

International Conference on Education in Mathematics, Science & Technology

ICEMST2015
April 23-26, 2015
Antalya / TURKEY

ABSTRACT BOOK



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TEACHERS' PERCEPTIONS OF WEBQUEST AS EFFECTIVE TEACHING TOOL

Mustafa Jwaifell

WebQuest used as an instructional tool as one of e-learning applications in education; has attracted the attention of scholars and post graduates students in the Jordan. WebQuest known within students textbooks as a resource of information that learners have to reach for writing the content published at the site, While WebQuest underlying principles, components and a way of navigation that make it as an instructional tool designed for individualized and group learning, thus it is not perceived as a methodological tool in practice. This study aimed at identifying teachers' perceptions of WebQuest as effective teaching tool after a workshop about designing instructionally a published WebQuest.

Keywords: e-learning, webquest, instructional design, teachers perceptions, in-service training



THE USE OF SIMPLE EXPERIMENTS IN TEACHING PHYSICS TO THE CHILDREN WITH SPECIAL NEEDS

Dušanka Obadović, Bojan Lazarević, Ivana Bogdanović, Mirjana Ilić

This paper deals with inclusive teaching to the children with problems in intellectual development and sand-blind children. In the Republic of Serbia children with special needs are included in regular classrooms in the Primary schools and that is called inclusive teaching. Inclusive teaching strategies are of great importance in order to help children with special needs to attend classes with the children of the same age. Their difficulties in the learning process require special developed curriculum custom to them. In teaching physics the use of simple experiments could be of great help. While conducting simple “Hands-on” experiments, children become active participants in teaching process and also it helps their socialization with their classmates. It is very important to choose adequate simple experiments so child can be included in its conduction, despite of his or her problem. It is necessary to create a friendly atmosphere in the classroom. When sand-blinded child is included in conducting simple experiments, his or her classmates must sometimes describe phenomena and compensate their friend’s inability of observation. Usually classmates will not be able to help their friend with problems in intellectual development to understand how experiment should be conducted. In this case, the teacher will have to provide additional assistance in conducting the experiment and also in the process of drawing conclusions. Teacher must be careful in creating groups for conducting experiments, so regular students will accept their classmates with special needs. In this paper, a suggestion of some adequate simple experiments for teaching physics to the children with special needs is given. Experiments in the fields of motion, pressure, density, heat, electromagnetism and sound are proposed.

Acknowledgement

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Keywords: physics, simple experiments, special need children



METACOGNITIVE AWARENESS OF SCIENCE ORIENTED STUDENTS IN REPUBLIC OF SERBIA

Dužanka Obadović, Milica Pavkov Hrvojević, Ivana Bogdanović, Stanko Cvjetičanin

This paper presents an analysis of science oriented students' metacognitive awareness. Research sample consists of about 200 students of both genders that have enrolled in science oriented department in one of four Grammar schools in Novi Sad. Students enrolling Grammar school in Serbia are mainly 15 years old girls and boys. For the need of this research, the questionnaire (that included Metacognitive Awareness Inventory - MAI) was constructed. According to the first framework given by Flavell (1971), metacognitive awareness can be categorized into awareness of: metacognitive knowledge, metacognitive regulation and metacognitive experiences. Knowledge of cognition usually includes three different kinds of metacognitive awareness: declarative knowledge, procedural knowledge and conditional (strategic) knowledge. Regulation of cognition refers to awareness of the need to use certain strategies, such as planning, information management, monitoring, evaluation and debugging in process of thinking and learning. The students, who conceive the experiments (scientific method) in teaching physics helpful for their understanding of the physics contents, have shown higher level of metacognitive awareness. The same could be concluded for the students who are writing down in a notebook the performed experiments (procedure, explanation, conclusions...) and the students who understand experiments and their explanations. If metacognition is defined as the knowledge and control over children's own thinking and learning activities, it is very obvious that metacognition have great impact on learning process.

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Keywords: physics, science, metacognition, metacognitive awareness



CONNECTING THE CONTENTS OF NATURAL SCIENCES AND MATHEMATICS IN CLASSROOM TEACHING

Stanko Cvjetičanin, Dužanka Obadović, Ivana Bogdanović, Milica Obadović

In order to successfully achieve the objectives and tasks of classroom teaching, it is important to make the correlation between educational contents of different school subjects. The aim of this paper is to analyze the use of the principle of correlation between the contents of natural sciences and mathematics by teachers in Republic of Serbia. The study included 280 teachers. The analytical and descriptive method, i.e. action research, is applied. The research technique is the survey. Teachers do not make the necessary correlations, especially because they are not methodically trained. Within the professional development of teachers, it is of great importance to introduce activities through which teachers will learn how to teach certain contents of science by demonstrating the application of simple mathematical procedures in classroom teaching, respecting the mental and physical characteristics of students.

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Keywords: natural sciences, mathematics, correlations, classroom teaching



TASKS AND META-TASKS TO PROMOTE PRODUCTIVE MATHEMATICAL DISCOURSE IN COLLABORATIVE DIGITAL ENVIRONMENTS

Arthur Powell, Muteb Alqahtani

Rich tasks are vehicles for mathematical discussions. Such discussions when productive involve essential mathematical actions and ideas such as interpretations, procedures, relations, patterns, invariants, conjectures, counterexamples, and justifications about objects and relations among them. These mathematical objects and relations can be conveniently and powerfully represented in digital environments. However, for digital environments, how to shape tasks so that productive, deliberative discussions occur requires continued theorization and explication. To theorize and explain features of tasks that promote mathematical discussions, we were guided by this question: What features of tasks support productive, deliberative discourse in collaborative, digital environments? To frame this inquiry, we employ a sociocultural theory of learning (Goos, 2004; Sfard, Forman, & Kieran, 2001), a dialogic notion of mathematics (Gattegno, 1987), metacognition (Desautel, 2009; Schoenfeld, 1992), and pedagogic-cognitive tools (Ray, 2013). Based on our conceptual framework, we fashioned a research setting which is a professional development project that involves middle and high school teachers in a semester-long, online course to learn discursively dynamic geometry through collaborating to solve tasks in digital environment, Virtual Math Teams with GeoGebra (VMTwG). It is a multimodal, interactional synchronous space that contains rooms for teams to collaborate with access to tools for chat and for mathematical explorations, including a multi-user, dynamic version of GeoGebra, where team members can define dynamic objects and drag their base elements around on their screens. We designed both open-ended, dynamic-geometry tasks and meta-tasks to prompt participants to discuss as well as manipulate and construct collaboratively dynamic geometry objects, notice dependencies and other relations among the objects, make conjectures, and build justifications. Based on a context analytic approach, our analysis of tasks and meta-tasks reveals that the combination of these activities engaged participants in sustained discussions that were mathematically significant in terms of its content and justifications.

Keywords: tasks, sociocultural theory, pedagogic-cognitive tools, metacognition, productive discourse



INSTRUMENTAL APPROPRIATION OF A COLLABORATIVE, DYNAMIC-GEOMETRY ENVIRONMENT AND GEOMETRICAL UNDERSTANDING

Muteb Alqahtani, Arthur Powell

Geometry is important for other areas of mathematics. It provides visual representations alongside the analytical representation of a mathematical concept (Davis, 1992; Goldenberg, 1988; Piez & Voxman, 1997). Pairing learning geometry with technological tools that allow learners to investigate collaboratively geometrical relations can help develop solid understanding of geometry. However, though using technology in teaching is recommended, meta-analytical studies show that teaching mathematics with technology cannot guarantee positive influence on learning (Kaput & Thompson, 1994; Wengilnsky, 1998). Consequently, careful investigations are required to understand the influences of technology and its implementation on learning geometry. To contribute to this understanding, we describe the influence of learners' appropriation of online dynamic geometry tools on their geometric understanding. This paper responds to the question: How does learners' appropriation of an online, collaborative dynamic geometry environment shape their geometrical understanding? To understand learners' appropriation of technological tools, we draw on the theory of instrumental genesis (Lonchamp, 2012; Rabardel & Beguin, 2005), which explains how learners interact with tools. To appropriate a tool, learners develop their own knowledge of how to use it, which turns the tool into an instrument that mediates an activity between learners and a task. The tool used in our study is the Virtual Math Teams with GeoGebra (VMTwG)

environment. It contains a chat panel and multiuser version of GeoGebra. The learners are seven middle and high school mathematics teachers who participated in a professional development course in which they collaborated synchronously in VMTwG to solve geometrical tasks. We use conventional content analysis to analyze the work of a team consisting of two high school teachers. Our analysis shows that the teachers' appropriation of the dragging feature of VMTwG shaped their understanding of geometrical dependencies. This informs the broader question of what knowledge is constructed from using certain technologies.

Keywords: dynamic geometry, instrumental genesis, professional development, collaboration, geometric reasoning.



NEW SCIENCE CURRICULUM BASED ON INQUIRY-BASED LEARNING - A MODEL OF MODERN EDUCATIONAL SYSTEM IN REPUBLIC MACEDONIA

Natalija Aceska

The process of globalization, more progressive development of the scientific findings, new technology and the way of communicating with the new forms of literacy in which the most secure spot has been taken by the development of natural sciences in the spirit of sustainable development have been the reasons that make science and sustainable development an educational imperative. The development of natural sciences in the educational processes in Republic of Macedonia has become an essential process which is being permanently improved with the goal to find the best solutions for its improvement. Currently, all of the elementary and secondary grade teachers have to face this process. One of the most recent changes is the study of natural sciences according to the adapted educational curriculum from the Cambridge International Examination Center. The goal of this reform is to lead the students on the right way of becoming future "scientists". The programs include research that encourages students to ask questions and derive the answers themselves with the support from their teachers. This is a proven method with which natural science classes will become more interesting for the students and the findings will remain learned. The educational curriculum also allows the students to develop their critical thinking and to think and use the proofs. Students will easily learn that natural sciences are important and can help them in solving everyday life's problems according to the principles of education for sustainable development. A very important part in the adaptation and realization of the adapted educational curriculum from the Cambridge International Examination Center is being played by the information and communication technology (ICT) that is a very useful resource for the development of the knowledge, skills and understanding among students. ICT needs to improve the quality of the teaching. The teachers will have the opportunity to choose and use the most appropriate and effective ICT resources.

Keywords: science, education for sustainable development, curriculum, ICT



TECHNOLOGY EDUCATION IN FINLAND - CRAFT, CREATIVITY, TEXTBOOK OR TECHNOLOGY

Ossi Autio

Changes in the economy, nature, production and society together with increasing scientific and technological knowledge make demands of transforming school teaching in the field of technology education. This article analyses current trends in Finnish technology education. The aim of the article is

briefly to explore the integration between Science -, technology - and traditional craft education in Finland. Finnish technology education can be characterized as the design approach that has evolved from the craft oriented tradition. Additionally, it involves many elements of computer controlling and electronic principles. Thanks to Finnish industry and their interest groups there are positive signs of real strengthening in technology education. But still much of the learning is focused on production skills, and approaches that are now dominant in craft education do not prepare students to meet the challenges of modern technology and working life.

Keywords: technology education in Finland, craft education, science education



A SURVEY OF STUDENTS PARTICIPATING IN A TABLET-ASSISTED EDUCATION PROGRAMME

Elif Binboğa Yel, Orhan Korhan

This study mainly examines anthropometric data, data regarding the habits, experiences and attitudes of the students about their tablet/laptop/desktop computer use, in addition to self-reported musculoskeletal discomfort levels and frequencies of students participating in a tablet-assisted interactive education programme. A two-part questionnaire was used to collect data. The survey results are of critical importance because making reasonable recommendations to the new generations for healthy use of desktop/laptop/tablet computers is only possible if we can understand the relationships and risk factors involved in and eliminate the risks to prevent musculoskeletal discomfort.

Keywords: questionnaire, education, tablet computers, musculoskeletal



USING COMPLEXITY THEORY TO CONSTRUCT A DIGITAL LEARNING ENVIRONMENT FACILITATING EXPERIENTIAL LIFE EDUCATION PROGRAMS ON ELEMENTARY SCHOOL TEACHERS AND STUDENTS

I-Tsun Chiang, Hsiu-Chi Fu, Shang-Ti Chen, Hsin-Chih Wu, Sheng-Hung Tsai, Mao Liu

E-learning has become a global trend, however, the entire globe is facing the problems of social disruption and disorder, overwhelmed with sensual desire, and filled with distorted sense of ethics and morality, it has a strong need to guide the younger generation to understand the meaning and purpose of life through life education. Therefore, there is an urgent need to understand how to develop, implement, and promote experiential life education programs with technology support environment. Complexity theory has been pervasively applied in education and management to adapt multiple environmental changes and multidisciplinary collaboration in recently research. Evolving from chaos theory, complexity theory not only keeps the unpredictability and nonlinearity in education models but also develops mutual-adaptation, co-evolution, dynamic interaction and self-organization. Therefore, it is appropriate to use this theory to construct educational models in complicate educational areas. The study used complexity theory as the theoretical basis and utilized a series of high-definition digital TV programs as teaching materials to develop life experiential education courses model and understand its effectiveness for elementary school teachers and students. The study was conducted by observing volunteer classes to understand the design of digital learning. One unit of a national popular TV program, "Let's Play Stories", was utilized as the teaching materials. Attitudes and behaviors of teachers and students during participating, suggestions from teachers, feelings and learning of students, and interactions were investigated. Purposive sampling

was used to collect five schools in northern and central Taiwan. Qualitative research methodology was the major research approach to construct the teaching model. The results of the study help us to understand how to establish digital learning model and effectiveness of using complexity theory to construct a digital learning environment facilitating experiential life education programs on elementary school teachers and students in real teaching sites.

Keywords: digital learning , experiential education , life education , complexity theory



TEACHING THE LINES, ANGLES AND POLYGONS ACCORDING TO CONSTRUCTIVISM SUPPORTED BY CONCEPT CARTOONS

Fatma Canan Göksu, Necla Köksal

The purpose of this research is to put forward applicability of subjects of lines, angles and polygons in a constructivist learning environment which is supported by concept cartoons. Since the research aims at putting forward constructivist learning process which is supported by concept cartoons, it is conducted as an action research. The research is implemented with the participation of students studying at 7th grade of a secondary school situated in Karacasu town of Aydın province during the spring semester of 2012-2013 academic year. Data were gathered by problem scenarios and performance assignments students completed. In the research, the qualitative data is analysed by using content analysis technique. In consequence of analysis of the research data, it is seen that constructivist learning implementations which is supported by concept cartoons improves problem solving abilities of students and that they can display knowledge they learnt through concept cartoons in performance assignments. Also, according to findings obtained from interviews with students, it is determined that learning process supported by concept cartoons contribute learners' affective, cognitive and social attributes, learning-teaching processes and teacher attributes.

Keywords: teaching mathematics, concept cartoon, constructivist learning environment



A QUALITATIVE STUDY TO DETERMINE 7TH GRADE STUDENTS' MISCONCEPTIONS ABOUT SOME CHEMISTRY TOPICS

Filiz Avcı, Burçin Acar Şeşen, Fatma Gülay Kirbaşlar

During the process of learning science concepts, it is aimed that students construct the new knowledge in their minds by linking it to the prior knowledge. That is why, the correctness of students' prior knowledge will lead them to learn new concepts accurately. In that sense, determining the students' misconceptions has become a part of the learning process. This study aims to determine 7th grade students' misconceptions about such chemistry topics in Science and Technology subject as "Stable Atom", "Positively Charged Ions", "Negatively Charged Ions", "Chemical Bond", "Covalent Bond", "Ionic Bond", "Covalent Bond Consisting of Different Atoms", "Compounds", "Solution" and "Particulate Size in Solution". Qualitative analysis method is used in the study. Semi-structured interviews have been conducted with five 7th grade students of a secondary school in İstanbul and those students are the ones who have already learnt pre-defined topics and whose academic achievement at Science and Technology subject is low. Semi-structured interview form has been prepared with regard to the students' misconceptions after a related literature review was done. As a result of the content analysis done on the students' answers it has

been found out that students have such misconceptions as “Stable atoms are prone to give and take electrons”, “If an electron is displaced in an atom, negatively charged ions are formed”, “If a neutral atom takes an electron, positively charged ions are formed”, “Chemical bond is formed as a result of atoms’ exchanging electrons”, “The bond which is generated by H and Cl atoms in HCl solution is called an ionic bond”, “Compounds are made up of the same kind of atoms”, “When stirred in water, salt melts and stays at the bottom”, “When put in a pot at the same temperature, cube sugar is dissolved faster than granulated sugar”.

Keywords: teaching science, teaching chemistry, teaching concepts, misconceptions



THE RELATIONSHIP BETWEEN PRE-SERVICES SCIENCE TEACHERS’ EPISTEMOLOGICAL BELIEFS, LEARNING APPROACHES AND UPE SCORES

Sedat Kanadlı, Ahmet Akbaş

The purpose of this study is to identify the relationships between epistemological beliefs, learning approaches and university entrance scores of freshmen pre-service science teachers, and to investigate whether there is a significant difference among their Undergraduate Placement Examination scores based on the levels of epistemological beliefs (very developed, developed, underdeveloped, and never developed level) and learning approaches (very deep, deep, surface, and very surface level). The survey research design was used in this study and the study group consisted of 290 freshmen pre-service science teachers at Mersin University, İstanbul University, Cumhuriyet University, Muğla University, Gazi University and Dokuz Eylül University at the autumn term of 2014-2015 academic year. Epistemological Beliefs Questionnaire (the belief that depends on effort, the belief that depends on innate ability and the belief that there is single truth), developed by Schommer (1990) and adapted by Deryakulu and Büyükoztürk (2002) into Turkish and Revised Two Factor Study Process Questionnaire (surface approach and deep approach), developed by Biggs, Kember and Leung (2001) and adapted by Önder and Beşoluk (2010) into Turkish, were used to gather the data.. Because the collected data was not normally distributed, Spearman Brown Rank-Order Correlation Test and Kruskal-Wallis H Test were employed to analyze it. As a result of the analysis, it was concluded that pre-service science teachers’ beliefs of learning depend on effort and innate ability were more developed, they preferred deep approach more than surface approach, there was no meaningful relationship between UPE scores and learning approaches, but there was meaningful but weak relationship between UPE scores and epistemological beliefs, the UPE scores showed no significant difference based on levels of learning approaches and epistemological beliefs. It was given some suggestion on UPE questions type and science teacher education based on the results obtained from this study

Keywords: learning approach, epistemological beliefs, UPE score



THE RELATIONSHIP BETWEEN AFFORDANCES OF VIRTUAL MANIPULATIVE MATHEMATICS APPS AND YOUNG CHILDREN'S LEARNING PERFORMANCE AND EFFICIENCY

Patricia Moyer-Packenham, Hilal Gulkilik, Emma Bullock, Christina Watts, Arla Westenskow, Stephen Tucker, Jessica Shumway, Jennifer Boyer-Thurgoood, Katie Anderson-Pence, Kerry Jordan

This presentation discusses changes in young children's learning performance and efficiency during clinical interviews in which each child interacted with a variety of virtual manipulative mathematics apps on iPads. Researchers interviewed over 100 children ages 3 to 8 using a protocol format with two pre-assessment apps, four learning apps, and two post-assessment apps. Data were gathered quantitatively and qualitatively, using wall and screen-capture videos, pre and post assessments of performance, and time-stamping to record efficiency. Following 30-40 minute interviews where children interacted individually with the mathematics apps, results showed that children in the Preschool group increased efficiency while maintaining performance, children in the Kindergarten group increased performance while maintaining efficiency, and children in the Grade 2 group increased their performance and efficiency in skip counting, but not in place value. Affordances of each of the different virtual manipulative mathematics apps were linked to changes in children's performance and efficiency. In some cases children did not access an affordance, children accessed an affordance and it supported performance and efficiency, or children accessed an affordance and it hindered performance and efficiency. Overall, children in different age groups responded in different ways to the apps and some apps had a greater influence on children's learning performance and efficiency than others.

Keywords: virtual manipulatives, math apps, ipads



DETERMINATION OF SCIENCE TEACHERS' AND PRIMARY TEACHERS' TEACHING AND LEARNING CONCEPTIONS AND CONSTRUCTIVIST LEARNING ENVIRONMENT PERCEPTIONS

Tuğba Ecevit, Pinar Özdemir Şimşek

The fact that scientific knowledge increases every single day and technology develops rapidly, raises the importance of science education. The most important duty for the introduction of science education to primary school students falls to primary school teachers. To produce an effective and fruitful science education, it is very important to know teachers' conceptions of learning and teaching, and how communication medium between teachers and students is. The purpose of this study is to determine the science teachers' and primary teachers' learning and teaching conceptions and constructivist learning environment perceptions. The sample of study consists of science teachers and primary teachers working at the public schools in the Central Anatolia region during 2014-2015 academic year. "Easily accessible sampling method" was used for the selection of the participants. The study is a quantitative research and survey model which is directed to the determination of the current state has been used. Teaching-Learning Conceptions Questionnaire (TLCQ) and Constructivist Learning Environment Survey (CLES) have been used as the means of data collecting. The scale which was used with the aim of determining teachers' conceptions of teaching and learning was 5 point Likert scale with 30 items which was developed by Chan and Elliot (2004) and translated into Turkish by Aypay (2011) and it is composed of two sub dimensions called conventional and constructivist scales. Reliability coefficient of teaching and learning conceptions scale is 0,84. The scale used for the purpose of determining teacher's constructivist environment conceptions was 5 point Likert Scale of 25 item which was developed by Taylor and Fraser, methodized by Ibarra (2005) and adapted to Turkish by Acat and others (2007) and this is composed of three sub dimensions as flexibility in teaching, individual attention and democracy of the environment. Reliability coefficient of constructivist environment conceptions scale is 0,81. Descriptive statistics and multivariate analysis of variance will be used for the analyses of the data gathered. It will also be evaluated whether the

coefficients vary according to teacher's branch, length of service and gender. However well the science education curricula has been prepared, the thing which is important is the teachers' effect on the application. That's why, the search for the reflections in application gains importance in this study.

Keywords: teaching and learning conceptions, constructivist learning environment perceptions, science teachers, primary teachers, science lessons



MISCONCEPTIONS ON PRESSURE AMONG STUDENTS

Tuğçe Görkemli, Sena Kılınc

Pressure is one of the concepts on which students usually have misconception. Therefore, it is crucial that teachers should be aware of all those misunderstanding or misapprehension made by the student. Teachers need to be adequate, focus on the subject and gain the necessary knowledge on the meaning of some concepts such as pressure force, surface area, vectorial and scalar quantities in physics. The lack of information of teachers and intern teachers may cause misconception of students as usual. Another difficulty that teachers mostly come across on "pressure" concept is formulating and expressing solid, liquid and gas substances within different formulas. It is often done casually as if a habitual action. In this study, it is intended to present all the misconception and misunderstanding on pressure concept by means of all available information. This research is achieved as Literature survey.

Keywords: pressure, misconceptions, pressure force, surface area, vectorial and scalar quantities



VIEWS OF SCIENCE AND TECHNOLOGY TEACHERS ON SCIENTIFIC PROCESS SKILLS AND THEIR IDENTIFICATION LEVELS

Nejla Gültepe

The research was a descriptive study in which survey model was used on totally 37 Science and Technology teachers in Çankırı, Karabük, Kastamonu and Kütahya. The inventory was prepared by the researchers to receive teachers' opinions on the importance of these skills in science education, to identify the frequency of their in-class practice with these skills and the problems they encounter and to specify their identification levels on these skills. The content validity of the inventory was ensured through the opinions of researchers in science education; and following the application of 4 teachers. The inventory consisted of 7 questions 6 of which contained the opinions of the teachers about the effects of these skills on science education, concept learning and other thinking types and the environment these skills are thought in; about the problems they encounter during the teaching process and the frequency of the application of these skills. The last question was prepared in order to specify the sufficiency of the teachers in identifying these skills. Content analysis was performed and the results were given as frequencies. Even though teachers think that these skills in general have a positive effect on science education, concept learning and other thinking types, the answers they gave showed that the in-class activities they do promote concept learning, these activities are not in the manner of making students gain skills. Besides, 6 teachers think that these skills hinder concept learning. Whereas quite a number of teachers argue that these skills can only be gained effectively through lab activities in which teachers and students both engage in, almost all of them think that central examination based teaching poses a great obstacle. It has

been found out that teachers are more successful in identifying skills of observation, making predictions, experimenting, and making inference than other skills.

