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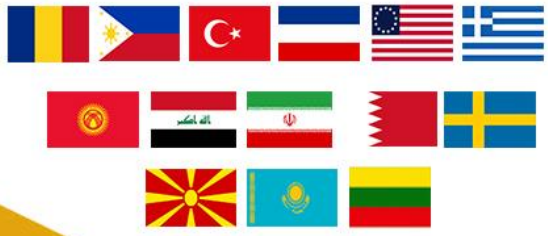

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30 October – 01 November 2020

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ABSTRACTS BOOKS

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World Conference on Science & Mathematics Education

5th WORLD CONFERENCE ON SCIENCE AND MATHEMATICS EDUCATION

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ABSTRACTS BOOKS

Organized by

Istanbul Ayvansaray University
Association for Human, Science, Natura, Education and Technology

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KEYNOTES

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

Keynote Title: "Lattice Reactions and Interactions Governing Phase 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 diffusionless 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.

Prof. Dr. Adem KARAHOCA
Istanbul Nişantaşı University
Istanbul, Turkey

Keynote Title: "Smart Technologies and Big Data"

Abstract: Smart cities are enabler of the smart technologies to improve outcomes across every aspect of city operation to give feasible service to residents. Making cities smart can be enabled by using full potential of technology and innovation ecosystems in cities. Implementation of IoT (internet of things) devices, sensors and other methods and approaches to get data from the city

operations trigger operational data size and increases the big data. To give real time decisions for the city operations, smart applications and data enabled capabilities must be supported with big data sets. In this study, smart technologies and big data interaction was analyzed to improve city operations for providing more benefits and opportunities for city residents.

Bio: Adem Karahoca is currently a full-time professor in the Department of Computer Eng. And dean of Engineering and Architecture Faculty, Nisantasi University, Istanbul, Turkey. He received his B.Sc. degree in Mathematical Engineering from Istanbul Technical University, M.Sc. and Ph.D. degrees in Software Engineering from Istanbul University. He has published 20 IT related books in Turkish and edited 4 IT related books in English. His research interests are data mining, fuzzy systems, information systems, business intelligence, computers in education, human computer interaction and big data. His research papers have published in Expert Systems with Applications, Applied Soft Computing, Soft Computing, Neural Computing and Applications, Journal of Biomedical Informatics etc.

Assoc. Prof. Dr. Murat TEZER
Near East University
North Cyprus

Keynote Title: "Teachers' Opinions on WEB 2.0 Tools and Use in Mathematics Teaching During the Pandemic Period"

Abstract: An important feature of successful math teachers is that they can provide a variety of activities that support students' learning and assessment. Web 2.0 applications are known to provide a variety of tools to help produce creative activities. A Web 2.0 tool enables the student to enter data and create multimedia products using text, graphics, sound, and video. The possibilities for creativity and variety are unlimited. As a standard, students are expected to demonstrate reasoning and intuition and understanding when solving math exercises. The aim of this study is to examine teachers' opinions about WEB 2.0 tools and use in mathematics teaching in distance education during the pandemic period. As a research method, interview technique, one of the qualitative research methods, was used in this research. The working group of the research consists of 12 clasroom teachers working in primary schools. Suggestions were given as a result of the findings of the research in which the semi-structured interview form was used to collect the data.

Bio: He was born in Nicosia in 1972. After completing his primary education, he completed his high school at Nicosia Turkish Lycee in the year of 1990. In the same year, he started to Hacettepe University at Ankara for BA and graduated in 1994. He completed his MA (1996) and Ph.D. (2003) at the Faculty of Arts and Sciences, Applied Mathematics and Computer Sciences Department of Eastern Mediterranean University. He gave his Ph.D. Thesis about "Cycle Decompositions and Labeling of Graphs" in 2003. Between the years 1994 and 2003, he worked as full-time instructor in the same university. Between the years in 2010-2014 he worked as a project advisor and project assistant at Yeniyüzyıl Kindergarten, Karaoğlanoğlu

Primary School, Gönyeli Primary School, Çamlıbel Primary School, Şehit Hüseyin Ruso Secondary School, Yeşilyurt Primary School in Northern Cyprus and Kurtuluş Lycee and under the grant program supported by the European Union and also gave these school teachers Smart Board lessons. He gives in-service training courses (statistical software SPSS, further evaluation and assessment, and office programs) to the teachers these working in schools affiliated to the Ministry of Education.

