC, October 04) Workshops and EG MM01 (Manchester 2001). A long-time practitioner of Computer Graphics, he first joined the Eurographics Association (EG) in 1986, helped organize the first Portuguese Computer Graphics Meeting in 1988 and was a founding member of the

Eurographics Portuguese Chapter. He leads the EG Working Group on Sketch-Based Interfaces and Modeling, served on the EG Promotions Board from 2002 to 2006, on the EG Publications Board from 1997 to 2000, was EG Conference Monitoring Officer for EG2001 and was elected member of the Associations' Executive Committee from 2000 to 2006. He also serves on the Steering Committees of Expressive Graphics, Computational Aesthetics and NPAR (Non-Photorealistic Animation and Rendering) conference series.
He was invited as proposal evaluator for the ITR program of the National Science Foundation in 2000, 2001 and 2003 and EU's IST Fifth framework program, EUREKA and related consultation meetings on many different occasions. He has been a member of several research projects both at the National and European Level, Including MAXIMUS, IMPROVE and Eurotooling 21 research projects. He was Principal Investigator (PI) of the Smart Sketches (IST-2000-28169) project, and led the Alfa INETGAM II-0072-A network of excellence, both started in 2001. He also leads the CGEMS international project, co-funded by the EC Eurographics and SIGGRAPH Associations since September 2002. He participated in several European projects connected to graphics and graphics standardization efforts as a researcher with the Portuguese Computer and Systems' Engineering Institute (INESC) CAD/CAM group from 1984 to 1989. He was a consultant with FhG/IGD in Multimodal Interfaces (1999). He serves or has served on the program committees of over 170 international conferences. Since 2007 he is Editor in Chief of *Computers & Graphics Journal* and serves or has served on the board board for six other international journals. He is affiliated with ACM (Distinguished Member since 2017, Senior Member since 2007) / SIGGRAPH since 1989, IEEE Computer Society (Senior Member since 2000), IAPR, and was chairman of the Eurographics Portuguese Chapter from 2000-2008. He served as IFIP TC13 (Human Computer Interaction) National Representative from 2000 to 2013. He served on the ACM/SIGGRAPH Educational Committee since 2004-2011 and Small Conferences Committee since 2008. He has also served on the EG Education Board since its inception in 2001. Since Juy 2014 he is Chair of the ACM SIGGRAPH Specialized Conferences Committee. He is an ACM Distinguished Speaker since 2015 and a Member of the ACM Europe Council since 2015. Joaquim Jorge's interests are in Calligraphic and Multimodal User Interfaces, Visual Languages and Pattern Recognition techniques applied to Human-Computer Interaction. He is author or co-author of over 260 papers published in peer-reviewed international conferences and publications. He was elected Fellow of the Eurographics Association in 2010. In 2014 he was given the IFIP Silver Core Award for his services to IFIP TC13.

Prof. Dr. Ahmet KAÇAR
Kastamonu University
Faculty of Education, Kastomonu,
Turkey

Keynote Title: "Matematik ve Sanat. Matematik ve Sanat İlişkisine Matematik Eğitimi Açısından Bir Bakış"

"Mathematics and Art. A View from the Perspective of Mathematics Education to Mathematics Education"

Bio: Ahmet Kaçar was born in Kastamonu, Turkey. He received the Bachelor of Science degree in Mathematics in 1984, the Master of Science degree in applied mathematics in 1986 and the Doctor of Philosophy degree in applied mathematics in 1990 from Ataturk University, Erzurum, Turkey. In 1990 he was an Assistant Professor and lectured at Mathematics Department of Atatürk University until 1995 in which he joined the Department of Mathematics Education, Kastamonu School of Education, Gazi University, Turkey, as lecturer and researcher. He became an Associate Professor in 1999 and a Professor in 2005. He is the author of papers and books in mathematics and mathematics education. His research interests are applied mathematics in mathematics; teacher education and elementary mathematics education in mathematics education.

Ahmet KAÇAR is currently the Professor of the Mathematics Education Department and Dean of Arts and Dizayn Faculty of Kastamonu University. He serves as the Editor of Kastamonu University Kastamonu Education Journal since 1997.

ABSTRACTS

Solving inequalities over the field of complex numbers

Aslanbek Naziev, Ryazan State University, RU

Abstract

Most people think that inequalities cannot be solved over the field of complex numbers. We want to show that this can be done, and show how can it be done. In the present, the first paper in the indicated direction, we consider the simplest case, namely, the case of quadratic inequalities with real coefficients. In the behavior of real solutions of quadratic equations and inequalities with real coefficients there exist some oddities. For example, for inequalities of the form x^2+ px + q < 0 with positive discriminant the set of solutions is the interval between roots. The length of this interval decreases as discriminant decreases, but as soon as the discriminant becomes negative, no matter how much it decreases, nothing changes, just no solutions. In the case of quadratic equations and other quadratic inequalities, the pictures are similar. We shaw that the transition to the complex plane allows obtaining a more satisfactory picture. Moreover, we construct, with the help of LaTeX, dynamic model visually demonstrating the change of the complex solution sets in the dependence of coefficients' changes. This model clearly shows how the transition to the field of complex numbers permits to remove abovementioned oddities.