Keywords: science process skills, science education, science and technology curriculum, science and technology teacher




DEVELOPING A FRAMEWORK TO UNDERSTAND HOW STUDENTS PARTICIPATE IN CLICKER-INTEGRATED ACTIVITIES: FOCUSING ON FRAMING

Yu-Ta Chien, Chun-Yen Chang

Clickers have gradually become an integral part of the science classroom. The most successful instructional strategy so far to conduct clicker-integrated science instruction might be peer instruction. Peer instruction is originally developed by Eric Mazur's group at Harvard University for improving physics teaching. Within the class conducted with peer instruction, opportunities for students to discuss their own solutions to clicker questions are amply provided. Several science educators have adapted Mazur's method with clickers and obtained positive outcomes. However, little study has been done to directly investigate in what way students are engaged in peer instruction with clickers. Previous studies mainly focused on students' pre-/post-test scores or pre-/post-discussion answers. This study therefore investigates how students are engaged in clicker-integrated peer instruction in situ. A dynamic account of cognition involving framing, a construct originating in socio-linguistics and anthropology, is adapted. Framing is to describe how participants in an activity form a sense of what is going on in interaction. Framing thus informs the participants of acceptable ways to talk, act, and even think in the activity. Through qualitative-quantitative mixed analyses on students' discussion and interview data, an analytic framework to infer students' framing of clicker-integrated activities is established. Two different types of students' framing, including thinking clicker-integrated peer instruction as (1) opportunities for sense-making or (2) opportunities for getting the correct answer, are identified. Moreover, it is found that the aforementioned two types of framing (1) drives much of students' practice and (2) correlate with their learning outcomes. Students tend to have higher scores on post-tests if they frame clicker-integrated peer instruction as opportunities for sense-making patterns; whereas students tend to have lower scores on post-tests if they frame clicker-integrated activities as opportunities for getting the correct answer.

Keywords: clicker, science learning, epistemological framing, conceptual learning



BLOCK VOTING IN THE CLICKER-INTEGRATED CLASSROOM: INTERACTION BETWEEN STUDENTS' PRIOR KNOWLEDGE, CLICKING BEHAVIORS, AND CONCEPTUAL LEARNING OUTCOMES

Chun-Yen Chang, Yu-Ta Chien

This study explored the relationship between high school students' prior knowledge, conceptual learning outcomes of Newton's laws of motion, and the use of a prominent feature of clicker systems, i.e., the display of real-time class responses aggregated by clickers (hereafter "display of voting results"). With a controlled setting and the instructional design that is widely used in clicker-integrated science instruction, this study demonstrated preliminary evidence that displaying the real-time responses of the whole class could inhibit students' conceptual learning. It was found that students were more likely to change their

answers if they saw the display of voting results ($U = 61.50$, $Z = -2.17$, $p = .033$). The post-test scores of the non-display session were systematically higher than those of the display session ($U = 55.00$, $Z = -2.47$, $p = .013$). The superior learning gain of the non-display session over the display session approximately reached a large size ($r = 0.45$). In addition, it was found that in the display session, students with lower prior knowledge were more likely to block vote than those with higher prior knowledge ($U = 12.00$, $Z = -1.84$, $p = .066$). The current study serves a warrant that science teachers should rethink whether displaying voting results is needed in clicker-integrated science classrooms, especially when students cannot answer correctly under the circumstance of individual voting, or when students have little prior knowledge of the topic being taught.

Keywords: clicker, voting display, science learning, conceptual learning



ACCORDING TO THE TEACHERS' OPINIONS, TEACHING MATHEMATICS IN THE 5TH GRADES IN NEW 4+4+4 EDUCATION SYSTEM

Hafize Gumus

The aim of this paper is to investigate the teachers' opinions about mathematics education in the 5th grade students, to identify the difficulties and to develop recommendations about these difficulties. The data were gathered by using semi-structured interviews conducted with 8 classroom teachers and 8 mathematics teachers. All of the interviews were recorded on a tape recorder and in the interpretation of the data, content analysis and the constant comparison techniques were used.

Keywords: teaching mathematics in the 5th grades, 4+4+4 education system, teachers' opinions.



AUTOMATIC EXAM ATTENDANCE SYSTEM BASED ON ILLUMINATION INVARIANT FACE RECOGNITION

Burçin Özmen, Kamil Yurtkan

Application of the computer-aided security systems are one of the applicable technologies especially in the crowded places such as entrance gates where high security measure is requested. On the other hand, automatic face recognition is useful in the applications that the recognition of the authorized people should be completed in a limited time. It is observed that identification of the students for exam security is one of the important issues in universities where crowded exams take place. The proposed computer assisted system will help invigilators to report the attendance in a limited time. It will be able to recognize the human faces, and then matching operation through the database of the university will be made by performing the analysis. The faces are to be captured in the classroom environment. By using non-subsampled Contourlet transform, obtained images are then to be transformed into multiscale and multidirectional contour information for face detection where the intrinsic geometrical structures are used for characterizing feature vectors. The main reason for the choice of non-subsampled Contourlet transform is based on its effectiveness to capture the smooth contours and geometrical structures in the image. After the face detection, facial feature extraction operation is needed. NSCT method will be employed for facial feature extraction. NSCT obtains a sparse image representation due to its properties such as directionality and shift invariance by first applying a multiscale transform and then applying a local directional transform to gather the nearby basis functions at the same scale into linear structures.

Extracted facial geometric properties from the detected human face will be assumed to be facial features. After that, classification depending on the face geometry could be applied. Support vector machine-based classifier will be used to identify the faces from the face database.

Keywords: automatic attendance, face recognition, attendance system, exam security, student authorization



HIGHER EDUCATION IN INDIA-INNOVATIONS AND CHALLENGES

Rajnalkar Laxman, Anil Kumar Hagargi

Education plays a pivotal role in the development of the society and decides the direction in which it has to develop. It has been the salient driver for the achievement of various societal milestones. Since development and advancement is order of the day, education has caught the limelight and turned to be paramount significance. In the present paper, an attempt is being made to throw some light on the current status of higher education, Gross enrolment ratio, state of employability of the output of higher learning institutions. Providing quality education and producing employable output has been a major challenge faced by institutions of higher education. We survive in a society where education is base to go up in the ladder pertaining to social, political, economical etc, in the society. The paper further highlights the innovativeness being developed, persued and followed in the in the wake to changing dimensions of education globally. Academicians and administrator have to think on serious initiatives be followed to bring about desired changes. The curriculum and delivery mechanism has to be changed and updated from time to time to meet the expectations of the society. Though there is a visible growth in terms of increase in number of higher learning institutions i.e. 475 universities, deemed universities and institutions with national importance are functioning in India, but not even a single higher learning institution from India figured in the top 200 institutions in the world, this poses serious question on the education system being adopted in the country which can only be answered by adopting innovative changes to be followed in higher learning institution. The concerted efforts so initiated may bring desired quality output from the sector. Thus the present paper makes an effort to critically examine the present status of higher education system in the country and makes an attempt to provide measures to be adopted in the days to come to make the sector more vibrant and relevant and more societal oriented. Education ultimately should enable the society to attain and achieve the desired changes and enjoy the demographic dividend. Further it should contribute visibly in the development of productive social capital.

Keywords: GER,employability, higher education, higher learning institutions, demographic dividends,curriculum, social capital



THE VIEW TO THREE TIER TESTS FROM LITERATURE PERSPECTIVE

Sena Kiliç, Tuğçe Görkemli

Incorrect interpretation and the misunderstanding of the concepts that make up scientific knowledge has become an important subject on which researchers dwell on. Misconceptions are identified first by open ended questions and then by two tier tests. Nowadays the tendency of identifying the misconceptions by the way of three tier tests are common among researchers. Therefore, the goal of this study is to review the three tier tests that are used for identifying the misconceptions. In accordance with this goal, the

researches done by three tier tests about the education of science by the way of scanning literature are reviewed in this study.

Keywords: three tier tests , misconception, science education



CONTRIBUTION OF STORIES TO PROBLEM SOLVING SKILLS IN MATHEMATICS IN PRIMARY EDUCATION (EXAMPLE OF PROVINCE OF MALATYA)

Celal Çakan, Ebru Korkmaz

One of the methods that can be used to improve the problem-solving skills in mathematics is stated that the teaching mathematics with stories. Mathematics teaching with the story, students to use mathematical language easier and contribute to more successful in solving word problems (Morgan, 2006). In mathematics education with the story, providing information tangible rather than intangible, so students will never forget them. In addition to this, information is provided restructuring, problem solving and critical thinking skills are also developed. Problem-solving skills to contribute to the students of elementary school students in math expression with stories of individuals as well as increasing the persistence in learning to observe the attitudes developed for this course is the objective of the research. For these purposes, the following questions will be answered. Attitudes towards mathematics for elementary school students how changed? What is the retention level in spite of what has been learned to pass a certain time after the subjects taught elementary school students? Mixed methods research in experimental research model in this study, Creswell (2003) 's sequential explanatory design (quantitative-qualitative) will be applied. In this embodiment predominantly qualitative data collected after quantitative data are collected and analyzed. Mixed methods research, researcher of a study or qualitative and quantitative methods each other in subsequent studies, is defined as the combining approaches and concepts (Creswell, 2003; Tashakkori and Teddlı, 1998; Johnson and Onwuegbuzi, 2004). To combine qualitative and quantitative methods in a single operation, providing a more holistic understanding and creating better-informed education policies, various aspects of the investigated event helps to explain (Steckler et al., 1992; Davies, 2000). In this study the universe; Malatya is to create primary schools sample of the study will consist of 8th grade primary school students.

Keywords: mathematics education, stories, problem solving



WHAT'S GOING ON IN THE GARDEN KIDS?: THE IMPORTANCE AND VALUE OF SCHOOL YARDS

Safak Ozturk Aynal

Nowadays the value of school yards in education gradually increase. Indoor education goes on to outdoor education. Therefore, school gardens could be used in the curriculum as far as possible and it is provided for children to be creative. Thus natural design of school yards have started to attract more attention. In trying to develop very different designs of the school yards, children can think in a different ways while they are playing, children can live different experiences in different dramatic plays and observe lots of variations in the nature and natural designed places. Briefly, natural school yards design which refers different play areas as well as nature, is an outdoor environment for children. In this paper, characteristics of the school yard (in preschool education) will be discussed in detail.

Keywords: preschool education, school yard



KNOWLEDGE, ATTITUDE AND BEHAVIOUR OF UNIVERSITY STUDENTS ON SEXUALITY

Sinan Erten

The main objective of this study is to examine the sexuality gaze, information about teen sexuality with what degree they have, is to identify and uncover attitudes towards sexuality. Also university students to determine the status of the misconceptions and misinformation about sexuality in the among the other objectives of the research. The data for this study were collected last 3 years. The data of the university students studying in Ankara and Konya were obtained by voluntary contributions. College students who were included in the study were subjecting a specific selection. About 500 as the data Necmettin Erbakan was obtained from students at the Faculty of Education at the University of Ahmet Keleşoğlu. The results were obtained from the 4582 data. Cronbach's alpha correlation coefficient calculated to determine the reliability of the scale was found to be within the scope of research alpha 0.78. Findings related to the personal characteristics of the participants were analyzed by percentage and frequency statistics. In data analysis, t-test and ANOVA were used 5-point Likert-type "Sexual Health Info" can be taken from the scale scores between 1 and 5. College students need to know about healthy sex life has emerged, many issues they know or they do not know or missing. They have positive attitudes as negative attitudes about healthy sex life. In addition, students in relationships before marriage, living together before marriage and revealed the different views on sexual behavior and go on a proper interpretation of the road. In addition, the results of the analyzes conducted were found significant differences between men and women.

Keywords: sexual health, knowledge of sexual health, perception of sexuality.



INVESTIGATION OF MATHEMATICS TEACHERS' AWARENESS OF DEVELOPING MATHEMATICAL LANGUAGE

Ayla Ata Baran, Tançül Kabael

Teachers naturally focus on mathematics instead of language and students are traditionally expected to learn the new language skills needed for mathematics by exposure rather than explicit instruction in much the same way they learned their original, natural language. But the language of mathematics is not a natural language (Gray, 2004). Because of the importance of this language in mathematics education, teachers should strongly endorse the use of mathematical language in the classroom and frequently make efforts to assess student communication (Owens, 2006). The purpose of this study was to investigate mathematics teachers' awareness of developing students' ability for using mathematical language effectively. The study was designed qualitatively in which the data was collected through clinical interviews. Clinical interviews were conducted with ten middle school mathematics teachers. Clinical interviews were nearly fifty minutes long and videotaped by a camera. Data was analyzed qualitatively by using thematic analysis technique (Gibbs, 2007). The findings revealed that teachers believed that the ability of using mathematical language positively affects students' success in mathematics. According to the findings, half of the participants weren't aware of that mathematics is a universal language. Besides, the teachers, who had awareness about this language, graduated from mathematics major or had a graduate education in mathematics education. Furthermore, these teachers were also adequate in explaining the properties and structure of mathematical language. Another finding of this study was that

teachers believed that using the language of mathematics effectively ensure to develop students' ability of using mathematical language. While the participants graduated from faculty of education said that they should just have sufficient pedagogical knowledge, the participants graduated from mathematics major said that they should both have sufficient pedagogical knowledge and content knowledge. Thus, teachers were lacking of what their responsibilities are about developing the ability of using this language. Eventually, it was questioned that what the signs of mathematical communication ability are in middle school mathematics curriculum. It was found that using mathematical symbols and mathematical terms correctly, expressing mathematical thoughts orally were signs of mathematical communication ability in curriculum.

Keywords: the language of mathematics, mathematical communication, middle school mathematics.



THE EFFECTS OF USING SOMATOSENSORY VIDEOGAMES TO PROMOTE "LIFE-EFFECTIVENESS" OF CHILDREN IN ELEMENTARY SCHOOLS

Hsin-Chih Wu, I-Tsun Chiang, Shang-Ti Chen, Shiou-Ru Chen, Sheng-Hung Tsai, Student Hsiu-Chi Fu

With dramatic advancement of technology, children in elementary schools have much more opportunities to immerse in technology environment. However, children nowadays are facing a variety of challenges in emotional control, peer pressure, and social interactions and relationships due to rapid changes of social environment on campus. In order to develop their social capacities, it is important to provide appropriate activities with technology to enhance their life-effectiveness. Therefore, there is a crucial need to understand how to improve the life-effectiveness of children in elementary school. The purpose of this study was to explore their life-effectiveness by using somatosensory video games, Xbox 360 Kinect. A total of 84 participants were recruited and divided into an experimental group ($n = 40$) and control group ($n = 44$). The experimental group voluntarily agreed to complete 30-minute Xbox 360 Kinect trainings one time a week for total of 4 weeks. The Life-Effectiveness questionnaire was used to measure and complete before and after the intervention in both groups. The Wilcoxon nonparametric test for each two independent samples was used to evaluate time-series training effects. Results showed that experiment group significantly improved their self-effectiveness between pre- and post-test ($p < .05$). The study concluded that somatosensory video games is a potential tool to enhance the life-effectiveness of children in the elementary school. Further studies are suggested to validate possible follow-up benefits of somatosensory video games and to develop the best intervention model.

Keywords: digital learning , life effectiveness, educational technology, somatosensory video game



POSSIBILITY OF USING SOMATOSENSORY VIDEOGAMES TO PROMOTE ZERO HOUR PHYSICAL EDUCATION IN ELEMENTARY SCHOOLS IN TAIWAN: A QUALITATIVE PERSPECTIVE

Hsiu-Chi Fu, I-Tsun Chiang, Shang-Ti Chen, Sheng-Hung Tsai, Mao Liu, Student Hsin-Chih Wu

The purpose of study is to explore how the somatosensory videogames effecting life-effectiveness and its influence on schoolchild's social networking on a zero hour physical education sessions in Taiwan. Participants in this study were students, teachers, and parents in two elementary schools in northern and central Taiwan. Students were voluntarily agreed to complete 30-minute Xbox 360 Kinect game one time a week for total of 4 weeks. Semi-structured interviews were conducted to collect information from

participants regarding their subjective attitude and experience about life-effectiveness, team collaboration, and gaming pleasure during somatosensory videogame sessions. Participant observations were also conducted to understand their real behaviors, feelings and interactions during this zero hour physical education session. The results showed that using the somatosensory videogames could positively arouse their self-awareness and competitive attitudes; however, teachers may play important roles who effected the attitude of students. In addition, the scores in the somatosensory videogames could have equivocal effects on the team collaborations of students due to the social relations in their real life. The results of the study help us to understand how the somatosensory videogames is a tool to construct the social interactions and life-effectiveness on elementary school students in real life. It is worth to develop zero hour physical education classes in elementary schools in Taiwan.

Keywords: physical education, educational technology, zero hour PE, somatosensory video game



STEM TEACHERS' PERCEPTION OF PEDAGOGICAL AFFORDANCE OF SMART MOBILE TECHNOLOGY

Khitam Shraim

Smart mobile technology, in particular: Smartphones and iPads, are becoming increasingly ubiquitous among educators and students. Globally, the proliferation of smart mobile technology (SMT) in the current digital environment represents an opportunity to explore the potential of mobile learning (mlearning)–learning on the move facilitated by mobile technologies. Similar to the trends of other countries throughout the world, SMT penetration has reached 75% in Palestine in 2012. Given the ready-at-hand availability of these devices, it is reasonable to recognize the valuable affordances of SMT to enhance teaching and learning in Palestine, as well as to meet the needs of a new generation for which SMT is becoming an integral part of everyday life. Thus, the purpose of this study was to explore STEM teachers' perception towards the value of integrating SMT in their teaching activities. In the first phase of the pilot study, qualitative data were collected from two focus groups, while in the second phase, quantitative data will be collected through a questionnaire. Data were coded into four categories: perception of functionalities of SMT, self-efficacy, pedagogical affordances and challenges. The preliminary findings show that while mobile learning is still at an experimental stage, common themes are already emerging from the research regarding its potential to become a “transformative technology” that creates flexible, accessible and personalized learning environment. Therefore, in order to take full advantage of SMT in their teaching, teachers must not only be familiar with how to use it, but also understand how to incorporate its functionalities into teaching activities that align with learning outcomes. The results also indicate the various challenges and the need for institutional support to invest in teachers professional development and in technology in order to enhance the perception of mlearning in higher education in Palestine.

Keywords: smart mobile devices; mlearning; affordance; self-efficacy; perception



TPACK FRAMEWORK FOR TEACHERS' PROFESSIONAL DEVELOPMENT

Khitam Shraim

The study describes the use of the Technological Pedagogical Content Knowledge (TPACK) framework to explore the necessary professional knowledge needed in empowering science, technology, engineering

and math (STEM) teachers to integrate meaningful mobile apps in the content and pedagogy that are relevant to teaching STEM. Mixed research methods were used. First, two four-hour workshops were provided by four facilitators to support 60 participants in developing an understanding of smart mobile devices functionalities in teaching. BYOD model was used; all participants were asked to bring their own device. Participants were oriented the Pedagogy Wheel, created by Allan Carrington. The Pedagogy Wheel sorts a wide variety of apps into the various aspects and areas of Bloom's Digital Taxonomy. Several apps were downloaded and used for training participants how to integrate technology in various activities. Participants were given two weeks to explore the affordance of their Smartphones and iPads and to develop their own lesson plan. Second, 2-hour workshops were conducted collecting participants' reflections upon experiences when integrating mobile apps in their lesson plans. Third, a questionnaire was developed, based on TPACK components. The questionnaire's items are addressing TCK (Technological Content Knowledge) , TPK (Technological Pedagogical Knowledge) and TPACK (Technology Pedagogy and Content Knowledge) , in addition to the personal information. The initial findings indicate the need for STEM teachers' professional development to reconceptualize the role of mobile technology in teaching STEM. By using the TPACK framework, teachers' knowledge and beliefs concerning mobile technology to enhance teacher professional development program.

Keywords: TPACK, STEM, professional development, mobile technology



ICT AND EDUCATION.GOOD PRACTICE IN SCHOOLS IN ROMANIA

Silvia Moraru

Paper shows the conclusions of the European project "ICT and Education", whose coordinator I was and Teaching innovatively (with focus in ICT) and its impact on the quality of education .New information technologies are making a contribution to the modernization of teaching –learning –assessment process.This presents findings on the impact on educational systems in Finland ,Netherlands and Romania .In these projects directors ,inspectors and teachers have visited in Romania :schools , laboratories for physics , chemistry biology ,computer science connected to the internet and equipped with necessary infrastructure . They saw lessons of chemistry ,physics and IT where students and teachers worked with multimedia products made joint teams in our schools. This paper has 4 chapters: I)Compararison between European Strategies regarding implementing ICT in education; II) The strategy of Implementation of ICT in Education in National High School Bucharest ; III)ICT Integration in the Curricular Area of Science ; IV)Conclusion ;

Keywords: ICT, creativity,interactivity, performance ,e-learning



A POSSIBLE MECHANISM FOR ENHANCING THE ADVANCED KNOWLEDGE CONSTRUCTION IN ONLINE LEARNING COMMUNITIES

Sheng-Yi Wu

In recent years, regarding learning, the applications of peer collaborative learning through online learning communities have been progressively developed, applied and explored. Especially after the rise of social networking site--Facebook, the concept of social network service (SNS) has provided innovative reforms in the operations of online learning communities. Peer collaborative learning of online learning communities

is often conducted with the discussion teaching method, which serves as a key teaching method in many cooperative learning activities. Literature has suggested that an asynchronous or synchronous online discussion session incorporating different teaching strategies may improve students' cognitive ability and knowledge construction process. However, some studies found that an online discussion activity without any control or interferences from educational instructors would lead to a lack of a higher-level cognitive processing or an advanced knowledge construction. To address this issue, this study treats Facebook as the learning community and attempts to assist students' online discussion activities through adopting the teaching strategy—collaborative problem solving (CPS) and using the concept mapping as cognitive tools. Thus, this study aims to establish a collaborative problem solving (CPS) teaching strategy, and integrate the “Social Online Learning Integrated Discussion (SOLID II)” system of concept mapping.

Keywords: online discussion; collaborative problem solving (CPS); concept mapping; facebook



INVESTIGATING 11TH GRADE STUDENTS' VAN-HIELE LEVEL 2 OF GEOMETRICAL THINKING

Alattin Ural

This study aimed to investigate 11th grade students' Van-Hiele level 2 of geometrical thinking. A total of 50 11th grade students, who were selected randomly from two 11th classes of two different high schools in Antalya, participated in the study. The data collection tool included four open-ended and eight multiple-choice questions compatible with Van-Hiele level 2 of geometrical thinking. The study was a qualitative research. Descriptive analysis was conducted to analyse the responses given to the open-ended questions. 52% of the students were successful at defining geometric figures. On the other hand, the students were successful at having the knowledge of which geometrical property determines the class(es) of figure at the rate of 38%; of ordering the geometric figures at the rate of 65%, and of a geometrical property leading to which geometrical property at the rate of 45%. Among the reasons of failure were not having the knowledge of which geometric properties determine a class of figure, not understanding the relations among geometric figures and deciding by looking at the figure instead of formal thinking.