Assoc. Prof. Dr. Nazım Kaşot

Keynote Title: Teaching Environmental Education Through Technology

Abstracts: It is very important to share information about the environment, to create awareness and to ensure its sustainability, to connect with and touch people. People need to know that the environment must be protected in order to survive. Addressing environmental problems and eliminating these problems can only be possible if people have environmental awareness. Various media tools and technologies can be used to spread environmental awareness among people. Everybody knows that social media raise awareness of the public by examining environmental problems. For this reason, it can be said that the easiest way to share information about the environment is social media. Increasing environmental knowledge and awareness with technologies that can be used alongside the media has become one of the important issues of today's world. Despite different opinions, the Covid-19 pandemic has shown that digital learning has become a part of our lives and will be used more often in the future. In this presentation, methods that will facilitate the learning of environmental issues with the help of technology will be mentioned and examples will be given.

Bio: Nazım Kaşot studied biology at the Ege University between the years 2003 and 2007. His graduation project was about the biology of stripe necked terrapin (*Mauremys rivulata*). He was ranked third in the class and the fourth of section Nazım Kaşot, Kıbrıs Adası'nda Dağılış Gösteren Çizgili Kaplumbağa'nın (*Mauremys rivulata*) Ekolojisi ve Biyolojisi Hakkında Bir Ön Çalışma with 85/100 points. He has the master degree on Secondary Education Field Teaching at Atatürk Teacher Training Academy between the years 2010 and 2011 and then worked as a biology and science teacher at the Bekirpaşa High School, Mehmetçik Secondary School, Mağusa Vocational High School, Haspolat Vocational High School and Gazi Mağusa Türk Maarif College. He had many experiences in the field of secondary education and combined his experiences to improve the environmental education in secondary schools. He was graduated from the master program on environmental education at the Near East University in 2012. He was also graduated from his PhD program on the same area in 2016 at the same university. He is now working for University of the Mediterranean Karpasia as an associate professor. He is conducting researches especially on environmental educatiton and biodiversity issues. He has lots of academic papers and books in the field of environmental education and biodiversity.

ABSTRACTS

ERKEN ÇOCUKLUK DÖNEMİNDE SU OYUNLARIYLA STEM BECERİLERİNİN GELİŞTİRİLMESİ

Fatma Şahin, Marmara University
Beril Şenel, Marmara University
Elif Kızmaz, Marmara University
Emine Beğeçarslan, Marmara University
Zübeyde Burçin Gürbey, Marmara University

Abstract

Children curiously and instinctively ask questions about how, what and why-question about thier environment. Increasing this interest supports children to develop their ideas about the world and natural sciences. One of the most effective methods to support this is the game. Game-based science learning approaches enable children to use their daily experiences and activities in a meaningful way while exploring science concepts. It is one of the most effective and natural ways to improve children's STEM skills in early childhood. This work was designed with inspiration from here. The aim of the study is to examine the effect of early childhood water games on the development of STEM skills. The study group of the study consisted of 21 students of 5th grade students of a primary school in İstanbul Maltepe. Four different water games were played to the students considering STEM stages. In the research, "information evaluation and studens opinion forms " filled by students and "Group Evaluation Rubric" filled by researchers were used as data collection tools. It is prepared in rubrik 3-point Likert type (Very good:3, good:2, can be developed:1). The information evaluation form consists of 14 open-ended questions. In the research, water games related to swimming an stinging have been played from salvation from desert island, let's do submarine, rainbow sherbet, let's carry the water.The games were played considering STEM stages and a design emerged in each game. After the evaluation of the research data, the effect of water games on the development of STEM skills was determined. In a study related to swimming and stinging in early childhood, children expressed that they found the swimming and stinging experience enjoyable. As a result of the study, it is recommended to work on different topics and in different age groups within the scope of the contribution of the games to the development of STEM skills.

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Investigating the Science Teacher Candidates' Ability to Prepare Misconceptions Refutational Text

Fatma Şahin, Marmara University
Zübeyde Burçin Gürbey, Marmara University
Hatice Mertoğlu, Marmara University

Abstract

Biodiversity is essential for the continuation of human life and sustainable development. For this reason, the concept of biodiversity has an important place in education. This work was designed with inspiration from here.

The sentence of problem: The problem sentence of the study is, "How are the science teacher candidates' skills to prepare misconception refutational text related to biodiversity?" constitutes the question.

The aim of study: The aim of the study is to examine the science teacher candidates' ability to prepare misconception refutational text related to biodiversity. In the study, the problems that pre-service teachers experienced while preparing misconception refutational texts were also investigated.