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The Game of Proof in an Introduction to Proofs Course

Joyati Debnath, Winona State University

Abstract

Joyati Debnath is currently a Full Professor of the Department of Mathematics and Statistics at Winona State University (WSU), Minnesota. She received M. S. degree in Pure Mathematics and Ph. D. degree in Applied Mathematics from Iowa State University, Ames, Iowa. She has been a faculty at Winona State University for over 27 years and teaching a wide range of undergraduate courses in Mathematics. She received numerous Honors and Awards including the Best Teaching Award from Iowa State University, the Outstanding Woman of Education Award, and Whose Who Among American Teachers. Her research interests include Integral Transform Theory, Partial Differential Equations and Boundary Value Problem, Associations of Variables, Discrete Mathematics, Software Engineering Metrics and Tools, Forensic Science, Network Theory and Topological Graph Theory. Joyati Debnath has always been actively involved in undergraduate research projects and has supervised many undergraduate students in mathematics. She and her 4 students received CURM mini-grants in 2009-10, attended both the summer faculty workshop and spring research conference in 2009-10 and served as peer reviewer for 2010-11 proposals. She is an author or co-author of over 60 publications in numerous refereed journals and conference proceedings in Mathematics and Computer Science. She is a recipient of many Grants including the National Science Foundation Instructional Laboratory Improvement (NSF-ILI) grant, WSU Professional Improvement Grants, WSU Foundation Grants, WSU Summer Research Grant, WSU Lyceum Grants, and Grants for WSU Undergraduate Student Research. She is currently in the process of submitting an NSF STEM scholarship grants for undergraduate students at WSU. She is a member of the Committee on Undergraduate Student Activities and Chapters in MAA 2010-2013 and will also be serving as a Coordinator of the Undergraduate Poster session at the Joint Mathematics Meeting. She has made numerous research presentations and served as the Technical Session Chair at National and International Conferences in Mathematics and Computer Science including the Annual Meeting of the American Mathematical Society (AMS), Annual Meeting of the Society of Industrial and Applied Mathematics (SIAM), International Conference in Industrial and Applied Mathematics (ICIAM), International Congress of Mathematicians (ICM), International Conference on Computers and Their Applications, International Conference on Computer Applications in Industry and Engineering, and IEEE International Symposium in Signal Processing and Information Technology. For last few years, she has been coordinating the Distinguished Lecture Series in Mathematics at Winona State University.

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Bilimin Doğası Öğretiminde Tarihsel Yaklaşım: Dijital Öyküleme Yöntemiyle Hazırlanan Etkileşimli Kısa Tarihsel Hikâyeler