Keywords: geometry, geometric thinking, van hiele



A BRIEF OVERVIEW OF THE MATHEMATICS EDUCATION HISTORY IN RUSSIA WITH THE QUALITY APPROACH

Suat Aşkın, Murat Ayan, Daniya Aşkın

It is observed that the developed countries determine the quality standards of education and they achieve an increase in the educational efficiency as a result of application of these standards. In the modern world where having a higher education level is the basic indicator of being developed, especially developing countries are attempting to reinforce their education systems with modern standards in all senses in order to keep pace with the competition. Therefore, it is necessary for our country to question the compliance of such standards and to develop them constantly. Accordingly, one way to make this possible is to give importance to the mathematics science in the statistical field. In the modern world, Russia takes place among the countries which have a different issue and a different position. The fact that it has a voice in the field of politics and military results from a serious education system of high quality—especially the mathematics education. Even though Russia puts its signature under several accomplishments in the field

of mathematics, there are only a few researches in the world and especially in Turkey which deal with the studies of Russian mathematicians. It is thought that conducting a study in this field would be very beneficial in terms of both global mathematics history and mathematics history in Turkey. One of the reasons why Russian scientists are good at mathematics and why mathematics has a very long history in Russia might be that mathematics education institutionally takes the first place in higher education. The objective of this research is to indicate the role and importance of mathematics education within the frame of total quality management approach and to examine the developments of mathematics learning and education in Russian education system and the works and studies of mathematics educators. In the research, the lives and works of some of the mathematicians, mathematics educators and pedagogues who take place in kilometer stones with their studies related to the mathematics learning and education conducted from past to present in Russia are chronologically classified. Moreover, it is tried to highlight to what extent the world and Turkey benefit from global mathematics history and Russian mathematics history while teaching mathematics and to what extent it is necessary to benefit from these histories. As a result of the research conducted, it is seen that the mathematics education in Russia dates back to 1650s and this field has been researched as a science since 1798, significant steps have been taken in this field up today and they have developed special mathematics teaching methods in this field.

Keywords: total quality management, education, mathematics education, mathematics history, Russia.



BLENDED LEARNING METHOD FOR TEACHING DIFFERENTIAL EQUATIONS

Murat Akkuş, Yıldray Keskin

The purpose of this study was to assess the effects of a blended learning environment on teaching differential equations and also to determine the advantages and disadvantages of a blended learning method. In this study, a course of differential equations was prepared with a syllabus and related materials according to the blended learning model. Two classes with an instructor teaching differential equations were studied. All of the students were exposed to the same concepts. The control group was taught in a traditional face-to-face manner with very little technology support while the experimental group was taught in a blended learning environment. The students of the experimental group took the course in an online environment for five weeks. Data collection consisted of a mixed-methods approach. No significant difference was observed between the results of the pre-test and post-test, based on delivery methods. In terms of the students' intrinsic motivation, self-efficacy, grade motivation and career motivation, no statistically significant difference between the two groups was found. However, a significant difference between the motivation levels of self-determination was observed. The results demonstrate that both the students and the instructor require technical support. Administrations should provide both students and teacher with the necessary tools and technical support when they are needed. The researcher is left to conclude that during the process of designing course materials, instructors should take advantage of social media. Therefore, as the results show, a blended learning environment is a good alternative for teaching differential equations.

Keywords: blended learning, curriculum, differential equations, educational policy, motivation



THE EFFECT OF TEACHER'S PEDAGOGIC COMPETENCY ON STUDENTS' ATTITUDE TOWARD MATHEMATICS

Alattin Ural

This study aimed to investigate the effect of teacher's pedagogic competency on students' attitude toward mathematics. The study was a quantitative research. A total of 55 10th (28 students) and 11th (27 students) grade students, who were selected randomly from a high school in Burdur Province, participated in the study. 11 students studied in the division of science-mathematics, 19 students studied in the division of Turkish-mathematics, and 25 students studied in the division of social sciences. On the other hand, 18 of the students were female and 37 of the students were male. A scale of attitude toward mathematics, of which validity and reliability were done by Ural ve Argün (2010), was used to measure students' attitude toward mathematics. In order to determine the teacher's pedagogic competency, students were asked to fill a 5-point Likert scale consisting of 15 items out. SPSS was used to determine the reliability of the scale and Cronbach's Alpha was found .873. Anova analysis in SPSS was conducted to investigate if there was a significant relation between the scores of attitude toward mathematics and the scores relating to the teacher's competency. As a result, it was determined that teacher's pedagogic competency didn't have a significant impact on students' attitude toward mathematics.

Keywords: attitude toward mathematics, teacher's pedagogic competency



A NEW STEAM AGE: TOWARDS ONE CULTURE FOR LEARNING SCIENCE

Martin Braund

In many cultures learning has been organised around subject disciplines broadly conceived as the Arts, Humanities and Sciences. Subject disciplines of the curriculum have evolved structures and characteristics creating boundaries between them that are counter to the experiences of many adolescents, who rarely meet such borders in their daily lives. Disciplinary borders favour a utilitarian view of knowledge and creativity, often under-valuing some disciplines, including the creative and performing arts, not directly associated with primary means of economic production. The borders between self-reinforcing disciplinary structures result in inadequate attention paid to the potential of working across, between and beyond disciplines. In this paper I examine how this schism between the 'Arts' and 'Sciences' has come about and the potential harm it continues to do. An example from the history of science, the case of Darwin's changing relationship with the two cultures, is used to promote the benefits of more creative approaches to teaching science in a new project, 'Darwin Inspired Learning'. The benefits to learning science using methods from one of the Arts, drama, are shown. The argument is made for 'STEAM', showing how education in the 21st Century is moving away from a restricted notion of STEM (Science, Technology, Engineering and Mathematics) to one that encompasses the Arts (Science, Technology, Engineering, ARTS and Mathematics). STEAM promotes economic development, encouraging people to work creatively to generate and communicate ground breaking new ideas. It is argued that teaching methods and content from arts subjects should be used to promote a more engaging and cognitively challenging experience of science education at a time when poor pupil attitudes to studying science subjects continues to be an issue in many countries.

Keywords: science education, teaching innovation, drama, curriculum

THE EFFECT OF USING CREATIVE DRAMA TECHNIQUE IN MATTER'S STRUCTURE AND CHARACTERISTICS UNIT TO STUDENTS' ACADEMIC SUCCESS IN SCIENCE AND TECHNOLOGY LESSON AND STUDENTS' OPINIONS

Şahin İdin

The aim of this study is to investigate using creative drama method in Class 7 of the impact of science and technology to academic success within the "Structure and Properties of Matter" unit. Experimental methods of qualitative research methods and interview technique, used in qualitative research methods in this study. Research lasted for four weeks with 7th grade students which secondary two state schools are in Ankara. An academic success test was used, ensured validity and reliability, within for quantitative data collection tool. An interview form used, has nine items, within qualitative data collection tool. Quantitative data were analyzed using the SPSS software package 15.00. According to the results of One-Way Anova, was found not significant difference between scientific achievement test that students in the experimental group and the control group pre-test and Post-test scores ($p > .05$). All of the students interviewed, science and technology lessons should be treated with the methods of that creative drama, state. The various proposals are included at the end of the study according to the findings.

Keywords: creative drama, science and technology, achievement



THE POSITIVE AND NEGATIVE EFFECTS OF DIGITAL TECHNOLOGIES ON STUDENTS' LEARNING

Tolga Gok

The technology providing quick and easy online access to information and social activities has undeniable effects on academic lives and study hours of students. It was therefore important to investigate what we know about the impact of digital technology on education. This study investigates the effects of developing technologies on the students' performance and learning. The research was conducted with 220 university students. Data were collected using a survey designed for gathering the students' opinions about the digital devices. The students were asked some questions such as why/how long/when do they use the digital devices. The results of the research indicated that the digital devices had negative impact on students' knowledge and learning due to distraction from academic tasks. The study reveals that most of the students spent more time on social media (facebook, twitter, youtube etc.) than academic courses. Detailed results and recommendations based on the academic success are presented in the study.

Keywords: digital device, educational technology, higher education




THE COMPARISON OF COLLEGE AND UNIVERSITY STUDENTS' LEARNING STRATEGIES FOR CHEMISTRY COURSES

Tolga Gok, Ozge Gok

It is essential to know, comprehend, apply, analyze, synthesize, and evaluate the physical science (chemistry, earth science, and physics, etc.) for the science and engineering students. The purpose of this study was to compare the tendency of the college and university students to physical science. The research

was conducted with 166 students. Data were collected using Learning Strategy Survey (LSS). Cognitive/metacognitive strategies and resource management strategies of the students were compared with the help of this survey designed for chemistry courses. The results presented that the usage of learning strategies of the college and university students were similar in terms of chemistry. The students' thoughts revealed that the chemistry is not accepted as a key-course for their major field and they preferred to memorize the content of the course without any comprehension. The detailed findings and suggestions were reported in the study.

Keywords: chemistry, higher education, learning strategies



PRE-SERVICE ELEMENTARY MATHEMATICS TEACHERS' PROGRESSES ON DYNAMIC GEOMETRY ACTIVITIES AND VIEWS ABOUT USING DYNAMIC GEOMETRY REGARDING TECHNOLOGICAL PEDAGOGICAL CONTENT KNOWLEDGE

Bilal Özçakir, Erdiñ Çakirođlu

Using technology provides teachers to change education in good way and the teachers' knowledge about the educational uses of technology has an important role for improving education (Carr, Jonassen, Marra, & Litzinger, 1998). Students can learn mathematical concepts with deeper understanding when appropriate technological tools are used in instructional phases. De Villiers (2004) noted that to provide Dynamic Geometry Environments (DGE) in schools, primarily pre-service and in-service teachers should use Dynamic Geometry Software (DGS) effectively and be engaged using DGS to develop a better understanding of concepts on their own. Therefore, the purpose of the study is to introduce DGS to pre-service teachers and investigate their progresses on dynamic tasks, and views about using DGS. This study is designed as a case study. The participants of the study are purposefully selected from 47 sophomores in DGS course, by their scores on Technological Pedagogical Content Knowledge (TPCK) scale, since the TPCK refers to the knowledge of any topic, which is taught with suitable pedagogy by using appropriate technological tools (Koehler & Mishra, 2005). A DGS task is given to each participant and their progresses on the task are observed. In addition, an interview is conducted to obtain data on their views about using GeoGebra, Geometer's Sketchpad and Geometry Expressions. Students found Geometry Expressions easy to use while testing constructions or exploring geometrical constructs; Sketchpad and GeoGebra similar in some ways but construction in GeoGebra more useful than Sketchpad because of being able to use of analytical approaches in GeoGebra. In the presentation detailed discussion of the results and findings will be provided. These findings are thought as important for advancing use of DGE in schools and for finding ways to use technology as a tool in the learning environments.

Keywords: dynamic geometry activities, mathematics education, tpck, teacher education



THE EXAMINATION OF RELATIONSHIP BETWEEN WRITING SKILLS AND MATHEMATICS SUCCESS OF PRIMARY MATHEMATICS TEACHER CANDIDATES

Sefa Dündar, Levent Akgün

In this study, it was investigated that the relationship between writing skills (formal and contextual) and mathematics success of primary mathematics teacher candidates. Relational survey model was used in the study. The study was conducted with 102 mathematics teacher candidates educating in the department of

primary education in a state university in Turkey. It was used as data collection tool that essays written by the teacher candidates about the place and importance of mathematics in everyday life. These essays were analyzed with the use of "The Essay Evaluation Scale". The relationship between mathematics success and scores related to evaluation of the essays of the teacher candidates was examined and some suggestions were mentioned about the importance of writing skill.

Keywords: writing skills, mathematics success, mathematics teacher candidates



EXAMINATION TENTH GRADE STUDENTS' ERRORS IN FUNCTIONS

Mustafa Gök, Abdulkadir Erdoğan

Functions topic is one of the most fundamental issues of high school mathematics. This topic plays a key role in teaching many subjects –especially limit, derivative and integral, which constitute basic concept of calculus. For the current high school mathematics curriculum, teaching functions at tenth grade have a great important. The curriculum aims to teach the basic concepts taught in ninth grade in a broader meaning and preparing the students for the calculus courses. The aim of this study was to identify the students' main errors when they faced with the questions related to the teaching of functions at tenth grade. The qualitative research method was applied. The data were collected via to questionnaires. The questionnaires were firstly tested with 32 tenth grade students in a high school situated in Van center. The questionnaires were then proposed to 95 tenth grade students from three class of three high schools in Van Center. For the data analysis, the students' success level for each questionnaire was firstly identified. Then, students' errors were identified and categorized. The results of the study showed that, although the students' were successful on four questions, their general level of success was very low. The results also showed that the students had difficulty especially in solving questions containing a graphic representation. The students' main errors were classified as: 1. Error due to considering as even each function, which contains an even exponent, 2. Error due to generalizing to other functions the rules applied to find the inverse of a linear function, 3. Error due to the inability to change variables when looking for an inverse function, 4. Error due to generalizing to composed function rules applied for four operations, 5. Error due to considering a functional relationship only as an numerical relationship, 6. Error due to the inappropriate use of translation and symmetry, 7. Error due to drawing a curved graphic as a line, 8. Error due to misinterpreting the rate of change of a graphic. As a conclusion, it can be said that the students could not meaningfully learn the concepts related to functions and that they tend to overgeneralize the learned basic rules.

Keywords: function, student errors, 10th grade



THE ROLE OF TEACHER AND CURRICULUM IN INTERVENTIONS IN DAILY LESSONS

Ok-Kyeong Kim

This study focuses on interventions within daily lessons that are designed to support students when they have difficulty understanding the instructional material or completing the assigned task. Teacher reactions to student difficulties can be based on planned or on-site decisions. In either case, these interventions provide short, prompt support situated within regular ongoing lessons along with the curriculum being used, as opposed to a long-term program segregated from daily lessons. The demand of interventions in daily lessons is high in the classroom, and curriculum programs make an effort to include resources for

such interventions. Yet, there is no clear theoretical and practical guidance on daily interventions for both teacher and curriculum. This study examines interventions that are offered in a range of five curriculum programs in the US and those that nine teachers incorporate into instruction, in order to understand the nature of interventions embedded in daily lessons and the role of teacher and curriculum in these classroom interventions. Specific research questions are: 1. What kinds of interventions are available in the written lessons from a range of elementary mathematics curriculum programs? 2. What do teachers use among those available and in what ways? 3. What do teachers do when no interventions regarding observed student difficulty are available in the written lessons? Overall, interventions in the written lessons were limited in terms of the specificity and comprehensiveness, and many of the micro-interventions in the enacted lessons were not productive, especially when important resources provided in the written lessons were not used. When teachers used critical curricular resources well, they tended to serve student needs better. The results of the study highlight the importance of intervention resources in the curriculum and teacher role in recognizing the affordances of resources to provide appropriate interventions in the classroom.

Keywords: intervention, curriculum, teacher knowledge, elementary



CANDIDATE TEACHERS VIEWS TOWARDS THE USE OF INTERACTIVE BOARD

Ebru Korkmaz, Celalettin Korkmaz

The main aim of the research is to determine views of candidate teachers going on education faculties about interactive boards related with Fatih Project. In this context it will tried to be determined the level of education faculties in relation to train candidate teachers to responde the needs of national education.while future teachers are trying to put their opinions and ideas forth. This sub-objectives based on the overall objectives of the research are as follows:1. What are the views of candidate teachers on the qualification of prospective use interactive whiteboards in their career? 2. What are the views of candidate teachers on the effects of undergraduate courses using interactive whiteboards taken in their education life? This study is related to reveal the views of primary and science teaching teacher candidates in education faculties about the use of interactive whiteboards. Research data is to be obtained from senior students in Mustafa Kemal University Faculty of Education Science and Classroom Teaching is to be obtained from senior students. In this research phenomenologic method will be used. In phenomenologic researches data sources are individuals or groups who show and may reflect this phenomenon (Büyükoztürk et al., 2010). Therefore, purposeful sampling will be the way of research. For illustrative purposes, it is useful for the discovery and disclosure of facts and events (Yıldırım and Şimşek, 2011).In this study, semi-structured interviews as a data collection tool form (YYGF) will be used. Prepared form has 3 open-ended interview material. Literature and expert opinion for the creation of this article is taken. To analyze the data content analysis will be used.

Keywords: science and classroom teaching, IWB, Fatih project



PROBLEM-BASED LEARNING ASSOCIATED BY ACTION-PROCESS-OBJECT-SCHEMA (APOS) THEORY TO ENHANCE STUDENTS' HIGH ORDER MATHEMATICAL THINKING ABILITY

Achmad Mudrikah

The research has shown a model of learning activities that can be used to stimulate reflective abstraction in students. Reflective abstraction as a method of constructing knowledge in the Action-Process-Object-Schema theory, and is expected to occur when students are in learning activities, will be able to encourage students to make the process of formation of new mental objects, new processes and new schemes through the construction process in the form of generalization, interiorization, encapsulation, coordination and reversal. Problem-based learning that is presented through eight steps of learning has been able to enhance the mental action in students even though there is no doubt that it can not possibly know the whole picture of a person's mental activity. All steps in the problem-based learning approach can reflect on the problems of mental action in students. problem-based learning is appropriate to be used to improve students' high order mathematical thinking ability because of it has been able to condition the reflective abstraction related mental actions, mental processes, mental objects and schemes in students. Computer assistance and scaffolding techniques can be further stimulus for students to take place in their mental action which corresponded to expectations.

Keywords: problem-based learning, APOS theory, high order mathematical thinking



A MODEL ELICITING PROBLEM: AIRCRAFT BOARDING PROBLEM

Neslihan Şahin Çelik, Ali Eraslan

Recent years one of the main reason why mathematics modeling is getting more attention in reserach studies of mathematics education is PISA (Program for International Student Assessments) results. PISA survey tests reading, mathematical and scientific literacy in terms of general competencies, that is, how well students can apply the knowledge and skills they have learned at school to real-life challenges. PISA does not test how well a student has mastered a school's specific curriculum (OECD, 1999). Because of low-achieving students in the PISA results, many countries around the world recently make significant changes in their mathematics curricula. Similarly the Turkish government put into practice a new mathematics education program particularly focusing on mathematical modeling and higher level mathematical thinking. The vision of the new program is to help students to develop analytical thinking and reasoning skills, establish the relationship between mathematics and real life situations and create different solutions to the problems they face in their everyday life (MNE, 2005). The development of this kind of new abilities and understandings, whics are htpothesizing, describing, predicting, constructing, manipulating and working for complex and multifaceted problems is dependent on the development of modeling abilities. At this point, the question raised is whether middle school teachers who would teach mathematics modeling to their students have enough mathematical knowledge and skills needed. This research study was carried on a big city located in the Black Sea region in Turkey. The participants were three middle school mathematics tecahers who took the course of Modeling in Mathematics Teaching in their undergraduate education program. At the end of the school semester, the Aircraft Boarding Problem was given to three tecahers included in the focus group to work on it in a classroom environment. A total of 110 minutes interview with the group was video-recorded and tecahers' written solutions were also collected at the end. Teachers' thoughts and written solu-tions were analyzed using qualitative research methods. Research results showed that tecahers were able to successfully understand the problem, identify the parameters and simplifying the problem, on the other hand; they had difficulties to construct a model, interpret the solutions and verify the results.

Keywords: modeling, mathematical modeling, model eliciting, aircraft boarding problem



MIDDLE SCHOOL STUDENTS' MODELING PROCEESS: SUMMER READING PROBLEM

Neslihan Şahin Çelik, Ali Eraslan

Recently the new and redesigned mathematics education programs in many countries emphasize the necessity for the students to face complex and multifaceted problem situations and gain experience in this sense allowing them to develop new skills and mathematical thinking to prepare them for their future life after school. At this point, mathematical models and modeling approaches can be utilized in the analysis of complex problems which represent real-life situations in which students can actively participate. In particular, model eliciting activities that bring about situations which allow the students to create solutions to problems, and which involve mathematical modeling must be used right from primary school years, allowing them to face such complex, real- life situations from early childhood period. This research study was carried on a center town of a big city located in the Black Sea region in Turkey. The participants were 7th grade students in a middle school. After a six-week preliminary study applied to a seventh grade classroom, three students included in the focus group were selected using criterion sampling technique. A focus group of three students was videotaped as they worked on a model eliciting activity, the Summer Reading Problem. The conversation of the group was transcribed, examined with students' written work, and then qualitatively analyzed through the lens of Blum's (1996) modeling processing cycle. The study results showed that dstudents had a difficulty identifying parameters and relating to them each other, on the other hand; they took each parameter into account to consider and simplify the problem to reach a solution. In addition, they developed a strategy based on three parameters and verify and compare their models with real-life situations.

Keywords: middle school, modeling, model eliciting activity, summer reading problem



TENTH GRADE STUDENTS' UNDERSTANDING OF GEOMETRIC TRANSFORMATIONS: "FUNCTIONS" OR "MOTIONS"?

Hilal Güllük, Hasan Hüseyin Uğurlu, Nejla Yürük

Transformation geometry is a broad conceptual field that should be taught to students in all grades. Quite a few researchers and national curriculums of different countries emphasize its' role in the development of students' mathematical understanding processes as conceptual understanding, geometrical thinking or spatial reasoning. The purpose of this case study was to investigate students' understandings of geometric transformations including translations, reflections, rotations, and dilations. The study took place over four months in the spring semester of the academic year in a tenth grade classroom in a medium-sized Anatolian High School. The data was collected by task-based semi-structured interviews and participant observations of each transformation class. Transformations were taught by a 13 year-experienced mathematics teacher through using multiple representations of mathematical concepts. Task based interviews about transformations after the lessons were conducted with four students as participants who were selected purposively from the classroom. Data, gathered from these interviews and observations, was analyzed by constant comparative analysis. The results indicated that students understood geometric transformations as motions despite the teachers' efforts to promote function understanding. The motion understanding of transformations was robust to change because of students' prior experiences and the

teaching tools highlighting the dynamic nature of concepts. Discussion was provided based on these findings by considering the results of relevant studies.

Keywords: mathematical understanding, multiple representations, geometric transformations



PREFERENCE LEARNING STYLE IN MATHEMATICS: STUDENTS PERCEPTION

Sadri Alija, Halil Snopce

Teaching is an ability of complex recognition which is not inborn, but it is a process which can be learned and improved during time. This is the reason why we always try to improve and develop our ability in offering the best qualitative teaching methods to students in our universities. The aim of this research is to analyze some different aspects of student's preferences in learning mathematics, especially to analyze the preferences concerning the teaching style used by the teacher in the classroom. In this paper we show the results obtained from a survey realized during the fall semester of 2014 - 2015 with students of two different faculties of the SEE-University, students from the Faculty of Contemporary Sciences and Technologies and Faculty of Business Economics. The results obtained by this survey show that the method favored by the students is the non-traditional one with preference of 60.5%. In order to analyze student's preferences over different teaching methods versus some other factors, we have used cross tabulation. The results obtained in this paper show that the preferences of the female students, students with the GPA now between 7 and 8, students with MATH score in last semester with 6 (Satisfactory) tend in preference towards non-traditional methods. Taking into consideration the nature of the subject of mathematics, the obtained results suggest that the teacher should increase his engagement in the subject using different practices and methods in the classroom in order to enhance the interest of the students for the subject.

Keywords: mathematics, learning preferences, traditional, nontraditional, cross tabulation.