MethodA case study pattern, one of the qualitative research methods, was used in the research. Participants are 35 pre-service teachers who are studying in the third year of Science Education at a public university in Istanbul during the fall semester of the 2019-2020 academic year. Data collection tools of the research; “Misconception Refutational Texts” related to the concept of biodiversity prepared by pre-service teachers and “Opinion Refutational Text Opinion Form” where problems related to preparing misconception refutational texts of teacher candidates are determined. The data were evaluated with the “Rubric for evaluating misconceptions refutational texts” prepared by the researchers. Before the application of the research, pre-service teachers were trained on how to prepare the misconception refutational text. Prospective teachers were asked to prepare misconception refutational texts (Refutation and interpreters) for 6 misconceptions selected as a result of the literature review conducted by the researchers. The texts were evaluated rubrically by two of the researchers. At the end of the study, the reasons of the problems that prospective teachers experienced while writing the texts were also analyzed.FindingsAccording to the findings obtained from the research; it has been determined that teacher candidates' misconceptions refutational text writing skill is better than interpretive text. In addition, it was determined that three pre-service teachers could not write the misconceptions refutational texts as desired, but they had scientific knowledge about the misconceptions. It was determined that the misconception refutational texts written by these pre-service teachers did not meet the rubric criteria. The majority of students scored “very good” in the rebuttal text rubric for almost all items. Eighteen examined misconceptions refutational texts were subjected to descriptive analysis separately as interpreters and rebuttals. At the end of the rubrics, the "Refutational text is persuasive, understandable and correct." expression was examined separately for each misconception, the three refutational texts for each misconception are averaged for this statement.DiscussionWhen the researches are examined; In a study, it was pointed out that misconceptions refutational texts eliminate misconceptions in better learning of chemical bonds. Similarly, in another study, misconceptions refutational texts were observed to be more beneficial to students in understanding and learning.ResultsConsidering the literature, forehead and research findings, prospective teachers were found to have deficiencies in writing misconception refutational texts related to biodiversity. Lack of knowledge about the misconception given to the teacher candidates, and the lack of knowledge on the subject content of the misconception are the primary shortcomings.

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THE NOMINAL GROUP TECHNIQUE AND THE QUESTIONNAIRE: THE DIAGNOSIS METHODS FOR THE OBSTACLES AND DIFFICULTIES IN COMPUTER SCIENCES OF NURSING STUDENTS

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MOURAD MADRANE, UNIVERSITE ABDELMALEK ESSAADI

FATIHA KADDARI, UNIVERSITE ABDELMALEK ESSAADI

Abstract

Computer science as a school subject has been a regular media subject for more than twenty years. Indeed, all the educational systems of the world are now convinced that today's learners, brought to live in a hyper-scientific society, well informed and well computerized, must be endowed with knowledge and know how to use computer science.This research aims to discover the sources of computer difficulties encountered by some nursing students. We used two well-known methods of analysis: the Nominal Group Technique (NGT) and the Pencil / Paper Questionnaire.The data obtained revealed that the prerequisites are overestimated because the notions learned in high school are forgotten and that the basic notions of computer science seem to present difficulties for these learners. The results of the questionnaire and the NGT are similar and complementary. It becomes clear that using NGT and the questionnaire are efficient tools to diagnose the difficulties and obstacles of nursing students. So, the Nominal Group Technique can be used not only in identifying students' problems with scientific notions in computer science, but also in other subjects.

Keywords: NGT, Questionnaire; difficulties and obstacles.

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Exploring midwifery students' misconceptions of disease and sexually transmitted infection concepts through mind maps combined with an individual derective interview

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Rajae Zehrane, Université Abdelmalek Essaadi

Mourad Madrane, Université Abdelmalek Essaadi

Abstract

Sexually Transmitted Infections (STI) present a taught knowledge which evoked several agitations of comprehension. Among the factors that hamper this understanding: the nature of this knowledge, the approaches adopted in the curricula, and the learners' misconceptions. Since midwives students will be actors in health promotion and prevention of transmission of STIs, they should have adequate knowledge to transmit them healthily to the population. This study is the first to our knowledge, which aims to approach the conceptual world of midwifery students in order to discover their knowledge and their misconceptions of the disease in general and STIs in particular, and this by two tools: mind maps and individual directive interview. By diagnosing these barriers to learning, we will have time to take them into account in our teaching practices. As a result, the misconceptions identified reflect to a large extent the ideas of the media and Moroccan society, whose common knowledge takes priority over scientific knowledge. These conceptions sent us back to the obstacles: cultural and belief, epistemological and didactic. The didactic implications of the history of science could lead to effective training/teaching actions.

Key words: Barriers to learning, misconceptions, disease, STIs, students, midwives students.