SERKAN BULDUR, Sivas Cumhuriyet University

FERHAT OMRAN TOPRAK, Sivas Cumhuriyet University

Abstract

Bilim okur-yazarı bireylerin, çevresinde gözlemledikleri olayları ve olguları bilimsel perspektiften geçirmeleri beklenmekte, nitekim bunun için doğru bilim anlayışını etkin kılmaları gerekmektedir. Öğrencilerin doğru bilim anlayışı kazanmaları ya da diğer deyişle bilimin doğasına yönelik anlayış geliştirmeleri oldukça önemlidir. İçinde bulunduğumuz yüzyılı bilgi çağı şeklinde betimlersek bilimin doğasının anlaşılmasının da aslında ne kadar önemli olduğunun farkına varmış oluruz. Özellikle bilimin doğasına yönelik sahip olunan yanlış inanışlar da (Gül, 2014) bilimin doğası öğretimine verilmesi gereken önemi yansıtmaktadır. Bilimin doğasının öğretimindeki bu önemden hareketle araştırmacılar etkili bir bilimin doğası öğretimi yapılabilmesi için farklı yaklaşımlar geliştirmişlerdir. Buradan hareketle bilimin doğasının öğretimindeki ilgili çalışmalar ışığında üç temel yaklaşım öne çıkmaktadır (Abd-El-Khalick ve Lederman, 2000; Clough, 2006; Khishfe ve Abd-El Khalick, 2002). Bunlar; doğrudan-yansıtıcı yaklaşım, dolaylı yaklaşım ve tarihsel yaklaşım olarak sıralanabilir. Bu sınıflandırma ışığında kullanılabilen yaklaşımlardan birisi olan tarihsel yaklaşımın etkili kullanımını sağlamak amacıyla kullanılan tekniklerden birisi etkileşimli kısa tarihsel hikayelerdir (EKTH). EKTH'ler; bilim tarihini temele almak yoluyla öğrencilerin hem tarihsel bakış açısı kazanmalarını hem de bilimin doğasına yönelik anlayışlar geliştirmelerini sağlayan formlar olması nedeniyle bilimin doğası öğretiminde önemli bir yere sahiptir. Araştırmacılar EKTH'lerin etkililiğini artırmak amacıyla görsellerden yararlanılmasını önermektedirler. Bu bağlamda hikayelerin oluşturulmasında çeşitli görsel öğelerden faydalanmak adına bilgisayar destekli öğretim uygulamalarının çok daha etkili sonuçlar meydana getirebileceği düşünülmektedir. Bu noktadan hareketle bu çalışmada EKTH'ler dijital öyküleme yöntemine göre hazırlanmıştır. TÜBİTAK tarafından desteklenen araştırma projesinin bir bölümünü oluşturan bu çalışmada; dördü Roach (1993) tarafından geliştirilen ve Türkçeye uyarlaması bu çalışma kapsamında yapılan, üçü orijinal olarak yazılan ve diğer üçü de (Yücel-Dağ, 2015) tarafından geliştirilen 10 farklı EKTH'nin Dijital Öyküleme yöntemine göre hazırlanmış halleri tanıtılacaktır. Hazırlanan EKTH'ler Roach (1993) tarafından geliştirilen ve yedi farklı bilimin doğası unsurunu içeren bilimin doğası modeli esas alınarak hazırlanmış ve her EKTH'de en az iki bilimin doğası unsurunun yer alması sağlanmıştır; Sonuç olarak bu çalışma kapsamında; bilimin doğası öğretiminde tarihsel yaklaşım ve bu yaklaşımda kullanılan EKTH'ler tanıtılacak ayrıca bu araştırma kapsamında dijital öyküleme yöntemine göre geliştirilen 10 farklı dijital hikaye'ye ilişkin örnekler sunulacaktır. Bu EKTH'lerde yer alan bazı bilim insanları şu şekildedir; Ali Kuşçu, Isaac Newton, James Watt, Louis Pasteur.

Anahtar Kelimeler: Bilimin Doğası, Etkileşimli Kısa Tarihsel Hikâye, Dijital Öykü

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Impact of Mathematics Teachers on 10th Grade Students' Understanding of Polynomial Concepts: in case of some schools in Addis Ababa City Administration

Anteneh Tefera Abuye

Abstract

The study was intended to evaluate 10th grade students' understanding of polynomial concept in schools of Addis Ababa city administration in terms of procedural, conceptual and the aggregate result of the students against gender, and school type. The study was case study and employed quantitive research method. The finding revealed that the mean score of 10th grade students in procedural, conceptual and aggregate result out of 100% were 48.3, 43.8 and 46.05 respectively. This indicated that students scored higher on procedural than conceptual. Female students were less than the mean score of males on procedural and greater than male on conceptual questions as well on the combined score. The mean score of Private school 10th grade students were much higher than the mean score of 10th grade students of government schools in Addis Ababa city Administration. In addition, most students were unable reason out or correctly justify why they chose the answer in the first tier. The result illustrated that students were who have high score in procedural have also high achievement in conceptual and vice versa. it showed that there was a significant main effect of school type on procedural knowledge. There was no a significant interaction between sex and school type on procedural ($p = 0.439$) and conceptual understanding ($p = 0.192$). Similarly, the two-way ANOVA analysis indicated that the interaction (sex*school type) is not significant for both understandings. However, sex and school type have significant effect on conceptual understanding. Finally, the study recommended that secondary school mathematics teachers should take measure in their teaching-learning strategies to improve students' level of understandings (both procedural and conceptual) of polynomial concepts.

Key terms: Procedural knowledge, Conceptual knowledge, Procedural understanding and Conceptual understanding

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Biçimlendirici Değerlendirme Etkinlikleriyle Zenginleştirilmiş Etkileşimli Kısa Tarihsel Hikâyelerin Öğrencilerin Bilimsel Bilgininin Doğası Anlayışlarına Etkisi