TEACHING OF RATIO CONCEPT IN A CONSTRUCTIVIST LEARNING ENVIRONMENT

Mustafa Gök, Erdal Beyde, Abdulkadir Erdoğan

Conceptual understanding has a great importance in teaching mathematics. Theory of Didactical Situations (TDS) has questioned the necessary conditions to meaningfully teach mathematical concepts. Using the concept of didactical milieu, which is one of the important concepts of TDS, learning activities aimed by the constructivist approach can be created. An didactical milieu can be described as a learning environment that allows students constructing their own knowledge and an environment where teacher's role is well-defined and teacher's interventions are limited. The purpose of this study was to examine the 6th grade students' approach during the introduction of ratio concept in a learning environment designed according to the didactical milieu concept. Qualitative research methods were used in the study. An activity was designed and pilot implementation of the designed activity was conducted with 24 students of an elementary school in Van centre. The final activity was conducted with 26 other students of this elementary school. Data were collected with students' sheets, observation of students' activities and voice and video records of classroom interactions. Data analysis was carried out according to the different activity steps defined in TDS. The results of the study showed that the meaning of the ratio concept emerged at the end of the activity. As a conclusion, it can be said that TDS can be effectively used to meaningfully teach mathematical concepts.

Keywords: ratio, theory of didactical situation, adidactical milieu, 6th grade



DEVELOPMENT OF MATHEMATICS FOR HIGH SCHOOL STUDENTS COURSE MATERIALS BY USING PROBLEM--BASED LEARNING APPROACH BASED ON ACTION-PROCESS-OBJECT-SCHEMA (APOS) THEORY

Achmad Mudrikah, Luki Luqmanul Hakim

This study has the primary purpose of generating instructional materials of Mathematics for Senior High School Students with Problem-Based Learning approach based on the theory of Action-Process-Object-Schema (APOS). The stages of the activities that have been designed are obtained Subjects of Math for senior high school course by using Problem-Based Learning approach based on Action-Process-Object-Schema (APOS) theory that relevant to develop the ability of mathematics education program students in preparing them as a professional math teacher. The subject of this study is the third semester students of Mathematics Education Program in Nusantara Islamic University, Bandung, Indonesia.

Keywords: mathematics for senior high school students, problem-based learning, APOS theory



EVALUATION OF SCHOOL ADAPTATION PROCESS OF THE 1ST GRADE STUDENTS BY TEACHERS

Hasan Aydemir, Çiğdem Kılınçer

The aim of this study is to evaluate the 1st grade students' process of adaptation to school by the teachers. This research has been conducted on the basis of qualitative research methods. A questionnaire consisted of 6 questions for the teachers was used in order to collect the data. This questionnaire was applied to 19 teachers and the collected data was analyzed by QSRNvivo10 package program. According to results of the analysis, most of the teachers stated that the school adaptation process was difficult. It was found out that accepting younger age groups to primary schools a result of decreasing the age limit to 60 months, making these pupils start primary education without getting pre-school education, educating a combination of different age groups in the same class made the adoption process difficult. It is concluded that most of the students had some difficulties in the younger age groups from physical aspects such as holding pens, writing, cutting, gluing, toilet control; from social aspects such as playing, obeying class and school rules, leaving the parents, making friends, from cognitive aspects such as lack of self-confidence; inability to follow instructions, inability to focus, unable to read and bad reading comprehension. It was determined that 60-66 month-old students had problems on adopting to school because of being under age, having uncaring parents and not receiving preschool education Teachers work hard to support the physical and emotional development of the students, make them socialized, to make them adopt the school rules and to provide the parent support in the student's process of adaptation to school. It was concluded that the separation of age groups categories would reduce the difficulties arise out of the age imbalance in short-term, but in the long run, subjecting these students to the same test and implementing the same program showed that it would'nt be the ultimate solution. The teachers stated that the program should be eased, the school starting age should be arranged as 72 months again, schools should be enriched in terms of tools and materials, preschool education should be compulsory and the awareness of the parents should be raised.

Keywords: school integration process, the 4 + 4 + 4 education system, school starting age

A COMPARATIVE INVESTIGATION OF TEACHER EXPECTATIONS ACCORDING TO THE WORKING CONDITION IN COASTAL OR INLAND REGIONS FOR A MORE EFFECTIVE BIOLOGY EDUCATION

Seyid Ahmet Sargin, Furkan Baltaci, Ahmet Yumuşak, Fatma Özer, Mustafa Büyükcengiz,

In this study, it is aimed to determine the expectations of biology teachers whether change or not at physical conditions vary according to the province, for a more efficient teaching high school level biology. As the study area; from the coastal areas, Alanya district of Antalya Province, and from the inland region, Demirci district & its surroundings in Manisa city were selected. In order to determine the biology curriculum, school administrators, colleagues, in-service & pre-service training related opinions and expectations of teachers who work in both districts, a total of 66 biology teachers was administered a questionnaire. Assessment of the results, the teachers in the coastal areas indicated their more negative views on the issues of having enough guidance of school administrators and the received training in pre-service period, which provide basic information on issues related to education. However, the teachers working on the inland stated their negative thinking in that the school administrators are sensitive enough about the subjects of material needs for the biology courses, and for activities such as trip-observation, and they receive adequate support & assistance for the necessary permissions.

Keywords: Alanya, Demirci, biology curriculum, teacher expectations, pre-service and in-service training.



HOW TO MAKE INTERACTIVE MULTI-MEDIA LESSONS FOR EFL AND ESL LEARNERS

Morteza Barin

The on-line multimedia resources allow teachers to easily integrate multimedia materials into the classroom. Multimedia as teaching material tools presents a new method in educational process in world educational centers. Computer technology and Internet are inevitable new media in education methodology. With computer technology, Web-based learning has become a common choice in education institutions (Bauer,2002, p. 31). Furthermore, the variety of media such as text, graphics, audio, and video for delivering content has attracted many instructors and students to use the Internet a rich resource for distance education (Ali, 2003). These multimedia components get and hold learners' interest, which many researchers believe is important when teaching the video generation (Jonassen, 2000, p. 208). Visual text, graphics and video are some of the most popular tools in on-line learning. In many cases, graphics can be used to represent important information and are often used for supporting text(Newby, Stepich, Lehman, & Russell, 1996, p. 103). Using these techniques, the most widely used asynchronous online learning tool is courses primarily posted in visual text and static graphics (Liles, 2004). In this workshop windows movie maker will be introduced long with a practical sample project. This workshop will be useful for" • Teacher trainers • Syllabus designers • Curriculum developers

Keywords: multi-media lessons, online learning, web-based teaching,



A CONTENT ANALYSIS OF THE STUDIES RELATED INSTRUCTIONAL TECHNOLOGIES AREA IN CONTEXT OF SCIENCE EDUCATION

Sinan Çınar, Sema Demirci

Abstract: The aim of this study was to analyze the articles of the last ten years, which appeared in different sources, about “instructional Technologies in context of science education” in Turkey. For this purpose, ERIC database, YÖK (Higher Education Council) database were searched by using “technology based teaching” “computer supported teaching” and “animation” as keywords. Moreover, journals published in Turkey and which are possible to be reached electronically were searched using the same keyword. 50 studies in the science education context were analyzed by means of standards obtained from the related literature; research topic, place and year of publication, number of authors, working group size, the class-level working group, research design and methods of data collection and data analysis tools. The results provided us the general scope of researches about instructional technology in Turkey.

Keywords: science education, instructional technology, content analysis



AN EXAMINATION OF THE SCIENCE TEACHERS’ AND STUDENT TEACHERS’ LABORATORY SELF-EFFICACY PERCEPTIONS

Sinan Çınar, Sema Demirci

Aim of this study is to examine science teachers’ and student teachers’ laboratory self-efficacy perceptions from the personal characteristics points of view. The participants of this study are 30 science teachers and 139 student teacher studying Recep Tayyip Erdoğan University science teacher department. In this study, to collect the data the Laboratory Self-Efficacy Scale. The resulting data were analyzed using IBM SPSS 22.0 (Statistical Package for Social Sciences) program package. Frequency, t-test, one-way variance, frequency and percentage distribution is used in evaluation of the data. At the end of the study, it was found out that statically significant differences weren’t determined between professional experience levels and laboratory self-efficacy perceptions of teachers, and between genders and laboratory self-efficacy perceptions of teachers. Additionally statically significant differences weren’t determined between studying levels and laboratory self-efficacy perceptions of student teachers, and between genders and laboratory self-efficacy perceptions of teachers. But statically significant differences were determined between science teachers and science student teacher.

Keywords: science instruction, science teacher and student teacher, laboratory self-efficacy.



DEVELOPING AND APPLYING A TEST TO DETERMINE THE MISCONCEPTIONS OF HIGH SCHOOL STUDENTS ABOUT NEWTON’S LAW

Ersin Karademir

The studies on conceptual learning and misconceptions in recent years has gained a great importance. One of the conclusions of this study is that misconceptions obstacle to meaningful learning. This is a way to eliminate the barriers, misconceptions should be identified and is also reveal absolutely necessary. Students come to classroom with various knowledge from their daily life and previous learning. Therefore,

to correct their misconceptions is not so easy. This study aimed to determine the high school students' misconceptions about Newton's laws. Besides, it is aimed to investigate how students created these misconceptions according to classroom level 9th, 10th and 11th. At this study, it is prepared a concept test consisting of open-ended questions. After applying the test datas were evaluated according to classroom levels. It is calculated frequency and percentages. It is found that students in high school had a lot of misconceptions about Newton's laws.

Keywords: misconceptions, newton, high school students, physics lessons



PEDAGOGICAL AND PRACTICAL ISSUES RELATED TO THE PROFESSIONAL DEVELOPMENT OF A GROUP OF MATHEMATICS TEACHERS IN URBAN HIGH NEEDS SCHOOLS

Janice Fournillier, Christine Thomas, Draga Vidakovic, Pier Junor Clarke

This paper is part of the Monitoring and Evaluation phase of a National Science Foundation (NSF) Robert Noyce grant, which facilitated the study of the outcomes of the professional development of secondary mathematics teachers in urban high-need areas in a southern state of the United States of America. The goal of the project was to recruit, prepare, induct, and retain 40 students with undergraduate backgrounds in mathematics or mathematics related fields into teaching. Student selected for the project completed a graduate degree program in mathematics education providing them with a Master of Arts in Teaching (MAT) degree as well as a grades 7-12 mathematics teaching certification. We argue that it is very important to take into account the constructivist frames and qualitative research methodological approaches used in the study of human subjects and the processes used in determining the outcomes. In so doing, we are committed to exploring how we make meaning of the participants' experiences of teaching mathematics. A group comprising of two mathematics teacher educators, a mathematician, and a research methodologist who worked with groups of mathematics teachers in urban high-need schools over the period of nine years are now studying the outcomes of the professional training and development. We discuss the methodological and ethical processes involved in analyzing the data collected from the 14 teachers who participated in the workshop and the process of representing the outcomes in a way that is not only respectful but also useful to others in the field of mathematics education. Results are presented in the form of vignettes that represent groups of secondary mathematics teachers' understanding of themselves, as educators in urban high-need districts.

Keywords: mathematics education; pedagogical practices, professional development; ethics; constructivist frames; urban high need



A PRACTICAL DILEMMA: HIGH SCHOOL STUDENTS' PHYSICS-RELATED PERSONAL EPISTEMOLOGY

Muhammet Mustafa Alpaslan, Bugrahan Yalvac

This case study explores students' physics-related personal epistemologies in school science practices. The school science practices of nine eleventh grade students in a physics class were taped over six weeks. The students were also interviewed to find out their ideas on the nature of scientific knowledge after each school science practices. Analysis of transcripts yielded several themes which characterize students' ideas about the scientific knowledge in their school science practice. The findings show that students believe

that scientific data should be accurate; yet, while they collect data, they can make mistakes that do not change the conclusion of experiments. Traditional, formulation-based, physics instruction might have led students to view physics knowledge as unchanging and isolated pieces of facts, and physics problems as having one single answer. Future implications and directions are discussed.

Keywords: personal epistemology, case study, science practices



A LEARNING STYLE INFERENCY SYSTEM BASED ON FUZZY LOGIC TECHNIQUE AND HONEY&MUMFORD'S LEARNING MODEL

Kadriye Filiz Balbal, Naciye Mulayim, Ali Özdemir, Aysegul Alaybeyoglu

In this study, fuzzy logic based Honey and Mumford's learning system is proposed to characterize learning styles of the students who have various own learning skills, intelligence levels and learning styles. We used Honey and Mumford's model which is based on Kolb's learning style and which identifies four distinct learning styles namely; Activist, Theorist, Pragmatist and Reflector in accordance with the Kolb's model. In Kolb's learning system, effective learning process can be achieved by incorporating four models namely; Concrete Experience, Abstract Conceptualization, Reflective Observation and Active Experimentation. We designed a software system which includes some of the questions in Learning Style Questionnaire which is prepared by Honey & Mumford. We rated the answers of the students and give them as an input to the proposed fuzzy logic engine which has four input models namely Activist, Theorist, Pragmatist and Reflector; and an output namely EducationStyle. The proposed system inferences Education Style, Learning Status and Level of Learning Style of the student. By this way, instructor will be able to match his teaching style with student's learning style

Keywords: Honey & Mumford learning style, fuzzy logic, Kolb's learning style



METAPHORIC PERCEPTIONS OF HIGH SCHOOL STUDENTS ON THE CONCEPT OF "GEOMETRY"

Goncağul Yildirim, Tuğba Horzum

Until today, Geometry has been a key learning area in the teaching of school mathematics because it has an important role in overcoming some of the challenges faced by mankind. Therefore, the determination of students' understanding forms of the geometry can positively contribute to the students' learning. In this context, the use of metaphors, considered one of the most powerful intellectual tools, which configure, direct and control our thoughts about the formation and functioning of the events. Considering the experience of individuals before starting school and construction of teaching the concepts in primary and secondary levels connected with the geometry, it is believed that high school students' metaphors related to the geometry will be richer. Thus, it is aimed to reveal the metaphorical perceptions on the concept of geometry in this study. For this, participants were asked to complete the question "geometry is similar to..., because..." by writing what geometry means for the participants and why. 166 high school students participated in this study. The present study, which is an ongoing research in which we conduct content analysis, emerging metaphoric perceptions will be discussed in relation to literature and various suggestions will be made for geometry education.

Keywords: high school students, geometry

FUZZY LOGIC BASED GREGORC'S LEARNING SYSTEM

Vildan Cinarli, Naciye Mulayim, Ali Ozdemir, Aysegul Alaybeyoglu

In this study, fuzzy logic based Gregorc learning system is proposed to characterize learning styles of the students who have various own learning skills, intelligence levels and learning styles. Gregorc learning system helps student to notice their different ways of perceiving and ordering information. Such that student can learn by reasoning logically and intuitively; by seeing and hearing; by reflecting and acting or by analyzing and visualizing. The goal of this system is to categorize students learning style and to make instructor be able to match his teaching style with student's learning style. By this way, it is aimed to increase students success in education considerably.

Keywords: gregorc learning style, fuzzy logic



THE OPINIONS OF PARENTS REGARDING THE SAFE USE OF THE INTERNET BY CHILDREN

Mehtap Songül Özkaya

The aim of this study was to determine the opinions of parents regarding the safe use of the internet by school-age children between the ages of 6 and 11. The study was performed based on a qualitative study design, and study data were collected using a semi-structured interview form. As sampling method, the criterion sampling method was employed within the scope of this study. Ten parent couples who satisfied the study criterion were interviewed, and the interview meetings were recorded using a video camera. The data obtained during the interviews were then analyzed using the descriptive analysis method. Within the scope of the study, the positive aspects of the internet described by the parents included the assistance it provided to children with their homework/studies, and the internet's function as a source of entertainment. On the other hand, the negative aspects of the internet described by the parents included the excessive amount of time children spent on the internet; the possibility for children to encounter inappropriate images and advertisements; the children's tendency to imitate/emulate computer game characters; and the adverse effects it might have on the children's health. In this study, it was determined that parents considered advertisements, games, social networking sites, friendship/socialization sites, and sites with inappropriate images as sources of harmful content for children between the ages of 6 and 11. To ensure that their children could use the internet safely, the parents resorted to measures/precautions such as using internet safety software; limiting the time their children could access the internet; raising their children's awareness about using the internet; and making use of internet filtering. The parents considered that further measures should be taken by enacting laws that would ensure the safe use of the internet, and that parents should have a greater control on the internet access of their children. The study also demonstrated that while the parents were not knowledgeable about the legal regulations in Turkey regarding the internet, they were nevertheless of the opinion that further legal regulations are required for ensuring safe use of the internet by children.

Keywords: safe internet services, children between the ages of 6 and 11, parent opinions.



LEARNING ABOUT THE BULLWHIP EFFECT USING COLORED PETRI NET SIMULATOR

Dragana Makajić-Nikolić, Biljana Panić, Bisera Andrić Gušavac, Ivana Kovačević

Colored Petri Net (CPN) simulator for study and analysis of supply chain processes is described in this paper and some experimental results obtained by its use are presented. This CPN simulator is one version of the well-known beer game and overcomes some shortcomings we have noticed playing other beer games. The beer game is a role-play simulation game that lets students (or managers as well) experience typical coordination problems of supply chains. Supply chain consists of four stages (or co-makers): retailer, wholesaler, distributor and manufacturer. The simulator allows calculation of different supply chain performances. It is developed using a timed, hierarchical colored Petri Net and CPN Tools software package. The CPN structure developed and presented in this paper consists of one top page and 17 sub-pages in four hierarchical levels, which models decomposition of observed supply chain in sub-processes. For each stage, demand forecasting methods, replenishment policies, production and delivery times, inventory costs, and customer's demand may be defined and given as input data for simulation run. In CPN Simulator we have used three strategies for demand forecasting. First strategy is based just on the past demand and second and third strategies are based on adaptive time series method: Moving Average and Exponential Smoothing Methods. We conducted three groups of experiments, every group for a different strategy of demand forecasting and for every group we experimented with several different parameters. The simulation results are exported to Excel and its visual presentation and expressive reporting capabilities are used. This package is aimed for evaluation of different management strategies in a supply chain, as well as for educational purposes. This developed model can efficiently be used for teaching the bullwhip effect not only to undergraduate and graduate students, but managers as well.

Keywords: supply chain, bullwhip effect, petri net



TEACHERS' VIEWS ON ANIMATIONS WITH MUSIC IN MIDDLE SCHOOL SCIENCE AND TECHNOLOGY COURSE

Buket Akyol, Hülya Kahyaağlu, Ela Ayşe Köksal

Some subjects of science and technology course (electricity, atoms and so on.) create learning difficulties for middle school students who has not passed on formal operations period or newly passing. Animations with music are produced to overcome these difficulties by utilizing information and communication technologies. The related studies reported that animations used in science classes make a positive contribution to students' academic achievement, the retention of learned information. The opinions of students and teachers are said to be positive in studies regarding the use of animations in science lessons. The purpose of this study is to analyse teachers' opinions about the impact of animations with music on students' learning of science and technology course at middle school. This research was done with 10 science and technology teachers working in various regions of Turkey in 2014-2015 academic year. This study is a qualitative case study and analyses were performed on a questionnaire developed by the researchers. The results obtained with content analysis show animations with music have a positive impact on students

Keywords: animation, science and technology, teacher opinion

EVALUATION OF NUMBER SENSE DEVELOPMENT IN PRIMARY SCHOOL STUDENTS

Sidika Akyüz Aru

The purpose of this research to reveal the intuitions of primary school second grade students about number and their relations with each other. The qualitative research method was used in this research. The data was obtained through meetings with six primary school second grade students. As a data collection instrument, the four step activity set which was developed by Van de Walle and was recommended for relation variations which can be consisted for numbers was used. The responses that students give to the activities and the strategies they develop were used to evaluate the development of their number sense based on the capability as defined for each activity. The obtained results were discussed by viewing the subject of numbers in the mathematics primary school curriculum from a number sense development perspective. Several suggestions were made about the development of number sense in primary school students.

Keywords: number sense, development of number sense, mathematics



PRESERVICE SCIENCE TEACHERS' CONCERNS FOR EDUCATING STUDENTS WITH SPECIAL NEEDS IN THEIR FUTURE CLASSROOMS

Mustafa Cansiz, Nurcan Cansiz

In recent years, teaching students with special needs in general education classrooms has been a common goal of researchers. With simplest words, this approach is called as inclusive education. "The practice of serving students with a full range of abilities and disabilities in the general education classroom with appropriate in-class support" is defined as inclusion (Roach 1995, p. 295). The supporters of inclusive education express that all students with disabilities should be placed in regular school classrooms in which they receive support services (Nielsen 2002). An individual with a disability is defined as a person who differs from the average or normal person in "mental characteristics, sensory abilities, communication abilities, behavior and emotional development, or physical characteristics" (Kirk et al. 2012, p. 3). However inclusive education raises many issues in terms of general education teachers. In this study, the authors examined senior preservice science teachers' (PSTs) concerns for educating students with disabilities in science classrooms. Eight PSTs were involved in the study. The constant comparative data analysis was performed. PSTs' concerns for inclusive education were categorized into two themes: PSTs' concerns about themselves and PSTs' concerns about students with disabilities. Under each, there existed several sub issues. For the first category, data analysis yielded that PSTs were concerned about not being unable to cope with extra workload by accepting students with disabilities; lacking of enough training for educating those students; insufficient pedagogical knowledge; and scarce knowledge about disabilities. PSTs' concerns about students with disabilities included three sub-issues which were: not devoting enough time for disabled students' science learning; not to be able to achieve their science learning in terms of science content and science process skills, and not to be able to help them develop positive attitudes toward science. The results were discussed and implications for teacher education were made.

Keywords: inclusive education, science education, students with special needs



THE CHALLENGES FACED BY PRESERVICE SCIENCE TEACHERS DURING TEACHING PRACTICE

Nurcan Cansiz, Mustafa Cansiz

Teacher education is related to the how and what teachers should know about subject matter and pedagogy; how they thought and how they learned in preservice programs and schools (Cochran-Smith, 2004). This is vital for well-prepared and effective teachers. Although preservice science teachers receive training during teacher education, they may still face difficulties in performing their profession. Being aware of this, this study investigated what problems and difficulties preservice science teachers (PSTs) encounter during teaching practice in their mentor schools. Six PSTs were interviewed at the end of their fourth year in science teacher education program. All PSTs completed their teaching practice in the same mentor school. They observed two different science teachers in six, seven, and eight grade science classrooms. Two PSTs participated in each grade science classroom. The constant comparative method was used to analyze the interview data. The results indicated that PSTs encountered five main problems during their teaching practice. All PSTs expressed that there were students with disabilities in the mentor school and they were not trained for teaching science in inclusive classrooms. As a result, those students were not involved in classroom activities. The next problem PSTs identified was that they were not allowed to make enough teaching practice in mentor schools due to mentor teachers' concerns about covering the curriculum. The third one they clarified was that they do not have enough pedagogical content knowledge. Preservice science teachers also experienced problems with classroom assessment and classroom management due to lack of enough training. Although they took one course for measurement and evaluation, they thought they were not knowledgeable enough for assessing science learning effectively. In terms of classroom management, they believed that they learned the theory but they lacked practice. Results were discussed and implications were made for teacher education.

Keywords: teacher education, preservice science teachers, science education



AN M-LEARNING TOOL FOR PRE-SCHOOL KIDS

Mustafa Tarım, Celal Öztürk, Gülçin Yüklü

In today's world, technology has a vital importance in the matter of education, its affect can be seen almost everywhere. In the pre-school period, children start to learn how to engage society by learning sharing, solidarity, socialization and team work. The aim of pre-school period is to encourage learning new things and be aware of their talents. In this period, children have the biggest capacity to learn new things during their life. This study provide an opportunity for children; be aware of their secret talents in their brains. In this paper, we give an overview of an m-learning tool which we have developed for pre-school kids. We focused on the technological improvements and its affects on educational life for both teachers and students. It is aimed at develop an application which provides either parents are able to observe their children or children are able to learn new things while they enjoy it at the same time.