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INVESTIGATION OF SCIENCE TEACHER CANDIDATES' DIAGNOSTIC QUESTION PREPARATION SKILLS: SEASONS, CLIMATE AND AIR MOVEMENTS

FATMA ŞAHİN, Marmara University

SİBEL ADIGÜZEL, Marmara University

GÖZDE ÇALIŞKANER NİBAT, Marmara University

Abstract

The aim of the research is to examine the science teacher candidates' ability to prepare two-stage diagnostic questions on 'Seasons, Climate and Air Movements'. For this purpose, the problem of the research was determined as "How are the science teacher candidates' skills to prepare two-stage diagnostic questions?" In lower problems; "What is the situation of preparing the diagnostic test content of teacher islands (determining the relevant propositions and preparing the concept map related to the content of the subject)?" and "What are the pre-service teachers' development of test items from misconceptions and misunderstandings of 8th grade students?" answers to questions were sought. In the research, a holistic single case study pattern of the 'Observation Based Case Study' based on the collection of detailed data on certain situations was used. The research was carried out with 40 (39 females, 1 male) second grade science teacher candidates in the fall semester of 2019-2020 academic year. They made the relevant literature review by determining the content limits of the subject and developed the first test draft with open-ended questions. The test, which was examined and improved by experts, was applied to 40th grade students and misconceptions were determined. Teacher candidates prepared a diagnostic test that included multiple stages of the multiple choice test item by using the misconceptions as a distinguishable. The 'two-stage diagnostic test' prepared was applied to 60 eighth grade students at the end of the process. Data in the research; "Diagnostic Test Preparation Rubric" prepared by the researchers was collected using "Concept maps", "Two-Stage Diagnostic Test Questions" prepared by prospective teachers. The collected data were analyzed through descriptive and content analysis. According to the data obtained from the 'Diagnostic Test Preparation Rubric'; It was seen that 50% of the groups had a good level of fulfillment of the criteria above 70%. When “Concept maps” and “Two-Stage Diagnostic Test Questions” are examined; It was noticed that teacher candidates were generally at a moderate and good level in determining the information propositions about the subject, concept map related to the content of the subject, multiple choice test item with an open reasoned part and two-stage diagnostic test. While preparing concept maps; It was understood that poor level teacher candidates wrote propositions that connect two concepts with a single judgment, give two judgments in one sentence, including uncertain and incomplete information. In addition, when developing an open-ended test item, it was understood that they generally prepared classification based questions, and in two-stage tests they used weak distractors.

Keywords: Diagnostic questions, seasons, climate, air movements, science teacher candidates

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Factors influencing diagnosis and Consultation delay of patients with breast cancer in Tétouan-Morocco

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Abstract

Nowadays, cancer remains a serious disease, associated with heavy treatment costs and long-term sequelae that represent high costs of care. However, earlier diagnosis means better chances of cure and less extensive treatment. This work highlights the socio-demographic and medical factors of patients with breast cancer admitted into the 'reproductive health referral center' RHRC of Tétouan, and their impact on the various delays, from onset of symptoms to access to histological diagnosis. This is a retrospective descriptive study conducted on the breast cancer in the RHRC of Tétouan. We used accessible data from 81 women with breast cancer on registers, ranging from 46 women in 2017 to 35 women in the first half of 2018. In this study, the average consultation time is 260±345 days. As for the patients, 21% were between 18 and 39 years old, almost half 46.9% had a very low socioeconomic level and almost 33.3% were illiterate. Delay attributable to the patient or the health system delays diagnosis. Patient socioeconomic level is significantly (p=0.004) associated with health system delay, and education is significantly associated with consultation delay (p=0.020) and total time to diagnosis (p=0.026). To improve the quality of access to breast cancer care, it is necessary to make more efforts by adopting a policy whose main actions tend to minimize the factors which accentuate the length of these delays and instill health education in the Moroccan teaching curriculum in order to increase the level of literacy among Moroccan citizens.

Keywords: breast cancer, consultation delay,factors, diagnosis delay, referral time, literacy, Morocco.

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Students reasoning about concepts of topology: the case of locally finite family of closed sets

Khalid Bouhjar, American University of Malta

Abstract

This paper examines six students' work of a problem in general topology that tries to measure students' reasoning of locally finite family of closed sets, evidenced by their written work. Our data revealed two key trends in students' reasoning about this concept. First, students' concept images align with the concept definitions of this concept in the sense that they were able to use the definition in a proper way and go through all steps needed to solve the problem. Second, students did not exhibit 1) a richer conceptual understanding of the concept and 2) a richer procedural understanding of the concept function. This assertion was evidenced by 1) their elaborate work in delivering arguments that required a lot of explanation and analysis and which could be summed up simply by paying attention to a richer conceptual understanding of the concept, and by 2) their disuse of the restriction of a function and which would help them to connect to the formal definition of a locally finite set in order for them to reason about this concept in conceptually rich ways.