ÜBEYİT BAKAN, Baharözü Ortaokulu

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Abstract

Bilim ve teknolojideki hızlı değişimler toplumların ihtiyaçlarında da değişime neden olmaktadır. Çünkü, ancak bu değişimlere ayak uydurabilen ve kendini yenileyebilen toplumlar başarılı olabilirler. Bilim ve teknolojideki değişimlere ayak uydurabilmek için fen eğitimi faaliyetleri tüm toplumumuzun ve gelecekteki vatandaşlarımızın bilim okuryazarlık düzeylerini artırmalı (Çepni, 2005), öğrencilere bilimin doğası temasını kazandırmakla(Lederman, 1992) birlikte üst düzey düşünme becerilerini geliştirmeli ve çağdaş bir bilim anlayışı oluşturmalıdır (Derman, 2014).Bilim okuryazarlığının iki temel bileşeni vardır. Bunlar bilimi ve bilimin doğasını anlamak olarak belirtilmiştir. (Çepni, 2007).İlgili alanyazın incelendiğinde bilimin doğası çalışmalarında gerçek sınıf uygulamalarının çok tercih edilmediği (Yenice, 2015), öğretmenlere bilimin doğası öğretiminde yol gösterecek model ve uygulama örneklerinin az olduğu ve uygulama örneklerinin çoğaltılması gerektiği (Çetinkaya, Turgut ve Duru 2015) vurgulanmaktadır. Bu bağlamda özgün etkinliklerin geliştirilmesinin amaçlandığı çalışmanın alana katkı sağlayabileceği söylenebilir. Diğer taraftan ilgili alanyazın incelendiğinde bilimin doğası öğretiminde biçimlendirici değerlendirme uygulamalarının kullanıldığı çalışmaların çok az sayıda olduğu görülmektedir. Az sayıda yapılan bu çalışmalarda da genelde bir tane biçimlendirici değerlendirme etkinliğinin kullanıldığı görülmektedir(Bala, 2013; Bilen, 2009; Kılınç, 2010; Yücel Dağ, 2015). Bahsedilenlerden hareketle, bu çalışmanın amacı biçimlendirici değerlendirme etkinlikleriyle zenginleştirilmiş etkileşimli kısa tarihsel hikâyelerin(EKTH), öğrencilerin bilimsel bilginin doğası anlayışlarına etkisini araştırmaktır. Araştırma, deney-1, deney-2 ve kontrol gruplu ön test-son test yarı deneysel desen esas alınarak gerçekleştirilmiştir. Araştırmanın çalışma grubunu bir devlet ortaokulunda öğrenim gören 7. sınıf öğrencileri oluşturmuştur. Toplam 63 öğrencinin bulunduğu çalışma grubunda; deney-1 grubunda 23, deney-2 grubunda 20 ve kontrol grubunda ise 19 öğrenci bulunmaktadır. Araştırma 10 hafta boyunca bilim uygulamaları dersi kapsamında gerçekleştirilmiştir. Çalışma kapsamında dersler; deney-1 grubunda biçimlendirici değerlendirme etkinlikleriyle zenginleştirilmiş EKTH uygulanarak, deney-2 grubunda EKTH uygulanarak ve kontrol grubunda ise mevcut bilim uygulamaları dersi öğretim programı esas alınarakyürütülmüştür. Araştırmada veri toplama aracı olarak Rubba ve Anderson (1978) tarafından geliştirilen ve Kılıç, Sungur, Çakıroğlu ve Tekkaya (2005) tarafından Türkçe'ye adapte edilen 'Bilimsel Bilginin Doğası Ölçeği(BBDÖ)' kullanılmıştır.Ölçek deney-1, deney-2 ve kontrol gruplarına ön test ve son test şeklinde uygulanarak bulgular elde edilmiştir.BBDÖ altı alt faktörden oluşmaktadır.Bunlar; ahlaki, yaratıcılık, gelişimsel, sadelik, test edilebilme ve birleştirmedir.Araştırmada elde edilen verilerin analizinde ANCOVA testi kullanılmıştır. ANCOVA testi uygulanmadan önce, test varsayımları incelenerek, varsayımların sağlandığı görülmüştür. Yapılan ANCOVA testi sonuçlarına göre deney-1,deney-2 ve kontrol gruplarının ön test puanlarına göre düzeltilmiş son test puanları ortalamaları arasında ahlakilik boyutu, yaratıcılık boyutu, gelişimsel boyutu ve birleştirme boyutunda deney-1 grubu lehine anlamlı farklılıklar olduğu, sadelik boyutu ve test edilebilme boyutlarında anlamlı bir farklılık olmadığı tespit edilmiştir.Bu bulgulardan hareketle biçimlendirici değerlendirme etkinlikleriyle zenginleştirilmiş EKTH'lerin öğrencilerin bilimsel bilginin; ahlakilik, yaratıcılık, gelişimsel ve birleştirme boyutları üzerinde etkili olduğu söylenebilir.

Anahtar Kelimeler: Bilimsel Bilginin Doğası, Biçimlendirici Değerlendirme, Etkileşimli Kısa Tarihsel Hikâye

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