Keywords: e-learning, m-learning, pre-school education, education technology



GENERALIZING REPEATING PATTERNS: A STUDY WITH CHILDREN AGED FOUR

Margarida Rodrigues, Paula Serra

This paper presents part of a study that aims to understand how the emergence of algebraic thinking takes place in a group of four-year-old children, as well as its relationship to the exploration of children's literature. To further deepen and guide this study the following research questions have been formulated: (1) How can children's literature help preschoolers identify patterns?; (2) What strategies and thinking processes children use to create, analyze and generalize repetitive and growing patterns?; (3) What strategies do children use to identify the repeating unit of a pattern? and (4) What factors influence the identification of patterns? The paper focuses only on the strategies and thinking processes that children use to create, analyze and generalize repetitive patterns. The present study was developed with a group of 16 preschoolers in a private school in Lisbon, and it was carried out with all children. In order to develop the research, a qualitative research methodology under the interpretive paradigm was chosen, emphasizing meanings and processes. The researcher took the dual role of teacher-researcher, conducting the study with her own group and in her own natural environment. Participant observation and document analysis (audio and video recordings, photos and documents produced by the children) were used as data collection methods. Data collection took place from October 2013 to April 2014. The results of the study indicate that children master the concept of repeating patterns, and they are able to identify the repeating unit, create and analyze various repeating patterns, evolving from simpler to more complex forms.

Keywords: children's literature; repetitive patterns; algebraic thinking in four-year-old children



ADDITIVE FLEXIBLE CALCULATION IN 1ST AND 2ND GRADES PUPILS

Margarida Rodrigues

This poster reports part of the work developed by the Project "Adaptive thinking and flexible computation: Critical issues" related to additive thinking in 1st and 2nd grades pupils. The main goal of the study is to understand pupils' reasoning when solving numerical tasks involving additive situations, and identify features associated with adaptive thinking. For that, it aims to answer the questions: (1) What personal knowledge do pupils have?; (2) How do they use this personal knowledge to calculate?; and (3) How does this use of personal knowledge is reflected flexibly in additive calculation? Adaptive thinking refers to a thinking that can flexibly be adapted to new as well as familiar tasks. Strategic flexibility refers to the way as the problem is affected by circumstances to be solved. These circumstances may be related with specific features of the tasks or with individual characteristics or contextual variables. The flexible calculation and the quantitative reasoning are two dimensions that are interrelated to each other. Because the quantitative reasoning focuses on the description and modeling of situations and comparative relationships involved, it ultimately underlies the development of flexible calculation as a calculation that mobilizes numerical relationships, in an intelligent and adaptive way to situations and numbers themselves. Following a qualitative approach within an interpretive paradigm, individual clinical interviews with four pupils were conducted. The results show that, in the case of first grade pupils, the semantic aspects of the problem are involved in its resolution and the pupils' performance appears to be related to the development of number sense and to the relationships that they dominate. For the 2nd Grade pupils, the inverse reasoning constituted a critical issue, which they could mobilized after overcoming the initial difficulties. The results also suggest that these pupils see the difference as an invariant numerical relationship.

Keywords: adaptive thinking, numerical relationships, additive flexible calculation, quantitative difference

THE EFFECTS OF USING INTERACTIVE WHITEBOARD ON MATHEMATICS SUCCESS, ENGAGEMENT, ATTITUDE AND ANXIETY

Cengiz Erdik, Neşe Özkal, Fatih Sagir

The aim of this study is to investigate the effects of using interactive whiteboard on academic achievement, engagement, attitude and anxiety about the lesson. This study utilized pretest-posttest control group design. The data was collected through "Achievement Test", "Student Engagement Scale", "Mathematics Attitude Scale" and "Mathematics Anxiety Scale". The study was carried out in Antalya, Alanya during 2014-2015 academic years. The participants of the study were 56 students (n=27 Female, n=29 Male) of 11th class in an Anatolian High School in Alanya. In the study, the subject of "logarithm" in mathematics at 11th class was taught using interactive whiteboard with the experiment group (n=28) and whiteboard with the control group (n=28). t-Test was used for testing the difference between the pretest-posttest achievement, engagement, attitude and anxiety means of the experiment and control group. As a result of the analysis of the data, it was found out that the academic achievements, engagement to the Mathematics lesson, attitude and anxieties of the students in the experiment and control group for the subject of "logarithm" didn't significantly differ.

Keywords: interactive whiteboard, mathematics, achievement, engagement, attitude, anxiety



MIDDLE SCHOOL STUDENTS' UNDERSTANDING OF SOME ALGEBRAIC SYMBOLS

Ayşe Gamze Yalimol, Tuğba Horzum

Algebra, one of the sub-areas of mathematics, has many functions such as being language, problem solving tool, thinking tool and a lesson. With the use of algebraic symbols that make the algebra as a language, a lot of situation and events can be represented. At this stage the question "What the algebraic symbols mean for the students?" comes to the mind. The purpose of this study is to define the middle school students' understanding forms of the algebraic symbols. The participants of the study consist of 191 6th, 7th and 8th grade middle school students. The collection of data included document analysis approach and interview technique were used in the study that has a qualitative nature. In the documents given to the students, some algebraic symbols were examined. Students were asked to explain what these symbols mean for them. The present study, which is an ongoing research in which we conduct content analysis, students' understandings that occur will be discussed in relation to literature and various suggestions will be made for algebra education.

Keywords: algebra, algebraic symbols, algebra teaching, middle school students, student understanding



ATTITUDES OF UNIVERSITY STUDENTS TOWARDS BIOTECHNOLOGY AND ITS APPLICATIONS

Sibel Kahraman, Evrim Ocal

Biotechnology education in school curriculum found to elementary level from university level. The role of primary science teachers and secondary biology teachers is of great importance in equipping students with knowledge about biotechnology. This study examined Turkish university students' attitudes (n = 242)

toward biotechnology and its applications. For these purposes, the attitudes scale towards biotechnology is used developed by the researchers has been applied to 242 teachers and secondary biology teachers and/or biologist. The data has been analyzed by a computer statistics programme, SPSS. We found that no significant mean difference was observed according to gender and years in school as independent variables ($p > 0.05$). However, significant differences were found between science education department and biology department students ($F = 5.472$, $df = 1$ $p < 0.05$). Science education third and fourth-year students of university who have been studying to become primary science on department students showed significantly higher positive attitudes biotechnology and biotechnological applications than did biology department students. No significant interaction between gender and years in school; gender and department; years in school and department was observed ($p > 0.05$). However, significant interaction between gender, years in school and department was observed ($p < 0.05$).

Keywords: Attitude; Biotechnology; Biotechnology education; Science



EDULABS – THE AGIRE PROJECT: OBJECTIVES, MONITORING AND EXPECTATIONS

Lúcia Pombo, Vânia Carlos, Maria João Loureiro

The AGIRE project is a partnership between the University of Aveiro, a consortium comprising 26 companies related to teaching and learning, and one School Grouping, with the financial support of QREN. The project is embedded into the EduLab concept (school laboratories with technological equipments, as tablets, laptops, whiteboards, and educational materials such as ebooks and learning platforms) to promote the adoption of innovative teaching practices. The project stems from identified contextual needs and aims to monitor the project implementation within an interventional perspective, concerning educational innovation with the use of digital technologies. The goal is to promote teachers' and students' digital literacy, by developing Teacher Training Courses (TTC) and taking advantage from the school technology environment on a pedagogical level. After attending a short-term (15 hours) technological TTC, a 64-hour TTC involving 13 teachers of Basic Education during the current school year is being conducted. The TTC, developed in a blended learning environment, follows the flipped classroom methodology comprising autonomous tasks for consulting multimedia resources at a distance and face-to-face sessions for discussion, reflection and collaborative work. This fits into a design-based methodology (Parker, 2011), allowing the analysis of the intervention outcomes and its successively refinement towards a solution, following the phases: i) Analyze the problem; ii) Design and develop potential solutions; iii) Implement and evaluate; and iv) Reflect and report. A set of data collection instruments developed under this project allowed its monitoring, as well as the redefinition of the TTC and its previewed activities. For example, the questionnaire on the trainee teachers' digital literacy, the grid to monitor the strategies implemented in classrooms, as well as the autonomous work tasks allowed each teacher to position its practice at the level of technology integration and to raise his/her expectations towards the educational technologies.

Keywords: eduLabs; ICT in education; teacher training; collaborative learning; flipped classroom



MIDDLE SCHOOL STUDENTS' PERCEPTIONS ABOUT TRIANGLE CONCEPT

Şükran Sayı, Tuğba Horzum

Individuals have had much experience about the geometry by confronting various geometric shapes since their birth. One of the geometric concepts introduced to the children at an early age is the concept of the

triangle. In this study, it is aimed to determine middle school students' perceptions of the triangle concept with the idea that the triangle is one of the concepts of geometry and may affect the learning of geometry concepts which students may face in the future. A qualitative, case study research design was used in this study. The participants of the study consist of 60 6th, 7th and 8th grade middle school students studying in the central Anatolia region. The data were collected by means of questionnaire form which consist of three open-ended questions. Then, content analysis was carried out. After that, interviews were conducted with the students having statements that are not understandable. The present study, which is an ongoing research in which we conduct content analysis, students' understandings that occur will be discussed in relation to literature and various suggestions will be made for algebra education.

Keywords: the concept of triangle, geometry teaching, middle school students, student understanding



7TH GRADE STUDENTS' PROBLEM SOLVING SUCCESS RATES ON PROPORTIONAL REASONING PROBLEMS

Mustafa Serkan Pelen, Perihan Dinç Artut

Development of proportional reasoning is crucial for higher level mathematical skills. Previous studies have revealed how problem types influence difficulty level and success rate of proportional reasoning problems. This research was conducted to investigate 7th grade students' problem solving success and whether these strategies change with different problem types. 331 randomly selected students of grade seven, in official primary schools of Ministry of National Education in Adana in 2014-2015 education year participated in this study. A problem test which contains three different types of missing value (direct proportional, inverse proportional and additive/non-proportional) word problems was designed as a data collecting tool for the research. Pupils' responses to the problems in the solution task were scored in order to determine their problem solving success rates on different problem types. Descriptive data analysis methods were used in this study. Analysis taken from the data collecting tool has shown that 7th grade students solved different problem types with different success rates. The findings of the study also indicate that problem types affect students' problem solving performances. In detail, additive/non-proportional problems were solved with the lowest success rate, while direct proportional problems with the highest success rate. The tendency to overuse proportional responses in inverse proportional and additive/non-proportional situations was observed. Study showed that students have difficulty on distinguishing direct proportional, inverse proportional and additive/non-proportional problem statements.

Keywords: problem solving success rate, proportional reasoning, problem types



INVESTIGATING TECHNOLOGY, CONTENT, AND PEDAGOGY READINESS OF PRE-SERVICE TEACHERS ATTENDING TEACHER CERTIFICATE PROGRAM IN TURKEY

Ibrahim Delen, Sedat Sen, Niyazi Erdogan

Similar to the teacher certification programs all around the world, Turkish Ministry of National Education has initiated a new teacher certification program to provide an opportunity for other people from different occupational groups to become teachers. Measuring the occupational readiness level of this group joining the teacher candidates of future is very crucial. The main purpose of this study is measuring the pedagogy and content knowledge of students attending teacher certificate program with the aim of becoming a

mathematics teacher. Along with this purpose, educational technology readiness of candidates was also evaluated. This study was conducted with candidates who are about to complete the teacher certification program in two state universities. Technological Pedagogical Content Knowledge (TPACK) Regarding Geometry instrument previously developed by Bulut (2012) was adapted and given to the candidates at the end of the certification program. After entering the data into digital portal, descriptive statistics and multiple linear regression was applied by using SPSS v21 statistical package. Analyses aimed to reveal whether teacher candidates were feeling sufficient to use a variety of methods and techniques, to use educational technology, and to teach mathematical content and whether these feelings differ based on age, gender, and experience. When preliminary findings of study are examined, we found that age, gender, and experience of teacher candidates attending teacher certificate programs has no effect on their feelings about their content, technology, and pedagogy readiness. Although candidates feel they are ready in terms of technological skills and pedagogical knowledge, they had a hard time when asked to give examples about these topics. Considering problems teacher candidates will face when they begin teaching, we concluded better support mechanisms should be developed during teacher certification program.

Keywords: teacher certificate program, pre-service teachers, technology readiness, content readiness, pedagogy readiness



7TH AND 8TH GRADE STUDENTS ' KNOWLEDGE ABOUT RECYCLING LEVELS AND ATTITUDES TOWARDS RECYCLING

Osman Karpuzcu, Cumhuriyet Sancağtar Selamet

The environment can be described as an area where the people undergo a mutual transformation of the people by the nature and emerging feature of the human-nature relationship (Bourdeau, 2004, pp.10). The environment and the nature began to be seen as a tool of capitalism, after using human-natured environment with the industrial revolution, Fulfill the eternal request of the people as consumers is often the use of natural resources and depletion. Therefore, using more carefully of the natural resources and recycling has become an important and necessary topic (Ünal, 2011). All creatures in the natural habitat to maintain the vitality and natural habitats as a result of damage to the environmental problems occurring as a result of environmental problems can be said that the main reason of education about environmental subjects (Karataş, 2011). The main objective of environmental education; a new human type, to gain consumer awareness of morality and society, consuming as much as needed, who feel responsibility towards future generations, are sensitive to environmental issues and cultivate a conscious human model (www.cevremuhendisligi.org). In particular, values and attitudes formed in primary school, it is important at an early age in the name of love for the development of empathy in relation to nature (Erten, 2004, s.9-11). Thus, students in the emergence of the consequences of environmental degradation and environmental problems and learn about their role in prevention. Environmental and their thoughts on their contributions to environmental problems by helping them open to remove assessment would increase awareness of these issues (Haktanır, 2007, s.15). The goal of this study, the students who are studying 7th and 8th grades their impact on the environment to determine the attitude of the subject. The first part of the personal information of the student questionnaire used in the study, while the second part Avan vd. (2011) developed by the 'Environmental Attitude Scale for Elementary Students is made from. Constitute secondary school students who are undergoing training in the sample of the study Afyonkarahisar and Antalya continued data collection and analysis.

Keywords: environmental education, environmental awareness, recycle, environmental attitudes



AN ACHIEVEMENT TEST DEVELOPMENT STUDY: ELECTRICAL UNIT IN OUR LIVES ACHIEVEMENT TEST VALIDITY AND RELIABILITY RESEARCH

Şahin İdin, Cemil Aydoğdu

The purpose of this study is to develop a valid and reliable instrument to measure the success of the Electric Unit of Science and Technology course in life for students in the seventh grade. Taking into account the curriculum, a total of sixty four questions in order to meet thirty two recovery has been prepared under the unit. Before the final version of achievement test questions submitted to the expert and after first post-thirty student pilot studies were carried out. After content validity is provided Electrical Unit Achievement Test (YEÜBT) who study in public schools in Ankara, 253 applied to students in the eighth grade, the reliability coefficient of the test results (Cronbach's alpha) was found to be 0.82. Made material analysis (ITEMAN) average item difficulty and discriminant index of the test is calculated as 0.384 and 0.368 respectively. These results indicate that the developed YEÜBT reach valid and reliable results. As a result YEÜBT is a reliable and valid measurement tool that can use both in the scientific study and of middle school science classroom of the teacher evaluation process.

Keywords: electric, validity, reliability



REFLECTION OF A TEACHER'S KNOWLEDGE OF STUDENT THINKING ON TEACHING TRIGONOMETRICAL RATIOS IN A RIGHT-ANGLED TRIANGLE

Aytug Ozaltun Celik, Esra Bukova Güzel

In teacher education and professional development programs, it should involve the activities that improve the skills intended for teachers to elicit, consider and make sense of students' thinking. Hill, Ball and Schilling (2008) state that there is common consensus that an effective teacher possesses their students' mathematical ideas and thinking. The teachers focused on students' thinking could eliminate how problems are posed, questions are revealed, mathematical goals are achieved, interactions are performed and learning improves (Franke & Kazemi, 2001). When the teachers conduct their teaching based on students' thinking, they can help their students' conceptual learning. The most important factor make learning effective is for teachers to design tasks and ask questions by considering students' thinking because students construct new knowledge based on their thoughts. It could be determined extent to which students understand concepts by means of asking questions which would elicit students' thinking. In this direction, the purpose of the study is to elaborate on how a mathematics teacher reflects his knowledge of student thinking while he conducts teaching of trigonometric ratios in a right-angled triangle. In the context of the study, mathematics teacher's two-hour lessons were observed by researchers and the field notes were gotten by each one during observations. Also, in order to prevent loss of data, the lessons were recorded by two video cameras positioned in the classroom. The observed lessons were transcribed verbatim and analyzed based on the framework of knowledge of student thinking developed by Ozaltun (2014). As a result of data analysis, it was seen the teacher's approaches such as considering students' prior knowledge, encouraging mathematical thinking, creating discussion to elicit their thinking and asking for students to express their thinking. It is thought that the study will give a different point of view to teaching of trigonometric ratios in a right-angled triangle and future studies related to the knowledge of student thinking.

Keywords: knowledge of student thinking, mathematics teacher, trigonometric ratios in a right-angled triangle

ANALYSIS OF SECONDARY STUDENTS' CONCEPTUAL UNDERSTANDINGS ON THE TOPIC OF MIRRORS

Özgür Anil, Erhan Akkilik, Hüseyin Küçüközer

The purpose of this study was to analyze the conceptual understandings of secondary students on the topic of "mirrors". Within this context, the answer of the question "How process of conceptual change occurs in students" has been clarified. The sample of the study consists of 46 students from 9th grade students. Data of the research were collected through a "Conceptual Test", "Interviews", "Video Records", "Student Guidelines" and "Semantic Feature Analysis". The data was analyzed with Thorley's (1990) "Status Analysis Categories, which was also conducted in the studies of Hewson and Lemberger. With regard to the results obtained from the analysis of the conceptual change status; it can be inferred that while students were displeased with the existing concepts learnt through previous teaching strategies, the concepts and explanations which were acquired with the help of experiments and activities were "comprehensible", "conceivable" and "beneficial" for them. And therefore, it can be deduced that students internalized new (scientific) concepts resulting in meaningful and permanent learning.

Keywords: conceptual change, status analysis categories, meaningful learning, student guidelines



JOURNEY TO THE SCIENCE WORLD WITH STEM ACTIVITIES

Hülya Yılmaz, Melike Yiğit Koyunkaya, Fulden Güler, Didem Büyükalıtay

In the developing world, it is inevitable to teach the science and mathematics by connecting them with different disciplines and real life situations instead of teaching them theoretically. In this situation, if people in society are able to investigate, apply and extend innovations, they will increase social prosperity level by increasing economical competition level in a country. From this point of view, in recent years, developed and developing countries have begun to use and apply STEM (Science, Technology, Engineering, Mathematics) Education, which includes robust and core knowledge for Science and Mathematics courses, to constitute an innovator society. In our country, STEM was translated as Fen, Teknoloji, Mühendislik, ve Matematik (FeTeMM), and researchers began to work in this field in recent years. STEM literacy is defined as an individual's ability to access the depth knowledge regarding science, technology, engineering and mathematics and to construct the relationships among all the subfields. When we consider the importance of STEM Education and STEM Literacy, this research is the pilot study of the protocol that was signed with TEGV under the title of "Journey to the Science World with STEM Activities". In these activities, it is aimed to encourage participants to realize that they quite frequently use Science, Technology, Engineering and Mathematics in their daily lives and to realize that these disciplines are not different from one another on the contrary they are related to each other. It is also aimed to make participants to realize the importance of the relationships and interactions among these disciplines. Eight STEM activities under the names of "At Class", "At Game Park", "At Natural Life Park", and "At Home" which were developed by considering 5th and 6th grades Mathematics and Science Curriculum published by Turkish Ministry of National Education (MEB) and 5E Learning Process were carried out with 10 participants using interactive methods and techniques such as observation and experiment. The assessment of the research was conducted using some work sheets, "Relationship of Science-Technology- Engineering-Mathematics" scale, and assessment sheet of the day which completed at the end of each day. The preliminary results of the research show that participants are able to identify the relationships between the some fundamental subjects that are taught in science and mathematics courses and STEM fields. In addition, they are able to explore different examples related to these relationships in their environment. On that account, we think that it should be beneficial to develop these kind of activities and to embed these kind of activities to MEB Primary Teaching Programs.

Keywords: science, technology, engineering, mathematics (STEM) education, FeTeMM education, STEM education, STEM literacy



EVALUATION OF PROBLEM-BASED LEARNING ACTIVITY BY STUDENTS

Ela Ayşe Köksal, Zehra Molu, Gökhan Özdemir, Hülya Kahyaoğlu, Mehmet Tunçel,

Problem-based learning (PBL); considering the fact that we encounter various problems in our lives, viewing these problems as significant we try to find the cause of them, we solve these problems and also we tackle with potential problems before they occur, is an approach that adopts use of real-life problems in learning process. In PBL, starting with a problem situation by making the information necessary to solve this problem as the learning objective, students are provided with active learning. The purpose of this study to make an evaluation of a PBL activity carried out in the General Chemistry II course according to the views of the students. The activity was held with the freshman science education students in the Faculty of Education at Nigde University during the spring semester of 2013-14 academic year. The activity prepared on the structure of the atom, electron configuration and periodic table was performed with the discussion of the questions of a scenario, which gives the problem of whether Hydrogen element can be used as a fuel or not and is titled "Death before Born?", in five groups each of which consisted of 10-15 students on three sessions. The question of a scenario that under three training sessions in five groups consisting of 10-15 students was carried out by discussion. In each group, the authors of this study served as a guide. Each session lasted 1-2 hours. This event is performed for one week. Students had done the evaluation in a form distributed to them by writing their opinions and suggestions under the titles of guide, scenario, PBL group, you, general chemistry presentation, general chemistry laboratory, applications, discussion session, scientific advice and post module evaluation at the end of the activity. These documents were then analyzed by the content analysis. According to preliminary findings on from 24 students commenting on instructors, only two had thought that the guide had no contribution to learning process; one had thought that the guide contributed to their learning but when the guide could contribute more when she told the truth at the end; of a student guide, but stated that the probe. At the other hand, another student in the same group had positively rated this guide on not to tell the truth at the end because they learned how to come to a conclusion after a search and discussion; the other student discovered that she had to ask "why" question to herself for the first time and this leads to deeper learning. Generally, the students thought that since the guides support "discussion", "research", "critical thinking" and "self-learning", the guides contributed to their learning process.

Keywords: problem based learning, general chemistry, science education students



PERSONAL EPISTEMOLOGY AS PREDICTORS OF PHYSICS ACHIEVEMENT IN TURKISH HIGH SCHOOL STUDENTS

Muhammet Mustafa Alpaslan, Hakan Isik, Fatma Alpaslan

This study investigates the contribution of physics-related epistemological beliefs to Turkish high school students' physics achievement. Three hundred and fifty-nine students from two public schools in Mugla Province located in Aegean Region in Turkey were participated in the study. The participants were asked to complete a physics-adapted Turkish version of Epistemological Beliefs Questionnaire (EBQ), originally

developed by Conley and his colleagues (2004). The participants' GPA in a physics course was used as their physics achievement score. The findings reveal that students' epistemological beliefs were able to predict %7 of variance in their physics GPA. Epistemological beliefs about the justification of knowledge and the certainty of knowledge statistically significantly predict their physics GPA. The educational implications of the results are discussed.