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The Influence of Concrete Pictorial Abstract Teaching Approach on Students' Concepts Understanding and Retention in Mathematics in Rwandan Lower Secondary Schools

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Irenee Ndayambaje, University of Rwanda College of Education

Abstract

This study investigated the influence of Concrete Pictorial Abstract (CPA) teaching approach on mathematics performance based on a sample of eighth-grade students (N =

1,345) from the Rwandan Lower Secondary Schools. A quasi-experimental study with pre-test, post-test and retention test was used. Key aspects studied included mathematics

concept understanding and mathematics concept retention and then how these are influenced by teacher's teaching approach. Specifically the study aimed to a.) investigate students' concept understanding and concept retention in mathematics when exposed to CPA approach and compared to those exposed to non-CPA approach, and b.) ascertain the significant difference between the performance of the students exposed to CPA approach and those exposed to non-CPA approach in terms of post-test scores and retention test scores. Two groups (control and experimental) undergone pre-test, post-test and retention test. The assignment of control and experimental group among senior two classes from 10 schools was done randomly. The materials used to determine the concept

understanding and retention of the students in mathematics is a teacher-made test. Descriptive statistics and ANCOVA were used for the analysis of the study. For determining the improvement in concept understanding of mathematics, Hakes

methods of calculating gain was used to analyze the pre-test and post test score. The found that the level of performance of the two groups in the pre-test is below average level. During the post-test and retention test, the performance of students in non- CPA group is on average level and students in CPA group are on above average level. Hakes methods of calculating gain revealed higher significant performance in the post-test and retention test of CPA group of students than non-CPA group of students.

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CLIMATE CHANGE: A DISCOURSE OF OUR CONTEMPORARY WORLD

GBADEBO EDWARD GBADEYANKA, KARABUK UNIVERSITY

Abstract

The academic community has been contentious in the discourse regarding climate change. The study entails in-depth investigation and assessment of the past years' articles with a crystal focus on how often climate change mentioned in our sampled articles. The basis of the statistical data, both primary and secondary originated from Taylor and Francis publications which were focused and limited yearly. Vital literature review and citations equally considered with the 211 articles. The evaluation depicted that there is no notable change in the number of articles published on the context of research. It revealed accordingly the articles that believe and denied the phenomenon of climate change, climate change education and strategies, and knowledge and attitude of people towards climate change. The articles assessment on quantitative and qualitative or mix researched method – were significantly valued through detailed calculation and critical discussion. There is a need for collaboration of ideas from different fields of life to unify ideas of climate change into educational science networks. These will enhance the spread of news regarding the reality of climate change. The outcome is to ensure a collective "thinking bank" that will make the entire world both tropical, temperate, Mediterranean, polar and desert regions more sustainable for human.

KEYWORDS: Academic community; Attitude; Belief; Climate change; Denied; Education; Knowledge; Strategies; Thinking bank

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CLIMATE CHANGE: A DISCOURSE OF OUR CONTEMPORARY WORLD

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Siti Fatimah Ahmad Zabidi, Universiti Malaysia Pahang

Abstract

Massive Open Online Course (MOOC) Calculus is a Piece of Cake provides an alternative way of learning. This project was created with the spirit to innovate in teaching and learning. It provides a study platform that covers the Calculus course containing an introduction to limit & continuity, differentiation and its applications and last but not least, integration and its applications. MOOC is conducted fully online with no limit number of enrolments, allowing anyone to participate, while the learning activities and assessments taking place over the web. The learning materials are in the form of teaching videos, animation, and slide notes. The assessment consists of a number of quizzes and tests. Students will get an official certificate of course completion. This platform brings many benefits to leaners. It promotes flexible education and lifelong learning to learners in term of time, location, and pace. Furthermore, any student who paid and enrolled this MOOC can request for credit transfer program or better known as Credit Transfer MOOC (CTM) for the subjects BUM1223 Calculus and DUM1123 Calculus. As a summary, it can be said that the usage of the latest learning and teaching styles in mathematics subjects was effective based on the 100% successful rate in CTM. This platform is one of the interactive and attractive ways of learning mathematics.

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Preservice mathematics teachers' mathematical modelling experience: A case study

Yasemin Sağlam Kaya, Hacettepe University

Abstract

In last decade mathematical modelling (MM) got into the teacher training programs to give teacher proficiency in this regard and got into mathematics curriculum almost all levels to give student MM skills. As the first step of this process is teacher trainig, the aim of this study is to observe the first MM experience of preservice teachers in a real classroom environment, to reveal their perception of MM and their self refection on their MM experience. The participants of the study are three senior preservice mathematics teachers (PMT) who are enrolling in teaching practicum course. The data of the study consist of observation notes of PMT during a MM session in a high school class and the inteviews on their teaching experience. Content analysis was used to analyse transcribed interviews and observation notes. The findings of the study give clues about, how preservice teacher interpret MM, what they find complicated in this process and on what part of this process the teacher training programs should be more helpful to PMT.

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Preservice mathematics teachers' mathematical modelling experience: A case study

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Abstract

In last decade mathematical modelling (MM) got into the teacher training programs to give teacher proficiency in this regard and got into mathematics curriculum almost all levels to give student MM skills. As the first step of this process is teacher trainig, the aim of this study is to observe the first MM experience of preservice teachers in a real classroom environment, to reveal their perception of MM and their self refection on their MM experience. The participants of the study are three senior preservice mathematics teachers (PMT) who are enrolling in teaching practicum course. The data of the study consist of observation notes of PMT during a MM session in a high school class and the inteviews on their teaching experience. Content analysis was used to analyse transcribed interviews and observation notes. The findings of the study give clues about, how preservice teacher interpret MM, what they find complicated in this process and on what part of this process the teacher training programs should be more helpful to PMT.

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Preservice mathematics teachers' mathematical modelling experience: A case study

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Abstract

Implementing effective professional development (PD) programs can help teachers in developing their knowledge and skills to enhance students learning in the classroom. However, professional development (PD) programs conducted been seen as less helpful for teachers in developing their potential in teaching mathematics. Therefore, a systematic literature review was undertaken to report on the programs of professional development (PD) for mathematics teachers. This review aimed to explore the professional development (PD) programs for mathematics teacher and teacher components of an effective professional development (PD) in the empirical studies. This systematic review utilized 40 research articles from 2015 to 2020 as data from which such data were obtained from databases such as Google Scholar, ERIC, and Springer. The findings show that the mathematics teacher professional development (PD) programs been used to give an impact on teacher attitudes and practices in terms of classroom teaching practices, student learning outcomes, and teacher knowledge and skills. In addition, teachers' factors for an effective professional development (PD) program can be classified into several parts: 1) motivation, 2) attitude, 3) commitment, and 4) self-efficacy. This study is essential to strengthening the competencies of mathematics teachers based on the best model of professional development in line with current educational needs.

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ORTAOKUL 7. SINIF ÖĞRENCİLERİNİN ÇOKGENLER KONUSUNUN GEOGEBRA İLE ÖĞRETİMİNE YÖNELİK GÖRÜŞLERİNİN BELİRLENMESİ

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Abstract

Yapılan çalışmada problem durumu" Ortaokul 7. sınıf öğrencilerinin çokgenler konusunun Geogebra ile öğretimine yönelik görüşleri nelerdir?" ifadesidir. Bu bağlamda, yapılan çalışmanın amacı ortaokul 7. sınıf öğrencilerinin çokgenler konusunun Geogebra ile öğretimine yönelik görüşlerini belirlemek ve incelemektir. Ayrıca dersi farklı bir öğretim metodu kullanarak öğretim yapılması ile teknoloji ve dinamik yazılımların etkisini belirlemek ve araştırmak araştırmanın alt amaçları arasındadır. Nitel araştırma ilkeleri benimsenerek yapılan çalışmada nitel çalışmalarda sıklıkla kullanılan durum çalışması araştırma deseni kullanılmıştır. Uzman görüşleri doğrultusunda önceden belirlenen temalar bağlamında oluşturulan yarı yapılandırılmış görüşme formu aracılığıyla nitel veriler elde edilmiştir. Yapılan araştırmanın çalışma grubunu Elazığ ili Sivrice ilçesine bağlı bir devlet okulunda öğrenim görmekte olan ve kolay ulaşılabilir örnekleme yöntemi kullanılarak belirlenen yirmi 7. sınıf öğrencisi oluşturmaktadır. Çalışmada verileri elde etmede dört sorudan oluşan bir yarı yapılandırılmış görüşme formu kullanılmıştır. Katılımcıların sorulara gönüllü ve samimi cevaplar vermesini sağlayabilmek amacıyla süre esnek tutulmuş ve konu çerçevesi ve bütünlüğünü koruyabilmek amacıyla formdaki sorular önceden belirlenen iki farklı tema bağlamında oluşturulmuştur. Bu doğrultuda, elde edilen veriler içerik analizi yöntemi ile incelenmiştir. İki farklı tema kapsamında kategoriler ve kodlar kullanılarak nitel veriler tablolar ile sunulmuş ve yorumlanmıştır. Ayrıca veriler frekans ve yüzde değerleri ile sayısallaştırılmıştır. Konunun öğrenilmesini kolaylaştırır ve öğrenilenleri pekiştirir teması kapsamında incelenen öğrenci görüşlerinden elde edilen kodlara göre öğrenciler; konunun Geogebra ile somutlaştığını, görselliğinin arttığını, akılda kalmayı kolaylaştırdığını, kavramları ve problemlerin çözümünü pekiştirdiğini, farklılık sağladığını belirtmiştir. Konuyu eğlenceli hale getirir ve ilgiyi arttırır teması bağlamında incelen öğrenci görüşlerinden elde edilen kodlara göre öğrenciler; Geogebra ile matematiğin eğlenceli hale geldiğini, ilgi ve motivasyonlarının arttığını, kendilerinin de aktif hale geldiğini ve merak duyduklarını ifade etmiştir. Araştırmadan elde edilen bulgular doğrultusunda ulaşılan sonuçlara göre; Geogebranın matematik derslerinde kullanımı öğrencileri bilişsel ve duyuşsal olarak olumlu yönde etkilemiştir ve öğrenmeyi kolaylaştırarak daha eğlenceli hale getirmiştir. Derslerde farklı bir öğretim metodunun kullanımı ve teknoloji entegrasyonunun öğrencileri heyecanlandırdığı ve meraklandırdığı da ulaşılan sonuçlar arasındadır.