Keywords: physics education; personal epistemology



TEACHER CANDIDATES' VIEWS ON SUSTAINABLE DEVELOPMENT

Meryem Selvi, Mahmut Selvi, Ezgi Güven Yıldırım, Ayşe Nesibe Köklükaya

The purpose of this research is to receive and evaluate the views teacher candidates' views in various branches as to sustainable development. Teacher candidates who were students in various teaching departments in 2012-2013 academic year spring semester in a public university form the study group of this research. 22 female, 13 male in total 35 teacher candidates are in the participant group. Phenomenology research design is used in the research. Teacher candidates were chosen from different departments such as science teaching, mathematics teaching, primary school teaching, pre-school teaching, social sciences teaching, geography teaching, biology teaching, Turkish language teaching and art teaching departments. The data of the research were gathered by means of the half-developed 5 interview questions prepared by the researchers. For the validity of the questions, 5 researchers who are experts in their fields were consulted for their views. During the half-developed interviews, the participants were asked what the sustainable development is, what its importance is, individual contributions of the candidates to the sustainable development, how the sustainable development activities are. The content analysis of the qualitative data methods will be used to resolve the gathered qualitative data. The documents gathered by means of putting the results of the interview in writing will be analyzed via HyperRESEARCHTM 2.6.1. qualitative analysis programme so as to see the data relation and provide convenience while coding. At the end of the research, it is revealed that teacher candidates don't have enough information about what the sustainable development and its importance is and they don't act enough for the sustainable development.

Keywords: sustainable development, environment, teacher candidates



SCIENCE TEACHER CANDIDATES' OPINIONS ON V-DIAGRAMS AS A MEASUREMENT AND EVALUATION METHOD

Mustafa Dođru, Mahmut Selvi, Ayşe Nesibe Köklükaya, Ezgi Güven Yıldırım

The purpose of this research is to receive Science Teacher Candidates' opinions on V-Diagrams as a measurement method in Physics Laboratory II class and evaluate these opinions. 30 teacher candidates who are the 1st grade students in 2014-2015 academic year spring semester of a public university in Ankara will form the study group of this research. Before the application process, a seminar will be given as to V-diagrams and the preparation of the V-diagrams and prepared V-diagram examples will be shown to the participants by the researchers. During the study process, the participants will be asked to perform the experiments determined in the curriculum and prepare a V-diagram about each experiment instead of traditional reporting methods. The measurement and evaluation of the teacher candidates as to the

subject will be realized via these diagrams. At the end of the process, the data of the research will be gathered by means of the half-developed interview questions prepared by the researchers. An interview form including the half-developed questions as to V-diagrams used in the application of the half-developed interviews and the use of these diagrams as a measurement and evaluation method instead of traditional methods will be followed. The content analysis of the qualitative data methods will be used to resolve the gathered qualitative data. The documents gathered by means of putting the results of the interview in writing will be analyzed via HyperRESEARCHTM 2.6.1. qualitative analysis programme so as to see the data relation and provide convenience while coding. At the end of the research, teacher candidates' opinions on V-Diagrams as a measurement and evaluation method of Physics Laboratory II class will be presented.

Keywords: v-diagram, measurement and evaluation, teacher candidates



THE EFFECTS OF TECHNOLOGY SUPPORTED TEACHING AND CONCEPTUAL CHANGE TEXTS FOR THE REMEDYING THE MISCONCEPTIONS ON THE TOPIC OF CELL

Gökhan Özdemir, Engin Ünlü

This study investigated the effects of technology supported teaching and conceptual change texts for remedying students' misconceptions on the topic of "Eukaryotic Cell Organelle" and "The Differences between Animal and Plant Cells." This study was conducted in an Anatolian High School, the part of a Multi-Program School. The sample of the study was consisted of 21 students studying at 9th grade. An achievement test, including 11 open ended questions, focusing on common misconceptions on the aforementioned topics was administered to the students before and after the intervention. Two questions of the achievement test required some figures to draw for the students. After the pre-test, students took three hours teaching with the help of video, animations, visual aids, and seven conceptual change texts developed by one of the authors. Pre-test results indicated that the students had several misconceptions on the cell and related topics. However, post-test results indicated that the students demonstrated scientifically more normative conceptions. It is concluded that conceptual change texts integrated with technology aids are effective for the remedying the students' misconceptions on the topic of "Eukaryotic Cell Organelle" and "The Differences between Animal and Plant Cells." It is implicated that biology teaching could be effective and meaningful with the technology aids and conceptual change texts for the biology students.

Keywords: cell, organelle, misconception, technology supported teaching, conceptual change texts



MIDDLE SCHOOL PRE-SERVICE MATHEMATICS TEACHERS' READING AND WRITING OF SYMBOLIC MATHEMATICAL SENTENCES

Tangül Kabael

Mathematics is a universal language that has specific vocabulary with a syntactical and rhetorical structure like all other languages. Moreover, this language is superior to all other languages. The most important characteristic making it superior to all other is it's being precise (Zazkis, 2000; Sealey, Deshler and Hazen, 2014). Individuals with different native languages use mathematics language by supporting their native languages. While mathematical ideas are written by symbols precisely and shortly, these ideas should be red in natural languages meaningfully. On the other hand, mathematics language skills and mathematical

knowledge should be developed simultaneously. Therefore, mathematics teachers are responsible for not only developing mathematical concepts but also mathematics language skills of students. In this study, it was aimed to investigate middle school pre-service mathematics teachers' reading and writing of symbolic mathematical sentences. This qualitative study is part of a larger study. Data of this study was gathered by an open-ended test. This test consisted of two parts. In one part, symbolical sentences were given and readings of these sentences were required. In other part, mathematical propositions were given in natural language and symbolic writings of these propositions were asked. The test was applied to 23 middle school pre-service mathematics teachers. In spite of the fact that given sentences were about number concept, pre-service mathematics teachers were not successful about reading and writing of these sentences. These middle school pre-service mathematics teachers demonstrated that they were weak skills and knowledge about syntactical and rhetorical structure of mathematics.

Keywords: the language of mathematics, writing and reading in mathematics language, middle school pre-service mathematics teachers.



EFFECTS OF INPUT AND PROCESS FACTORS ON ACADEMIC ACHIEVEMENT IN TEXAS PUBLIC HIGH SCHOOLS

Niyazi Erdogan, Ayse Tugba Oner, Robert M. Capraro, Mary Margaret Capraro

Factors affecting student achievement in schools have been one of the top topics in educational research for a long time. A report (Coleman et al., 1966) reflecting on equality of opportunities in education was groundbreaking research informing educational researchers about the factors most influencing students' success. Since the Coleman report, debate on the role of these factors among social science researchers has been expanding. Shavelson, McDonnell, Oakes, Carey, and Picus (1987) placed all the factors affecting academic achievement into three categories: (1) input, (2) process, and (3) output. Input factors have been described as the factors which schools have little or no control over, while process factors have been described as factors which schools do have control over. The purpose of this study was to investigate the effects of input and process factors on Texas high schools' mathematics and reading achievement. In the present study, input factors, which cannot be controlled over schools, were identified as socioeconomic status, ethnicity, and community type. In addition, process factors were identified as attendance rate and school size. Hierarchical multiple regression (HMR) was used to examine the effects of input and process factors on academic achievement. In this direction, we used 2011 mathematics and reading Texas Assessment Knowledge and Skills (TAKS) test passing rates from 1059 high schools in Texas. The results indicated that a decrease in community population increases the mathematics and reading achievement. Also, the smaller a school becomes, the higher the reading achievement is.

Keywords: academic achievement, community type, attendance rate, school size



EXAMINING OF PROBLEMS PARTAKING IN HIGH SCHOOL TEXTBOOKS IN ACCORDANCE WITH THE OPINIONS OF TEACHERS

Deniz Sevcan Ökşen, Canselin Alıç, Ayten Pınar Bal, Perihan Dinç Artut

Teaching mathematics is a complex occupation. There is not a prescription that allows all students to learn or enable all teachers effective (NCTM, 2000, 16). The most important component of maths training is

teacher. One of the most important tool of teacher is textbook. For good maths education and training, special importance should be shown in writing of maths books (Semerci and Semerci, 2004). On the other hand, since the necessity of centre on maths training is to problem solving, it can be said that being attentive to the problems given in maths textbooks is also necessary. In this direction, it cannot be expected to help gaining of problem solving behaviour from the problems given in textbooks as they are not designed fit for purpose, having insufficiencies in its presentation and content. It can be considered as good book concerning that area if textbooks are chosen well, if they reflect the programmes of the Ministry of Education, if it is easy to be used by teachers and students, if it has visual attraction and if involves necessary images and figures functionally (Ceyhan ve Yiğit, 2004). In that regard, evaluating the problems partaking in textbooks of ninth grades according to the opinions of teachers, was thought to be important in this study. The aim of this study is to examine the problems partaking in maths textbook of ninth grades that is taught in public secondary schools of Adana province in 2014-2015 academic year in terms of language, visual elements, content and problem types in accordance with the opinions of teachers. The study group consists of 15 maths teachers who work in secondary education. Semi structured teacher interview form was used as data collection tool that was formed by researchers. The interviews were done as face to face in the schools of teachers with the contribution of two researchers. The opinions of teachers were recorded via tape recorder. The recorded datas were transferred to computer on the same day. The datas are analysed via NVIVO 8. 1 packaged software.

Keywords: textbook, mathematics teachers, problem solving



EXAMINING OF PROBLEMS PARTAKING IN MATHS TEXTBOOKS OF NINTH GRADE

Canselin Alıç, Deniz Sevcan Ökşen, Perihan Dinç Artut, Ayten Pınar Bal

Textbooks are the basic elements of education programme. They are the fundamental materials that allow teachers to use their power better in education, to give what they want to give more systemmatically and also provide the student to repeat what the teacher has taught when or where he wants to with desired tempo. Textbooks are the most important education materials that source student to learn in order to perform the targets of education (Aycan, Kaynar, Türkoğuz ve Arı, 2001). We frequently encounter the question Why we learn Maths or why we teach Maths or where we use what we have learnt (Gür, 2005, 70). The students may ask this question to themselves because they think the problems presented in maths lessons unworthy. Based on this idea, in this study it was aimed to examine the problems partaking in maths textbook of ninth grades that is taught in public secondary schools of Adana province in 2014-2015 academic year in terms of language, visual elements, content and problem types. They are aimed to examined by problem control list method that was developed by Ildırı (2009). The research is a study in scan mode in which qualitative methods are used. In order to collect data relating problems that are going to be examined in the research, "Problem Control List" that was developed by Ildır (2009), was reviewed and adapted for this research. The problems partaking in textbooks were examined and coded by two researchers seperately. Adaptive value was calculated between two coders for reliability of datas obtained from data collection tool. The analysis process of datas obtained from research still continues.

Keywords: mathem solvingmatics textbook, problem, proble

AN INVESTIGATION OF SEVENTH GRADE STUDENTS' CREATING EQUATION AND PROBLEM POSING SKILLS

Ümmühan Betül Dağistan, Tuğba Horzum

Due to the positive influence of understanding mathematics and mathematical thinking, problem solving and problem posing activities have an important place in the mathematics education. According to literature, it is stated that problem solving and problem posing are connected and support each other, and problem posing has a great importance in the development of problem solving skills (English, 1997, 1998; Lowrie, 1999). On the other hand it is a well known fact that students have difficulty in solving mathematical problems. These difficulties arise from the understanding the problem and the stage of creating an equation (Karataş ve Güven, 2004; Mayer, 1982). Therefore, it is aimed to investigate the students' ability of creating equations and problem posing. The participants of the study 73 seventh grade students that are studying at the middle school in the middle of the Turkey. Six open-ended questions, three questions intended for the ability of creating equations and three questions intended for the ability of problem posing, were asked to the students as a data collection tool. After that, interviews were conducted with the students having statements that are not understandable. The present study, which is an ongoing research in which we conduct content analysis, students' answers that occur will be discussed in relation to literature and various suggestions will be made

Keywords: creating equation, problem posing, problem solving



MIDDLE SCHOOL STUDENTS' PERCEPTIONS OF SOME GEOMETRY SYMBOLS

Zeynep Nur Kiliç, Tuğba Horzum

Geometry is an area that should be given attention, especially in primary and middle school, because it has built on abstract concepts and relationships between these concepts. The use of symbols can help students to learn geometry as well as algebra. Therefore, it is thought that the detection and comprehension of middle school students' understandings who have previously encountered with the geometry symbols is important. Hence, the aim of the research is to reveal how the middle school students perceive the geometry symbols. In the study, phenomenological approach, qualitative research design, was used. The participants of the study consist of 134 middle school students. Documents were used as a main data collection tool. After that, interviews were conducted with the students having statements that are not understandable. The present study, which is an ongoing research in which we conduct content analysis, students' perceptions that occur will be discussed in relation to literature and various suggestions will be made for geometry education

Keywords: geometry, geometric symbols, geometry teaching, middle school students, student understanding



THE IMPACTS OF GEOGEBRA ON PRE-SERVICE MATHEMATICS TEACHERS' MENTAL CONSTRUCTIONS OF RIGHT TRIANGLES

Melike Yiğit Koyunkaya

The concept of angles and right triangles are key components within geometry, and learning these concepts is an important step to success in the discipline and to learn more advanced topics such as trigonometry. Although angles and right triangles are central to the development of geometric knowledge, many researchers have indicated the limitations of students' knowledge of angles (Clements & Battista, 1989; Moore, 2014, Yigit, 2014). The main purpose of this research is to show how dynamic geometry software, GeoGebra, improve pre-service secondary mathematics teachers' Action-Process-Object-Schema (APOS) levels in terms of right triangles. The APOS learning theory was used as a theoretical framework in this study (Asiala, Brown, DeVries, Dubinsky, Mathews, & Thomas, 1996). The four participants were chosen from a large public university in the Midwest United States. Using Clements' (2000) clinical interview methodology, this study utilized five explanatory interviews (60 minute, one-on-one interviews) to gather evidence of PSMTs' mental constructions of angles and right triangles. The tasks used in this study were adopted from existing studies and designed in dynamic geometry software, GeoGebra. At the third interview, the PSMTs were asked to increase the 30 degrees angle to 35 degrees in 30-60-90 right triangle and to identify the changes and attributes. Two of the participants remained at the process level regarding right triangles and relationships between angles and side lengths in a right triangle (RASR) in the third interview while they revealed evidence of the schema level for right triangles and RASR at the end of the fifth interview. They worked with non-routine tasks related to right triangles and RASR throughout the fourth and fifth interviews, so they might modify their solution strategies after they worked with GeoGebra. Based on the PSMTs' responses, it is inferred that posing non-routine tasks in GeoGebra would elicit evidence of the schema level.

Keywords: APOS learning theory, right triangles, geogebra, pre-service mathematics teachers




INVESTIGATING THE USE OF TECHNOLOGY ON PROSPECTIVE TEACHER THINKING PREFERENCES: COMPARING SOLUTIONS OF GEOMETRY PROBLEMS WITH AND WITHOUT TECHNOLOGY

Didem Akyuz

The research suggests that students' solution strategies can be categorized as visual and non-visual when solving mathematics problems. Often students have difficulties in solving problems because they do not consider visual and non-visual solutions simultaneously, but rather rely on only one specific type of strategy. Reform efforts support connecting visual representations with non-visual ones in order to help students develop deeper understanding. This study investigates how prospective teachers with different preferences for visual and non-visual thinking solve geometry problems with and without using DGS. By doing this, the study aims to explore whether students use DGS in accordance with their thinking preferences or whether they explore different strategies. To this end, three plane geometry problems were given to 25 prospective teachers who took "Exploring Geometry with Dynamic Geometry Applications" course, in which they were asked to solve the problems with and without DGS. Additionally, a mathematical processing instrument (MPI) was administered to determine their preferences for visual and non-visual thinking. Based on MPI's results and students' solution performances, three students with different thinking preferences were selected and interviewed. During the interview, different geometry problems were given to the prospective teachers to be solved by using both DGS and paper-and-pencil. The data was triangulated with the lesson plans, DGS activities, and the assignments that they prepared for the requirement of the course. This gave rise to a multiple case study research design. The results reveal

that regardless of students' thinking preferences, the prospective teachers preferred to use visual solutions when they were asked to use DGS. When their solutions of DGS and paper-and-pencil were compared, solutions with DGS demonstrated a better conceptual understanding of the task than paper-and-pencil.

Keywords: technology, mathematics education, thinking preferences, prospective teachers



DETERMINING AND COMPARING THE PHYSICS ATTITUDE STATE OF İBRAHİM CİNKAYA SOCIAL SCIENCE HIGH SCHOOL STUDENTS IN DENİZLİ CITY

Özkan Kahraman

The purpose of this study is to investigate and determine the Physics Attitude State of Social Science High School students and compare them based on gender and class level variables and investigate correlation between exam scores and Physics Attitude Test points. The sample of the study is consisted of 298 students of twelve classes attending preparatory, ninth and tenth grades of Denizli İbrahim Cinkaya Social Science High School during 2014-2015 Academic Year. In this study survey method, one of the most common descriptive study method of quantitative approach, is used. To get data from the sample, Physics Attitude Questionnaire is applied to participants and analysed with SPSS 17.0 and then interpreted and discussed. In the analysis of the data, independent sample t-test for comparisons based on gender variable and one way ANOVA test for comparisons based on class levels are used. As a result of the study, average level of physics attitude is found at preparatory, ninth and tenth grade levels. According to gender variable, only for ninth grade level, significant difference is found in favour of boys. According to class level variable, significant difference is found only between tenth and preparatory classes in favour of preparatory class. In addition to them, correlation between exam scores and attitude points is found significant for only ninth class students.

Keywords: Physics Attitude, Class Level, Gender, Social Science High School



EFFECTS OF SECONDARY SCHOOL STUDENTS' EPISTEMOLOGICAL BELIEFS ON PERSPECTIVES IN SOCIO-SCIENTIFIC ISSUES

Ayşegül Ergün, Kadir Bilen

The aim of this study is to investigate the perspectives on socio-scientific issues of fourth grade secondary school students who have different epistemological beliefs. Mixed approach including a combination of quantitative and qualitative research methods were used in the study. Quantitative approach was used to determine the views of the students phenomenological qualitative dimensions. A total of 129 fourth grade secondary schools in the experimental group were identified epistemological beliefs. After, sophisticated epistemological (sophisticated) and immature (naive) beliefs were identified, 50 students were selected from participants in order to reveal the views of socio-scientific issues. To collect quantitative data were used "Epistemological Beliefs Scale", which was developed by Conley, Pintrich, Vekir and Harrison (2004) and "Feedback Form Towards Socio-Scientific Topics". The Epistemological Beliefs Scale consisted of 25 items and 4 subscales, while the Feedback Form Towards Socio-Scientific Topics included open-ended questions that are related to organic agriculture, GDO, genetic replication, and genetic diseases. For data analysis, descriptive statistics, Factor Analysis and independent sample t-test were used through SPSS 11.5 software. The total mean score obtained from their epistemological beliefs scale showed that overall,

student have moderate beliefs and there was no significant difference between the mean scores of girls and boys. Regarding certainty of knowledge of the students, the scores obtained from the source of knowledge and information development subscales of moderate average and the average of the scores obtained from verification size demonstrated a high level of beliefs. In addition, it was found that there is a significant difference in the accuracy of the information and verification subscale, there was no significant difference in the source of knowledge and information development subscales between male and female students. Sophisticated epistemological beliefs towards the socio-scientific issues are more extensive than those of naive students. This result reveals the views of more advanced students for sophisticated socio-scientific issues. This result is important for the development of the science literacy in terms of students' epistemological beliefs that will able to contribute to science teaching.

Keywords: 4th grade students of secondary schools, epistemological beliefs, socio-scientific issues, science literacy



DETERMINATION SECONDARY SCHOOL STUDENTS' PERCEPTIONS OF PSEUDO-SCIENTIFIC

Ayşegül Ergün, Kadir Bilen

The knowledge era is increasing the importance of science, thus, we encounter a great body of knowledge to be argued in terms of scientifically. Pseudoscience which is presented as scientific does not adhere to valid scientific processes and methods in good manner and mislead us in every field of our life. The aim of this study is to investigate secondary school students' knowledge of scientific method in science. Mixed method was used in this study. The participants of the study were 95 secondary school students. To collect quantitative data in the study, "science, pseudo-science distinction scale" developed by Oothoudt (2008) was used. Qualitative data were collected through two scales which were developed by researchers. Science, Pseudo-Science Distinction scale consisted of 23 items and 4 subscales. The scale based on the situation, consisted of two open-ended questions. Descriptive statistics, Exploratory Factor Analysis, independent Sample t-Test and One-Factor ANOVA were used for statistical analysis. According to the results of descriptive statistics, students obtained moderate level from the science pseudo-science distinction scales. In terms of gender and class variables among the total scores obtained from the scale, there was no significant difference. Students had medium level of scores for pseudo-science, scientific method, called science of information on science-discrimination, and belief in pseudo-scientific claims. In terms of four subscales, students' scores did not different according to gender. Among grade levels, there is a significant difference between the seventh and eighth grade students according to their level of knowledge about the scientific method. When faced with students pseudo-scientific claim and deciding on the events they often benefit from empirical scientific inquiry path is determined to deal with some of the alleged benefits of the size of the student community. When students' perceptions of science pseudo-science debate are examined, it reveals that they have to fit a huge range of knowledge of scientific knowledge and science expressing the totality of evidence-based factual information.

Keywords: secondary school students', pseudo-science, scientific method, science, perception of pseudo-science



HERITAGE IN TURKISH ELEMENTARY SCIENCE EDUCATION

Ela Ayşe Köksal

Heritage education is an instructional approach that uses active learning methods and is based on cultural heritage. Cultural Heritage refers to the entire corpus of material signs, either artistic or symbolic, handed by the past to each culture and to the whole mankind. Heritage education aims the protection, recognition, and learning of all aspects of a culture including historical architecture, museums and cities, cultural landscapes and street views, martyrdom, traditions, photographs, newspapers, documents, court records, family documents, memoirs, hand-made products and objects. In other words, heritage education means the teaching of tangible cultural heritage. Although heritage education is associated to history education, it is not required for history and in fact whole history is a heritage. However we can find most of the heritage related research in history and social studies education. The aim of this study is to evaluate Turkish elementary science education with regard to heritage education. For this aim, a qualitative research design was adopted and the program and textbooks will be content analysed for the objectives, subjects, activities, and evaluation aspects. Moreover, teachers' and students' views on the issue will be gathered through interviews and observations. It is expected that this study will be useful for curriculum evaluators and other researchers on their efforts on the development of required concepts, skills and attitudes on heritage education.

Keywords: heritage education, elementary science education, Turkey



ATTITUDES OF PRE-SCHOOL TEACHERS TOWARDS USING INFORMATION AND COMMUNICATION TECHNOLOGIES

Ahmet Sami Konca, Hikmet Zelyurt, Erdoğan Özel

The aim of the study is to determine the attitudes of pre-school teachers towards using technological tools and to analyze it in terms of different variables. The research was conducted based on descriptive study model. Working group was consisted of 103 teachers working at kindergartens in city center of Kirsehir and Malatya in the fall semester of 2014-2015 academic years. A personal information form created by researchers and "The Scale of Attitudes towards Using Technological Tools in Preschool Education" developed by Kol (2012) were used to collect data. Frequency, percentage, mean and standard deviation were used in order to analyze the data T-test for independent samples and one-way variance analysis were used in order to determine the relationships between variables. As a result of the study, the teachers showed a very positive attitude towards using technological tools. It was found out that pre-school education graduate teachers showed a more positive attitudes towards using technological tools as comparing with the distance education graduate pre-school teachers.

Keywords: information and communication technologies, early childhood education



EXAMINATION OF LEVEL FOR RADON AWARENESS OF STUDENTS IN TERMS OF SOME VARIABLES: A SAMPLE OF NEVSEHIR

Mahmut Polat, Davut Sarıtaş

The aims of this study is to examine high school students' awareness' levels for radon gas in terms of school type, class level and gender variables. It has also been investigated whether this levels of awareness is in relationship with acquisition of the science curriculum. The sample of the study is composed of 554 randomly selected 9th and 12th grade students who are studying at three different schools (Anadolu High School, Science High School and Vocational High School) in Nevşehir center. Survey method was used and data were collected by questionnaire that designed by the authors within consideration the relating literature. Chi-square, independent t-test and Pearson's correlation technique was used to analyze the data. The 249 participants in the study (49.9%) stated that they heard from radon, but only 181 (32.7) stated that they know the radon. Awareness level for radon according to the type of school is the highest Science High School's score. Then align the Anadolu High School and Vocational High School scores. There was no significant difference in terms of gender. Awareness in terms of grade levels was statistically significant in favor of the twelfth grade. It was determined that outcomes in educational programs related to harmful substances for all school types. At the end of the study, recommendations were presented to increase the awareness of the harmful substances.

Keywords: radon awareness, science outcomes, high school, Nevşehir



A METHOD SUGGESTION FOR INVESTIGATION OF VISUALS IN CHEMISTRY TEXTBOOKS: SEMIOTIC APPROACHES

Davut Sarıtaş, Mahmut Polat, Yüksel Tufan

Textbooks are one of the indispensable tools of the teaching process. Content knowledge is presented in the form of linguistic and extralinguistic representation in textbooks. Particularly visual elements; such symbols, formulas, drawings, models etc. are extralinguistic representations in chemistry textbooks. From a perspective, textbook is used as a communication tool in achieving knowledge to learner with a didactic process. Communication is possible only with the signs. Sign defined as "something that stands for something, to someone in some capacity". In this respect, visual elements, that corresponding to the extralinguistic representations that stands for chemical knowledge in chemistry textbooks, has also signs. Semiotics is also generally be defined as a discipline that examines signs. For an effective representation of chemical knowledge the signs must be appropriate to the knowledge that aimed to teach. To determine the level of appropriateness between the chemical knowledge and signs are possible with semiotic approach on extralinguistic and linguistic signs. In this context aimed this study to introduce an alternative method, which may be investigate whether the visuals represents the scientific knowledge in the textbook. 12th grade chemistry textbook was used in study. These problems are determined by considering semiotics of literature to investigate the book; 1.What kinds of signs contain the visuals from the book? 2.Which types of signs are used more frequently in the book? 3. Can this signs representing the chemical knowledge relay as well the semantic message? The study was conducted on the basis of above problems and some basic theoretical framework structures semiotics (e.g. Pierce's semiotic triad and sign taxonomy, Morris 'dimensioning etc.) Semiotic is used widely in linguistics, advertising and communication. The authors foresee semiotics can be used in different aspects of science education (e.g. concept teaching, scientific language and so on.)

Keywords: semiotics, investigation of textbooks, visual elements, chemical signs, chemical knowledge

THE STUDY OF TURKISH ADAPTATION STEM CAREER INTEREST SURVEY

Kadir Bilen, Ayşegül Ergün, Zehra Irkiçatal

As a result of increasing importance of international dimension in the economic development of the profession, science, technology, engineering and mathematics (STEM) draw the attention of the profession.. Determining secondary school's interest in STEM fields is important developing countries. The purpose of this research is to adapt STEM questionnaire which was developed by Kier, Blanchard, Osborne and Alberta (2013). The questionnaire consists of 44 items including 4 dimensions. Each dimension has 11 items. . In the process of adapting the questionnaire, product pearson correlation coefficients and associated t-test analysis were used to provide the linguistic equivalence. Linguistic equivalence was provided in a secondary school in the city of Denizli, Turkey. A total of 105 fifth grade, 106 sixth grade, 94 seventh grade and 141 eighth grade for a total of 446 (243 female, 203 male) were participated to the study. As a result of exploratory and confirmatory factor analyses, 44 items have been remained under four sub-factors. Cronbach's alpha coefficient of the reliability analysis was found to be .92. Cronbach's alpha coefficients for each subscale were found to be Science Occupations .78, Occupations Technology .82, for Occupations Mathematics .87, Engineering Occupations respectively. Results also showed that all the four sub-dimensions are found to be quite sufficient to assess students' interest in the STEM. It is believed that the questionnaire would be useful to teachers and educators for determining students' interest in the STEM fields.

Keywords: STEM professions, interests, secondary school students', scale, factor analysis



ELEMENTARY SCIENCE TEACHER EDUCATION STUDENTS' VIEWS ON A PLAY ACTIVITY

Zehra Molu, Ela Ayşe Köksal

General Chemistry is a course taken in both semesters in elementary science teacher education programs. The subjects of the course are given in the inductive manner (the structure of matter and the periodic table, chemical bonding, intermolecular forces, properties of liquids and solids, chemicals). The concept of elements (elements, symbols and classification of elements) takes place in elementary 7th-8th grade science and secondary 9th grade chemistry curricula. In a study at the high school level on the teaching of these subjects, students although thought that the subject is not hard failed to respond correctly to questions of an achievement test and attributed the cause to the difficulty of the questions. That study also showed that the course is taught traditionally, is not enjoyable and some of the information is memorized. In order to make chemistry more enjoyable and learning products more permanent for students, the role of play activities is an undeniable fact. Because studies have shown that play-based instruction increases student's academic success. The purpose of this research is to determine the views of elementary science teacher education students' about a play activity (where skipping rope and ball) used in the teaching of periodic table subject of general chemistry course. The research was conducted on the fall semester of 2014-15 academic year with the freshman students attending to the elementary science teacher education department at Nigde University. The study is a qualitative case study and data were obtained by the examination of the documents gathered from the students after the activity. According to the findings obtained from the evaluation forms by using the content analysis method, students found the activity fun, instructive, and developing mind and body, and reported that the activity provided permanent learning.

Keywords: play, general chemistry, elements, periodic table, elementary science teacher education

ANALYZING THE PROBLEM POSING SITUATIONS RELATED TO THE INTEGERS IN THE 6TH AND 7TH GRADE MATHEMATICS TEXTBOOKS

Pinar Çölkesen, Tuğba Horzum

Textbooks have a strategic location at all levels of education because of undertaking a bridge task between students and teachers. Textbooks need to be examined in order to be a better guide to the teachers and to improve students' thinking skills. On the other hand it is believed that the structure of the problem statement used has a great importance for an effective mathematics teaching. Hence, in this study it is aimed to investigate the posed problem statements related to integers subject which is one of the main subject in the middle school mathematics. For this purpose, mathematics textbooks and student workbooks thought at the 6th and 7th grade and offered by Ministry of National Education (MoNE) in the electronic media at the 2014-2015 academic year were analyzed using content analysis. The present study, which is an ongoing research, the results will be discussed in relation to literature and various suggestions will be made

Keywords: textbooks, problem posing, integers



DEPENDENCE OF THE SUCCESS OF SOLVING MATHEMATICAL PROBLEM ON THE CONTEXT IN WHICH IT IS GIVEN

Slađana Dimitrijević, Snežana Lawrence, Branislav Popović, Marija Stanić

We will present results of one empirical research conducted on population of high school students. We examine how varied success of solving the same mathematical problem given in three different ways: • by typical mathematical text (using appropriate mathematical terms and symbols); • by typical mathematical picture equipped with appropriate mathematical terms; • placed in some realistic environment, where the text is accompanied by appropriate image. Also, we examine on which way students perceive difficultness of imposed problems as well as students' attitudes towards mathematics in general.

Keywords: context problems, realistic approach, mechanistic approach



ACCELERATING CHILDREN REASONING IN PRIMARY SCIENCE USING INDIGENOUS KNOWLEDGE SYSTEM BASED ARGUMENTATION INSTRUCTION.

Zipporah Pewat Duguryil, Henry David Katniyon

The paper investigates the effect of Indigenous Knowledge systems based Argumentation instruction on primary four pupils reasoning in Primary science. The population for the study was made up of all primary four pupils in Mangu area education zone of Plateau State. A sample of 335 pupils comprising of 122 girls and 213 boys was selected for the study. The design was a quasi – experimental design. The research was done using the two groups the experimental and control groups. The control group was taught using lecture demonstration method while the experimental using Indigenous Knowledge systems based Argumentation instruction. Three instrument (Children reasoning skills scale, argumentation worksheet and pupils science achievement scale) were used for to gather data. Mean, t – test and ANCOVA statistics was used to analyse the data. The analysis of data revealed that Argumentation - based instruction was

effective in accelerating primary four pupils reasoning in science. It was recommended that Argumentation - based instruction should be used by primary science teachers to teach their pupils.

Keywords: reasoning primary science argumentation instruction indigenous knowledge systems



AN ASSESSMENT OF PRE – SERVICE SCIENCE TEACHERS ATTITUDE TOWARDS THE TEACHING PROFESSION

Zipporah Pewat Duguryil, Henry David Katniyon

The study assessed the attitude of pre – service teachers towards the teaching profession in North central Nigeria. The population was made up of all students in teacher training institution in north central Nigeria. 4000 pre - service teachers constituted the sample for the study. The design was a survey design. The Pre - service Teachers attitude scale PTAS was the instrument used. Data was analysed using simple percentage and t- test. It was found that pre – service teachers have negative towards teaching as a profession. It was recommended that children should be won for the teaching profession from secondary school level through campaigns and awareness programmes.

Keywords: pre-service science teachers attitude teaching profession



PARADIGMS OF TERTIARY PHYSICS, CHEMISTRY AND BIOLOGY STUDENTS AND PRESERVICE SCIENCE TEACHERS ABOUT THE PHENOMENON OF SCIENCE

Evrin Ocal, Suleyman Nihat Sad, Huseyin Kahraman

Together with many recent innovations in science and technology, we have witnessed some paradigmatic changes in science, which enables us to understand the world. The positivist paradigm of science, which was adopted as the sole research approach in the Age of Enlightenment, based on an understanding grounded in reason and observation in the search of a fixed reality, was alternated by the interpretivist paradigm, which advocated that no single truth exists, reality is interpreted and constructed rather than discovered (Glesne, 2013; Yıldırım & Şimşek, 2011). The nature of science is used to refer to “the epistemology of science, science as a way of knowing, or the values and beliefs inherent to the development of scientific knowledge” (Abd-el-Khalick, Bell & Lederman, 1998). That is, nature of science means what people understand from the word science. With this paradigmatic shift it has become an issue to answer such questions as What is science or scientific knowledge? How does one achieve scientific knowledge?, which enables us to inquiry the nature of science and understand its significance. Therefore, it was found worth investigating the paradigms of university students attending to physics, chemistry and biology departments at the faculty of science and letters, where an intensive education about basic science is offered, and preservice science teachers attending to the faculty of education, who are provided with an educational content covering all three disciplines together. The main purpose of this study is to investigate the paradigms of the senior students attending to physics, chemistry and biology departments at the faculty of science and letters and senior students at attending to the science teaching department. Thus the study was designed as a qualitative phenomenology. In phenomenology studies define what it means for individuals of their lived experiences regarding to a concept or phenomenon (Creswell, 2007). The participants of the study were 125 senior students selected according to criterion sampling approach from

Science Teaching department (n=72) of Faculty of Education at İnönü University, and Physics (n=5), Chemistry (n=26), and Biology (n=22) departments of Faculty of Science and Letters at İnönü University during 2014-2015 academic year. In phenomenology studies a sample of participants who are experienced with the phenomenon and can share their experiences with the researcher with ease can be accessed (Creswell, 2007). In the present study, the criterion was to have experiences with the phenomenon of science. Therefore, senior students at the departments of chemistry, physics, biology, and science teaching departments considering that they had already completed the basic science courses in their curriculum. Among the participants 93 were females and 31 were male, with one participant uninformed about his/her gender. The data about the paradigms of the participants about the phenomenon of science was collected with four open-ended questions: "1. How do you define the term science?", "2. What is scientific knowledge?", "3. What are the ways of achieving scientific knowledge?", "4. How do you define the characteristics of a scientist?". The answers were obtained in the written form. The obtained data have been entered into Nvivo10 qualitative analysis software program and currently being analysed. The findings will be presented and discussed after the analysis are completed.

Keywords: science, nature of science, scientific knowledge, science teaching



EXAMINATION ON THE PROCESSES OF INFORMATION CONSTRUCTION BY 7TH GRADE STUDENTS WITHIN A CONSTRUCTIVE LEARNING ENVIRONMENT

Recai Akkaya

The following topics have become the important fields of study recently: How students construct the information; which types of learning environments are influential; the issues to be paid attention within the framework of individual and group education. The construction of the information implies the abstraction of mathematical information, which leads us to such topics as abstraction in the field of mathematics education, the abstraction process and construction of information. This study includes constructivist learning applications that have been developed as a result of the researches carried out on how to acquire the information and have been one of the learning theories furthest influencing the mathematics education. The aim of this study is to design learning environments, suitable for Constructivism Approaches that influence students' mathematics education in terms of constructing significant mathematical information; to apply the designed education, to report it and to examine the quality of information construction within this process. To this aim, instruction of dependent and independent events concepts was carried out in the study. Case study was used as a qualitative research method. The main data resource of the research is the interview technique. Furthermore, observation technique and document analysis were applied. The study was carried out with two seventh students. In conformity with the principles of constructivist learning, the students were asked solve four sequential problems which are suitable for observing the actions in abstraction process and giving students the chance to use their previous experiences and knowledge as much as possible. According to data from study, activity which based on constructivist teaching to be effective in creating the concepts of dependent and independent event, the students using the structures already created, and reasoning correctly observed that the intended structure can construct. Meaningful contexts where students and former students also used the event information can be said to increase the motivation of action passing.


Keywords: constructivist learning, , process of abstraction,

STEM EDUCATION (SCIENCE-TECHNOLOGY-ENGINEERING-MATHEMATICS) IN K-8 CURRICULUMS IN TURKEY: A CONTENT ANALYSIS

Adem Taşdemir, Neşe Tertemiz, Dilber Acar

Rather than on a particular discipline specialization in education, the increasing trend in education is the interdisciplinary and multidisciplinary education. This approach could be combined with two or more disciplines or subjects and merged the subject. Interdisciplinary approach is targeted to taken as a whole of the same themes, issues, problems and so on of different disciplines, to reach the top-level cognitive skills, and to construct knowledge of student. Furthermore, how to transfer of information from school to real life is a major problem in education. This can only be establishing the relationship between the knowledge in different courses in school. Mathematics and science that are encountered during lifetime are two main disciplines to increase our quality of life. Science and mathematics are thinking tool and the people's common language. Furthermore, the international assessments studies such as TIMSS-R and PISA are examined importance given to education of countries. Also in these studies, the science and mathematics scores of countries are compared and students' achievements are analyzed. Seen from this aspect, science and mathematics is an important location. The acquisition of skills by students in these disciplines at an early age and the use of these skills with technology in solving problems in their daily are important. In this study, it is aimed to examine with direction of STEM education the science and mathematics curriculum in Turkey. In this sense, the interaction of Science-Technology-Engineering-Mathematics will be examined with the interdisciplinary approach in the curriculum. In this study, phenomenology that is a qualitative study will be used. The data will be obtained based on document analysis. The frequency analysis that is one of content analysis techniques will be used to analyze qualitative data. The results and recommendations will be created according to the findings.

Keywords: STEM education, k-8 curriculum, content analysis.



THE EFFECTS OF STUDENTS ATTENDANCE IN THE SUCCESS OF UNDERGRADUATE MATHEMATICAL COURSES-THE CASE OF THE SEE-UNIVERSITY

Halil Snopçe, Sadri Alija

This study investigates the influence of student's attendance in mathematics lectures and their final examination success. There are two basic objectives in this study: a) to identify the most common reasons of student's attendance/absence in mathematics lectures; and b) to identify the effect of the student's attendance in mathematical courses on their general results. The population of the study consists of the second year students of two different faculties of the SEE-University, students from the faculty of Business Economics and the faculty of Contemporary Sciences and Technologies. A survey is realized during the academic year 2014/15. This paper provides results of a survey completed at the beginning of the summer semester and results of the final success in Mathematics. The results of this survey show that besides the most common reasons of their absence during the lectures/practical hours, as are their family engagements and other part time engagements, there are also some other reasons which are influenced by other different factors. The survey shows that the nature of these other reasons can be classified in different groups such are: the timetable of the lecture/practical hour is not suitable for them; the boring courses; the lecturer is boring; the subject is difficult and they can not understand, so, there is no reason to take part in it; the lack of motivation; and also as e reason is mentioned that they simply dislike the subject. Using the method of logistic regression, we have indicated that student's attendance has a statistically significant impact on their final success in Mathematical courses. These findings suggest that enhancement of student participation, is a crucial aspect of administration which improves their

performance. At the same time, the lecturer should also create a good learning environment, to motivate students and enlarge their interest to the course.

Keywords: mathematics lectures, attendance, absence, success, binary logistic regression



THE EVALUATION OF ATTITUDES OF DISTANCE EDUCATION OF DISTANCE EDUCATION UNDERGRADUATE COMPLETING STUDENTS

Ömer Kürşad Tüfekci, Nezihe Tüfekci

Distance education, is an educational model that people who emerged when it may interfere with getting the training such as sufficient resources and lack of learning of individual, they are home bound due to disability or illness, the existence of people who could not continue formal education, and educational needs of those who want to develop themselves. However, distance education system is realized without time and place restriction for student and instructor, course materials and intermediate interaction through communication technologies to ensure the integrity of the training. In this study, is intended evaluation of gender, grade level, computer experience, perceived computer skills and learning styles of attitudes towards distance education by Egirdir School of Tourism and Hospitality Management Hospitality Management complete distance education students. For data collection a questionnaire form was created obtained from Kolb (1984) Learning Style Questionnaire and the Attitudes towards Distance Education. In this study the findings was evaluated by testing t-test, ANOVA and regression analysis. Research results will be shared with the congress participants.

Keywords: distance learning, learning styles, attitudes towards distance education



VIEWS OF PROPECTIVE TEACHERS' ABOUT LEARNING AND TEACHING PROCESS AND EVALUATION OF CONCEPTUAL DEVELOPMENT

Zeynep Nalan Yilmaz, Ozge Aydin

It is important that prospective teachers have basic concepts that are located in the teaching and learning process from the time they begin teacher training and reflect these concepts to the learning environment. The aim of the research is to determine views of prospective teachers' about learning and teaching process and to evaluate conceptual development. For this purpose, aimed to equip participants with the basic concept in issues cognitive learning styles, multiple intelligences theory, classroom environment and management, creativity and enhance creativity, thinking process, constructivist theory and the teaching-learning process, cooperative learning, problem solving based learning, active learning in the course of "Effective Learning and Teaching Processes". For the purposes of the study, the following research questions have been identified: 1. What are the views of prospective teachers' about learning and teaching process? 2. How is prospective teachers' conceptual development about learning and teaching process? In this research, qualitative research methods were used to collect data and analyze the results. The participants of the study were 21 elementary science-technology and classroom prospective teachers who attended the course. Written interview form was used to collect data and preparation of this form was benefited from researcher's experience. In this form which was considered concepts included course content, questions aimed at uncovering the conceptual development process. Before and after the course prospective teachers fill in the forms as written to reveal their conceptual development in this process. In

order to analyze the data descriptive situation analysis techniques was used. The first step of data analyses written interview forms which filled by prospective teachers read, separated in significant parts and code list was formed. In the light of code list, it was identified themes explaining the data in general and obtaining the codes under specific categories. Data is described, made tabs and interpreted systematically according to the codes and themes. Interpretation of the data prospective teacher's answers evaluated separately before and after the course to reveal their conceptual development. The analysis of the data is continuing. Results and conclusions will be given later.

Keywords: prospective teachers, teaching and learning process, conceptual development.



FORMAL LOGIC AND REAL THINKING: THE ROLE OF IMAGINATION IN THE PROCESS OF ABSTRACTION IN TEACHER-STUDENT RELATIONSHIP IN SCIENCE EDUCATION

Luis Mauricio Rodríguez-Salazar, Carmen Patricia Rosas-Colín, Joel Angel Bravo Anduaga, Gabriel Delgado-Toral

In Kantian epistemology, the space between general logic, as psychological process in the subject, and transcendental logic in epistemic subject is the space between the intuitions and categories, where the judgments play a key role. Kant's proposal is that this process is carried out by imagination schemata and reason, which Piaget submitted these to experimental control a century and a half later. In the framework of his psicogenetic theory, Piaget addresses the problem as the space between the logical-mathematical structures of the subject and the structures of logic and mathematics as sciences. This problem has been addressed emphasizing sociocultural transmission of logic and mathematics structures per se, without paying sufficient attention to the structures of the real thought of the student. Another way to address the problem in the theoretical framework of previous ideas of the student, not as a different way they have to structure reality, no matter the gender of both, teachers and learners. So, in this paper, the process of sociocultural transmission is addressed as a problem on the teacher's process of abstraction as different of learner's process. What is sought is that learners could arrive to knowledge, not only in formal sciences, but also in natural and social sciences. Then, we take Kant's proposal on the imagination and Piaget proposal of symbolic thought, coupled with the proposal of Homo symbolicus of both Ernst Cassirer and Terrence Deacon: respectively, a philosophical anthropology and anthropological biology. These proposals are synthesized by the epistemology of imagination for developing a proposal by the process of abstraction in teacher-student relationship in science teaching.

Keywords: imagination, formal logic, real thinking, science education



SOME ACTIVITIES ON STEM EDUCATION IN PRIMARY EDUCATION IN TURKEY

Adem Taşdemir, Dilber Acar

Within the education system, it is aimed to graduate students with some skills. Two of the disciplines that acquire these skills to students are science and mathematics. Mathematics and science that are encountered during lifetime are two main disciplines to increase our quality of life. Science and mathematics are thinking tool and the people's common language. Therefore, the necessity of science and mathematics teaching and learning is undeniable in our education system. In particular, technology consists with becoming a product to facilitate human life of these disciplines. However, application

mistakes in some stage of our learning lives have led us to develop negative attitudes towards mathematics and science. In this study, it is aimed to show how to design the some activities with these two disciplines (Math and Science which are the core disciplines of STEM) for students from primary school, and to examine the effects these activities on students' attitude. In this content, some STEM activities which are developed according to the formal operations period by researchers will be put to work with primary students. The study is a qualitative case study. The attitudes of students will be examined throughout activities. The study groups will be formed via homogeneous sampling that is a purposeful sampling method. Data will be collected with semi-structured interview form and observation records in the data collection process. Besides, the strategies on students manuscripts will be examined within the scope document analysis. The evaluative analysis that is one of content analysis techniques will be used to analyze qualitative data. The results and recommendations will be created according to the findings.

Keywords: STEM activities, attitude, primary education




INVESTIGATING THE RELATIONSHIP BETWEEN FOURTH GRADE STUDENTS' SCIENCE EXAM SCORES AND THEIR ACHIEVEMENT IN SCIENCE COURSE

Kadir Bilen, Ayşegül Ergün

In this study, it was aimed to investigate the relationship between fourth grade students' scores in a central science exam which was conducted in fall 2015 in Turkey and their achievement in science course. For this aim, as science achievement, students' scores that were obtained from an open-ended exam, while science exam scores were taken from science test in the exam of the transition to secondary education (named TEOG). While written examination scores and participation to the activities were taken as independent variables, science score in the national exam was considered as dependent variable. The study was conducted in 2014-2015 academic year and a total of 177 fourth grade students who were taught in the city of Denizli, Turkey. The relationship between dependent and independent variables were examined through multiple regression analysis. The findings revealed that there is statistically significant relationship between independent and dependent variables. Moreover, the results showed that independent variables are used to predicate the students' science exam scores.

Keywords: fourth grade students', science course, high school entrance, secondary education



MAPPING THOUGHT PROCESSES WITHIN ARGUMENTATIVE KNOWLEDGE CONSTRUCTION TO STRATEGIZE BETTER FACILITATION IN AN ASYNCHRONOUS ONLINE COURSE

Draga Vidakovic, Nermin Bayazit, Pier Junor Clarke

This paper is part of a larger study whose goal is to study secondary mathematics teachers' learning of some basic geometric concepts in an asynchronous online learning environment. In particular, in this talk we will focus on a case study of a graduate student, Kevin, who predominately used pseudo-thought processes as Vinner (1997) described when communicating via discussion board with his classmates and instructors about geometric concepts. We use Weinberger and Fischer's (2006) multi-dimensional approach to analyze his engagement on the discussion board and identify his argumentative knowledge construction process. Using the results of this study, we develop strategies to better facilitate students'

communication on the discussion board. The ultimate goal is to support and improve students' knowledge construction more effectively in an asynchronous online learning environment.