Anahtar kelimeler: Ortaokul 7. sınıf, Çokgenler, Geogebra

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The value of knowing the reason to learn numerical methods

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Abstract

Engineering students are often unclear about why it is necessary to study certain mathematical concepts. Actually, the topics are usually introduced in an isolated framework, which has nothing to do with the other subjects of the specialty. Students wonder … where do we use this? will we ever use it?Thus, it is essential to show the importance and usefulness of the different topics presented in order to awaken the interest of students. But, posing mathematics within the context of a problem not only fosters the student's interest but also achieves meaningful and comprehensive learning. The main objective of this work is to show a didactic proposal designed for teaching numerical methods for non-linear equations, posing mathematics within the context of a problem. In the 2021 academic year, this approach will be implemented in the Numerical Analysis courses of Electronic and Mechanical Engineering specialties at Facultad Regional San Nicolás, Universidad Tecnológica Nacional, Argentina. Additionally, rubrics were developed to evaluate the problem-solving process taking into account the expected learning outcomes of the experience; one of them will also be shown in this paper.

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Ortaokul 7. ve 8. Sınıf Öğrencilerinin Matematiksel Modelleme Becerilerinin İncelenmesi

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Abstract

Dünyadaki yaşam koşullarının değişmesiyle birlikte Matematik, formüllerin ezberlendikten sonra soruda yerine konularak doğru cevabın bulunduğu o geleneksel çerçevesinden çıkmış; matematiksel düşünmenin özünü oluşturan beceri ve uygulamaların önem kazandığı esnek bir hal almıştır. Matematik eğitiminde önemli bir konu haline gelen bu uygulamalardan birisi de "matematiksel modelleme" dir (Blum ve Ferri, 2009; Lesh ve Doerr, 2003). Bu araştırmada ortaokul 7.ve 8.sınıf öğrencilerinin matematiksel modelleme becerilerinin incelenmesi amaçlanmaktadır. Ülkemizdeki literatür incelendiğinde öğrencilerin modelleme becerilerinin incelendiği çalışmalara rastlanmakla birlikte (Bal ve Doğanay, 2014; Dede ve Yılmaz, 2013; Eraslan, 2012; Kal, 2013; Kertil, 2008; Olkun vd., 2009; Tuna vd., 2013; Türker vd., 2010) matematiksel modelleme çalışmalarının çoğunun öğretmen adayları ile gerçekleştirildiği ve bu durumun araştırmacıların uygulama sahası olan okullardan yeterince yararlanamadığının bir göstergesi olarak düşünülebileceği ifade edilmektedir (Aztekin ve Taşpınar Şener, 2015). Ayrıca alana özgü gerçekleştirilmesi hedeflenen bir beceri olarak matematiksel modelleme ilk defa 2017 yılında ortaokul matematik öğretim programında yerini almıştır. Dolayısıyla matematiksel modellemenin programa girmesinden sonra yapılacak olan ortaokul öğrencilerinin matematiksel modelleme becerilerinin incelenmesini konu eden çalışmaların da önemli olduğu düşünülmektedir. Bu çalışma nitel bir araştırma özelliğini taşımakta olup durum çalışması olarak tasarlanmıştır. Çalışma, 2020-2021 eğitim-öğretim yılında Türkiye'nin Doğu Karadeniz bölgesinde yer alan orta ölçekli bir ilin yine orta ölçekli bir ilçesindeki bir devlet ortaokulunda öğrenim görmekte olan 7.ve 8.sınıf öğrencileriyle yürütülmüştür. Öğrencilerin modelleme becerilerinin incelenmesi amacıyla öğrencilere araştırmacılar tarafından daha önceden geliştirilmiş bir matematiksel modelleme problemi (Takım Kurmaca) uygulanmıştır. Bu modelleme etkinliğinde öğrencilerden boy uzunlukları ve son üç maçtaki performans değerleri verilen oyuncular arasından en iyi takımı oluşturmaları, belirledikleri oyuncuların sahanın neresinde oynayacaklarına karar vermeleri ve oluşturmuş oldukları takımın rakip takımı yenme ihtimali üzerinde düşünmeleri istenmiştir. Veriler tüm grupların bütün süreçlerinin aynı anda takip edilmesine imkân veren video kayıtları, öğrenci çözüm kâğıtları ve araştırmacı gözlem notları sayesinde toplanmıştır. Öğrencilerin modelleme becerileri Tekin Dede ve Bukova-Güzel (2014) ile Şahin ve Eraslan (2018)'in çalışmalarından uyarlanarak geliştirilen dereceli puanlama anahtarı yardımıyla incelenmiştir. Bahsi geçen puanlama anahtarı ile öğrenci çözüm kâğıtları, araştırmacı gözlem notları ve video kayıtlarından elde edilen veriler problemi anlama, sadeleştirme, model oluşturma, matematiksel olarak çalışma, yorumlama, doğrulama ve raporlaştırma becerileri kapsamında betimsel analize tabi tutulmuş; öğrencilerin bu becerileri hangi düzeylerde sergilemiş oldukları değerlendirilerek puanlandırılmıştır. Araştırma sonuçlarına göre öğrencilerin problem durumunda sunulan verilerden hangilerinin gerekli olduğu üzerinde yoğunlaşarak varsayımlar oluşturabildikleri gözlenmiştir. Süreç boyunca problemi sadeleştirme aşamasında öğrencilerin sık sık şekil ve tablo çiziminden faydalandıkları dikkat çekmiştir. Bu bağlamda öğrencilerin en yüksek puan aldıkları yeterlikler "problemi anlama" ve "sadeleştirme" olmuştur. Durumu matematikselleştirerek üzerinde matematiksel olarak çalıştıkları aşamada ise öğrencilerin ön öğrenmelerindeki mevcut eksikliklerinden ötürü zorlandıkları tespit edilmiş, bu aşamalarda oldukça zorlandıkları görülmüştür. Dolayısıyla öğrenciler gerekli modeli doğru oluşturmalarına rağmen matematiksel olarak çalışma becerisinde zayıf kalmışlardır. Bu aşamada görülen eksikliğe rağmen öğrenciler hangi takımın daha başarılı olduğu sonucuna ulaşmışlar, ancak istenilen yenme ihtimalini sayısal olarak ifade edememişlerdir. Öğrenciler oyuncuları doğru seçip seçmediklerini teyit etmişler, ancak yenme ihtimalini hesaplamada yapmış oldukları matematiksel işlemin yanlış olduğunu fark etmelerine rağmen herhangi bir düzeltmede bulunmamışlardır. Problemin okunması tamamlandıktan sonra öğrenciler başlangıçta grup çalışmasında zayıf kalmışlar, bazı öğrenciler kendi başına problemi nasıl çözeceğini düşünmüşlerdir. Bu durum grup arkadaşlarının birbirlerine birlikte çalışmalarını hatırlatmasıyla kısa sürmüş, uygulama süresince grup çalışmasına daha da alıştıkları gözlenmiştir. Öğrencilerin problemi okuduktan hemen sonra araştırmacıya matematiksel modelin ne anlama geldiğini sormaları dikkat çekmiştir. Bu durumun öğrencilerin modelleme deneyimlerinin olmamasından kaynaklandığı düşünülmektedir. Bu nedenle okullarda öğrencilerin modelleme becerilerini geliştirmeye yönelik uygulamalara ağırlık verilebilir.

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Solving Inequalities Over the Field of Complex Numbers

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Abstract

Most people think that inequalities cannot be solved or even considered over the field of complex numbers. In our work, we show that this can be done and show how it can be done. In the present, the first paper in the indicated direction, we consider the simplest case: quadratic inequalities with real coefficients. This allows representing the advantages of transition to complex numbers in the clearest and distinct form. Moreover, we construct, with the help of LaTeX, a dynamic model visually demonstrating change of the solution sets in the dependence of changes of coefficients.

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