Keywords: secondary mathematics teachers' geometry learning, asynchronous learning, pseudo-thought processes




EXAMINING THE OPINIONS OF MATHEMATICS TEACHER CANDIDATES REGARDING THE MATERIALS DEVELOPED IN INSTRUCTIONAL TECHNOLOGIES AND MATERIAL DEVELOPMENT COURSE

Deniz Sevcan Ökşen, Ayten Pınar Bal

The aim of this study is to examine the opinions mathematics teacher candidates regarding the materials developed in Instructional Technologies and Material Development Course that is given as a part of Pedagogical Formation Certificate Training Programme. 13 teacher candidates that continue Pedagogical Formation Certificate Training Programme of Çukurova University Faculty of Education, formed the study group of research. Semi structured interview form and observation form that were prepared by researchers, were used as a data collection tools. In analysis of data, content analysis method was used. According to the result of analysis, in terms of students, teacher candidates expressed that the materials developed in instructional technologies and material development course are beneficial and important materials that provide permanent learning, they are visually remarkable and avocationally they help to save time during lesson. Also teacher candidates emphasized that in material preparing period they mostly gave importance in being beneficial to students, being cost-efficient, being multi-purpose and being suitable to acquisitions. On the other hand, it was found out that teacher candidates had problems in choosing subject, deciding suitable material and delivering them on time.

Keywords: instructional technologies and material development course, mathematics teacher candidates, pedagogical formation certificate training programme, preparing material



7TH AND 8TH GRADE STUDENTS' PERCEPTIONS OF ALGEBRAIC EXPRESSIONS AND EQUATIONS

Fatma Sümeyye Apan, Tuğba Horzum

The way to succeed in mathematics passes from knowing the algebra (Chapin, O'Connor, & Anderson, 2003). However, algebra is one of the areas that the students are having difficulty because of its abstract nature. Because algebraic expressions and equations are the fundamental concepts of algebra, It is believed that the students' perceptions about these two concepts may affect students' success. Therefore, this study aimed to investigate the secondary school students' perceptions about the algebraic expressions and equations. The participants of the study consist of 7th and 8th grade 73 middle school students who were in the Southeastern Anatolia region at the 2014-2015 academic year. Document analysis approach and interview technique were used as a data collection tool in the study which has a qualitative nature. In the documents given to the students, students were asked to give examples about algebraic expressions and equations and to express their reasons. After that, interviews were conducted with the students having statements that are not understandable. The present study, which is an ongoing research in which

we conduct content analysis, students' perceptions that occur will be discussed in relation to literature and various suggestions will be made.

Keywords: algebra, algebraic expressions, equations, middle school students, student understanding



ONLINE LEARNING: CAN VIDEO ENHANCE LEARNING?

Karim Hajhashemi, Neil Anderson, Cliff Jackson, Nerina Caltabiano

Higher education lecturers integrate different media into their courses. Internet-based educational video clips have gained prominence, as this media is perceived to promote deeper thought processes, communication and interaction among users, and make classroom content more diverse. This paper provides a literature overview of the increasing importance of online videos across all modes of instruction. It discusses a quantitative and qualitative research design that was used to assess on-line video pedagogy and perceptions of lecturers and student of video use.

Keywords: Online Learning, online videos



TO WHAT EXTEND IS TECHNOLOGY USED IN PRIMARY MATHEMATICS TEXTBOOKS?

Nazan Gündüz, Figen Bozkuş, Ülkü Ayvaz, Soner Durmuş

Technology, an integral part of every stage of human life, continues to develop rapidly with the increase of information. With the influence of education and training activities, it offers important opportunities in mathematics education. The importance of using technology have been increasing every day in problem solving, one of the important components of mathematics education; constructing relationship between concepts and operations, relating mathematics within itself and with other disciplines (Kimmmins & Bouldin, 1996). In this respect, computer algebra systems, dynamic geometry software and dynamic mathematics software can be seen as opportunities in order to enhance mathematics teaching and learning (Kağızmanlı, Tatar & Sezgin, 2013). The use of technology in mathematics is considered significant in increasing student achievement as well as developing positive attitude and interest for mathematics, reducing anxiety and fear towards mathematics and developing critical and analytic thinking skills (Alakoç, 2003). Textbooks are one of the important sources fundamental for teaching of any subject matter. Especially, they are important learning tools providing information for students and teachers on a regular basis (Öcal & Yiğittir, 2007). Textbooks reflect learning targets which are aimed in curricula and guide students in accordance with the objectives of curricula (Ünsal & Güneş, 2004). The purpose of this study is to investigate this function of textbooks and their connections with technology in mathematics education. In order to achieve this goal, two textbooks for each grade level among the books used in 5th, 6th, 7th and 8th grades in the academic year of 2014-2015 were selected. These eight textbooks were examined in the light of key words determined on the basis of learning areas and topics as to determine to what extent they take advantages of different technologies. In the process of document analysis, obtained data were analyzed descriptively. As a result, various suggestions were presented by revealing the level of the integration of topics in textbooks with different technologies.

Keywords: education technologies, textbooks, primary mathematics education

RELATIONSHIP BETWEEN LEARNING STYLES AND ATTITUDES TOWARD GEOMETRY OF CLASSROOM TEACHING STUDENTS

Hasan Aydemir, Smeyra Akkaya, Esra Macit, Uur zhan, Mustafa ınar

All students do not have the same learning style, and they all have their own different structure of learning and information processing (Usta, 2008, 34). Traditional classroom settings restrict students' thinking strategies and response options (Jensen, 2006.16). Learning is unique to individuals, and occurs in a plurality of factor-dependent manner. One of these factors is the learning styles (Ate and Altun, 2008). The impact of this learning style is also available for the learning of geometry topics. Students' attitudes toward the geometry may also be the impact of these learning styles. Hence negative attitudes may be avoided with determining how students' attitudes toward geometry are affected by learning styles of students. In the study, is intended to determine the relationship between attitudes and learning styles towards geometry of classroom teaching students in faculty of education of Inonu University. The sample of the study consists of 250 elementary school education students studying in 2014-2015 academic year. The survey method of quantitative research methods were used in the study. Data collection tool consists of the questions about the students' personal details, inventory of learning styles which developed by Kolb in 1985 and translated to Turkish by Akar and Akkoyunlu (1993) and consist of geometry attitude scale developed by Bindak (2004). The findings and the results of the survey will be given later in the proposal.

Keywords: classroom teaching students, learning styles, attitudes toward geometry



THE INFLUENCE OF SPECIALEDUCATION COURSE ON CHANGING MATHEMATICS AND TURKISH TEACHERS VIEW OF INCLUSIVE EDUCATION

Tuba Horzum, Kemal İzci

It is known that undergraduate education and inductive years of teaching have indicative influence on teachers' views for special need students and who should be responsible for the students' education. Besides, it is found that teacher education has impact on teachers for developing positive attitudes toward inclusive education. In this research, we examine the influence of "Special Education" course on middle school Mathematic and Turkish preservice teachers' views of inclusive education. For this purpose, at the beginning of 2014-2015 fall semester we applied the "Scale for View of Inclusive Education" as a pre-test. Then, during the fall semester, theoretical knowledge about special needs and their education have been taught to the preservice teachers. Later, the preservice teachers had conducted a small project that required them to observe a special need for two hours and write a research report. In addition, after the deliver of theoretical knowledge, a field trip to a school for children with mental disabilities was visited. At the end of the fall semester, we reapplied the scale as a post-test. Then, based on the pre and post test scores of the preservice teachers ten preservice teachers were selected for conducting an interview. Within the ten students, four of them were got higher scores from the scale while two of them got a medium and four of them got lower scores. 28 preservice Mathematic teachers and 28 preservice Turkish teachers involved within the current study, which qualitative and quantitative data sources conducted. Initial results showed that the preservice teachers improved their knowledge about inclusive education while their views of inclusive education remained vary. The results of the ongoing study will be discussed based in relation to literature on literature and based on the findings suggestions for researchers and teachers will be provided.

Keywords: inclusive education, special education, preservice teacher

THE RELATIONSHIP BETWEEN AFFORDANCES OF VIRTUAL MANIPULATIVES MATHEMATICS APPS AND YOUNG CHILDREN'S LEARNING PERFORMANCE AND EFFICIENCY

Patricia Moyer-Packenham, Emma Bullock, Christina Watts, Stephen Tucker, Jessica Shumway, Katie Anderson-Pence, Arla Westenskow, Jennifer Boyer-Thurgood, Hilal Gulkilik, Kerry Jordan

This presentation discusses changes in young children's learning performance and efficiency during clinical interviews in which each child interacted with a variety of virtual manipulative mathematics apps on iPads. Researchers interviewed over 100 children ages 3 to 8 using a protocol format with two pre-assessment apps, four learning apps, and two post-assessment apps. Data were gathered quantitatively and qualitatively, using wall and screen-capture videos, pre and post assessments of performance, and time-stamping to record efficiency. Following 30-40 minute interviews where children interacted individually with the mathematics apps, results showed that children in the Preschool group increased efficiency while maintaining performance, children in the Kindergarten group increased performance while maintaining efficiency, and children in the Grade 2 group increased their performance and efficiency in skip counting, but not in place value. Affordances of each of the different virtual manipulative mathematics apps were linked to changes in children's performance and efficiency. In some cases children did not access an affordance, children accessed an affordance and it supported performance and efficiency, or children accessed an affordance and it hindered performance and efficiency. Overall, children in different age groups responded in different ways to the apps and some apps had a greater influence on children's learning performance and efficiency than others.

Keywords: mathematics education; virtual manipulatives



GAINING INSECT AND PLANT COLLECTORSHIP SKILLS VIA NATURE EDUCATION TO THE SECONDARY SCHOOL STUDENTS

Ersin Karademir, Elif Karademir, Eren Can Aybek, Zeynep Akın Demircan

Classroom is an environment that only make possible to transfer the knowledge and reveal the cognitive skills. So, there is a need to support (e.g. In the forest, at the seaside or lakeside, or a game in a museum; drama or other creative art activities) activities to the classroom (Öztürk – Aynal, 2013). This project aims that take students to outside of the classroom and make them recognize life, nature and environment. Gain awareness on science education, increase the students' interest on science, provide rich science environment are among the main tasks of science and technology teachers. Activities outside the school, students' exploration the nature, their gain of social and concrete experiences are very important to provide these (Griffin, 2004; Tal, Bamberger and Morag, 2005). Activities and experiences of outside of school are run on open air, fit to the instructional objectives and respectful to the natural environment. These are student-centric activities. They can learn with doing and living. This study was carried out with 60 seventh and eighth grade student who come from low socio-economic and high academic achievement level. Students collected insect and plants in the insect and plant collection activity which a part of the project that supported by TÜBİTAK (The Scientific and Technological Research Council of Turkey) Nature Education program. This activity has been design according to the National Ministry of Education's Science Education seventh and eighth grade instructional program. Within this activity students classified insect and plants and turn it to a collection with accompany of expert instructors. At the end of the activity students' perceptions have been collected via semi-constructed interviews and activity evaluation forms. Acknowledgement: This study is derived from the project that was accepted by TUBITAK (The Scientific and Technological Research Council of Turkey) as number with 213B567 and named "Benim Fenim (My science).

Keywords: nature education, insect, plant, collectorship skills, outdoor education



EXAMINING THE PROOF SKILLS OF PRE-SERVICE ELEMENTARY MATHEMATICS TEACHERS RELATED TO THE BASIC MATHEMATICAL FACTS

Şahin Danişman, Emre Ev Çimen

Mathematics is not about determining what is true or what is useful, but about why it is true or why it is useful and convincing others about its truth or usefulness. The proof is an active process, since it requires organizing the formerly learned concepts and presenting them as logical discussions justifying or falsifying the statements. Despite the importance of proof in mathematics education, the students consider the proofs as official and mostly meaningless practice carried by teachers. However, the students question everything they learn since the initial years of education. That's why the teachers' approaches to the proof process are quite important. Hence, the teachers should try to help students have positive attitudes towards these processes. In this context, the present study aims to determine the competency levels of pre-service elementary mathematics teachers regarding the basic mathematical facts' proofs about numbers and fractions, which they will be using in their future careers. Case study design has been used for this aim and the data were collected from third- and fourth-grade students in elementary mathematics teaching through the use of structured interview forms. The interview form consists of nine basic mathematical facts mostly encountered in elementary level mathematics courses for pre-service teachers to prove. The findings indicate that the pre-service teachers have not thought about the proofs of such statements before and they are incompetent in proving the basic mathematics facts. When it is considered that the participants are third- and fourth-grade students, it is quite striking that they have not searched for the proofs of these facts and the proofs they provide were not appropriate for the mathematical terminology. On the basis of feedbacks from pre-service teachers, the present study has been seen to create awareness for pre-service teachers to search for the proofs of those facts.

Keywords: mathematics education, proof, numbers, fractions



WHAT CAN WE LEARN FROM 2011TIMSS' FINDINGS? CHALLENGES FOR GCC COUNTRIES

Hassan Tairab

In December, 2012 TIMSS published results of 2011 cycle. The participating Gulf Cooperation Council countries (GCC) (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and UAE) results were not that impressive as the average scores of all GCC countries were all below the international average of 500. Students of these countries were ranked among low achievers compared to high achieving students from countries such as Singapore, South Korea. The purpose of this research is therefore to present secondary analyses of the data collected from the participating Grade 8 science teachers and their students in the GCC countries and compare these data with the data collected from high achieving countries whose students produced the highest scores in the achievement test compared with the rest of other countries. The data analyzed was based on information collected by TIMSS's teacher questionnaire focusing on teacher quality as measured by teacher background variables of qualifications, participation in professional development activities, confidence in teaching science, and career satisfaction. These variables are directly related to curriculum implementation and deemed to be of high priority to both policy makers and student academic growth. This is particularly important given the recent call for teachers to be adaptive to teaching philosophies that

promote scientific inquiry in line with the needed the 21st century skills. The findings suggest that differences in teacher background variables exist and that teachers from GCC countries impacted their student achievement significantly less than those from high achieving countries even though there were greater percentages of students were taught by teachers whose background information related to qualifications, participation in professional development activities, confidence in teaching science, and career satisfaction are almost similar to those from Singapore and Korea. There were however, subtle differences in the percentages of students who were taught by teachers who attended professional development activities. Differences in achievement were explain in terms of quality of teacher related variables.

Keywords: GCC science education, science achievement, teachers' practices, teachers' quality, TIMSS



AN ANALYSIS OF 11TH GRADE STUDENTS' CONCEPTUAL KNOWLEDGE ON SOME SPECIAL NUMBERS AND NUMBER SETS IN MATHEMATICS

Emre Ev Cimen, Kürşat Yenilmez

The aim of this research is to determine 11th grade students' conceptual knowledge on some special numbers and special number sets in mathematics. With this motivation, students were asked to indicate the definition, meaning, example and use of prime, Fibonacci, triangular and square numbers as special number sets. For special numbers, students were asked to indicate the meaning, value and the use of "Pi", "e" and "i" numbers. We used case study design in this research. A research group of 88 students were selected from the 11th grade students of a public school located within the center of Eskisehir Province. The students' responses were analyzed by using descriptive statistical techniques. The responses were evaluated in four categories as correct, partially correct, wrong or empty. The distributions in each response category were determined based on the frequency values. As a result of the research, it was found that students have a better -if not good enough- conceptual knowledge of prime numbers than the other special number sets; and that they are quiet inadequate in giving examples and usage areas of special number sets. As for the special numbers, it was found that they have a better conceptual knowledge of "pi" number than "e" and "i" numbers; and that they have very limited knowledge of the values and the usage areas of the special numbers.

Keywords: mathematics education, special numbers, number sets.



DEVELOPMENT OF A LESSON PLAN FOR TEACHING RADICAL EXPRESSIONS THROUGH LESSON STUDY

Aytug Ozaltun Celik, Esra Bukova Güzel

Lesson study is a professional development model that Japanese teachers examine practices including planning, implementing, observing and discussing the lessons in collaborative and systematic manner (Lesson Study Research Group, 2013). In this study, the lesson study was carried out five steps consisting of researching and planning, implementing research lesson, reflecting and developing research lesson, implementing revision lesson and reflecting and developing revision lesson. The one of the important components of lesson study required a cyclical process is lesson plans which are essential for conducting effective lesson. Lesson plans usually contain lesson products, appropriate learning activities in a logical

order, assessment tasks and evaluation criteria of the lesson (Cameron, 2006 in McCutcheon, 1980). Teachers conduct their lesson in accordance with their lesson plan. If the lesson plan is prepared in a comprehensive way, it could prevent possible problems in teaching process and could help for students learning to be properly led. Teachers could carry out more effective lessons when they reflect all instances appeared in process of implementing any plan on next lesson plan by considering it. Lesson study is quite effective in the context of improving lesson plans because it contains for the lessons which conduct in an actual classroom to be evaluated from different teachers' perspectives. In this direction, the purpose of the study is to examine the two hour lesson plans prepared by the three teachers participated in a lesson study improved for teaching radical expressions. The teachers met twice in preparing the first lesson plan. They prepared a lesson plan for teaching radical expressions in the direction of preparing lesson plan guide. After the first draft, the lesson plan was implemented in the research lesson. In implementation one of the teachers conducted the lesson and the other two teachers observed the teaching-learning process by focusing the students. As a result of this, the lesson plan was edited and improved. In the reflecting and developing lesson plan, the teachers benefited from their observation and video records of the lesson. The developed plan was implemented in the revision lesson. Then, in the reflecting and developing process after the revision lesson, recent revisions on the plan were done and the final lesson plan for teaching radical expressions was revealed. The final plan in question included the purposes had wanted to gain, teaching tasks would be applied, questions would be asked to students, the points to need to consider and analysis students' thinking of radical expressions in two hour lesson. It is thought that the developing lesson plan through lesson study would be guide to mathematics teachers and pre-service teachers in teaching radical expressions.

Keywords: lesson study, lesson plan, radical expressions, mathematics teachers



PROGRESSIVE INCORPORATION PERSPECTIVE AND MATHEMATICAL KNOWLEDGE IN TEACHING: THE CASE OF PROSPECTIVE SECONDARY MATHEMATICS TEACHERS

Gulseren Karagoz Akar

This study investigated the relationship between prospective secondary mathematics teachers' perspectives on mathematics, mathematics learning and mathematics teaching and their mathematical knowledge for teaching in action. Data from two prospective teachers' practice-teaching, one in geometry and one in algebra, were analyzed with the teacher perspectives and the Knowledge Quartet frameworks. Results showed that prospective teachers who thought of mathematic, mathematics learning and mathematics teaching as dependent on the knower, corresponding with a progressive incorporation perspective, had demonstrated all the codes in the Knowledge Quartet Framework during their practice-teaching. These results suggest that, once prospective teachers are given opportunities to develop a progressive incorporation perspective on mathematics, mathematics learning, and mathematics teaching during methods and practice teaching courses, this might contribute to the developments in their mathematical knowledge for teaching in action, independent of the particular concept they teach. Suggestions for developing a progressive incorporation perspective during methods and practice teaching courses are made.

Keywords: teacher knowledge, Knowledge Quartet, teacher perspectives, prospective secondary mathematics teachers.



THE EFFECT OF BLENDED LEARNING METHOD ON PRESERVICE SCIENCE TEACHERS' SCIENCE TEACHING SELF-EFFICACY BELIEFS AND ATTITUDES TOWARDS TECHNOLOGY

Bekir Güler, Mehmet Şahin

The purpose of this study was to investigate the effects of blended learning method on pre-service science teachers' science teaching self-efficacy beliefs and attitudes towards technology. The study was conducted with 88 pre-service teachers at Science Education Department. The study was a quasi-experimental study with pre-post test and control group. Course materials and activities were prepared in similar property and presented according to the method used. Moodle, which is one of the open source course management systems used in blended learning, was used in the study. Firstly, the experimental group was informed about the Moodle, how they could use the system, what could they do and how would the course be conducted. In the control group, no different study was conducted in the context of the course. In the study, "Self-efficacy Belief Instrument in Science Teaching", which was developed by Riggs and Enochs (1990) and adapted to Turkish by Bıkmaz (2002), and "Scale for Attitudes Towards Technology", which was developed by Akbaba(2002) were used as data collection tools. The scales were applied as pre and post-test to pre-service teachers at the beginning and end of the semester. The quantitative data collected is analyzed using the IBM SPSS 21. The results will inform about the effects of using blended learning method conducted in undergraduate courses on preservice science teachers' science teaching self-efficacy beliefs and attitudes toward technology which they will be in contact in their professional life. Also this study may contribute to the literature about researching the effects of blended learning, has been used by a huge mass, in university level in our country.

Keywords: blended learning, science teaching self efficacy belief, attitude toward technology



THE PERCEPTION OF ENVIRONMENTAL KNOWLEDGE AND ENVIRONMENTAL PROBLEMS FROM PRIMARY TO HIGHER EDUCATION

Altay Firat, Aşkin Kiraz

In this study, the point of view of the students who are attending their education in primary first stage and second stage schools, middle schools and high schools in North Cyprus to the environmental facts and their case of recognizing environmental problems and awareness were tried to be specified according to their cognitive enhancement. The study was conducted in the case study design proper to qualitative research methods. The study group was formed from 100 students chosen twenty five each from one primary school, one secondary school, one high school and one university which were assumed to have higher success levels. The "Environmental Knowledge and Perception of Environmental Problems" interview form was prepared as structured by the researcher and it was filled by means of interviewing students in person. The data gained were analysed in the direction of qualitative research techniques by means of coding. Cognitive enhancements, academic point averages, education levels of the parents and jobs of the parents of students are the independent variables of the study. At the end of the study, it is found that the environmental awareness of students differ according to the independent variables, and some advice were given to the Textbook Commission of North Cyprus Ministry of National Education, academicians, teachers, non-governmental organisations and parents.

Keywords: primary school, secondary school, higher education, environmental awareness, environmental education



DIALOGIC DISCOURSE IN THE CLASSROOM

Yılmaz Sağlam, Sedat Kanadlı, Pınar Göksu, Vildan Karatepe, Emine Aynur Gizlenci

Classroom talk had been and is still a primary focus of concern for researchers. Once, teachers had been undertaking the classroom talk almost entirely. In those days, it was believed that the better, one takes notes, listens to his teacher silently, and duplicates the board, the greater, one appreciates what teacher says. Such a voiceless student had been therefore seen to be a good one. Even a recent study (TIMSS, 1999) indicated that math teachers had spoken significantly more words compared to their students (Hiebert, et al. 2003, pp. 109-110). The videotapes showed that the overall teacher-student talk ratio for Hong Kong was 16/1, Australia 9/1, the Czech Republic 9/1, and the United States was 8/1. In 1998, however, Sfard called public attention towards a novel approach entitled participation metaphor. This novel approach viewed the learner as an active participant rather than passive receiver. To this view, meaning primarily emerges from social plane through the interaction between people (Vygotsky, 1978). To Wertsch (1998, p. 66), such an interaction or dialogue could be possible if only dialogic discourse is practiced. He further alleged that in dialogic talk, one hears the voices of others, and understanding comprises one voice's response to another (ibid. 1991, p.73). In the present study, a total of 17 teachers volunteered and participated in a professional development program. The program involved theoretical and practical info about authoritative and dialogic talk. After the program had been completed, the teachers worked in pairs and designed lesson plans for their forthcoming classroom practices. Teachers' pre- and post-intervention practices were then videotaped. In this paper, which is supported by a grant from the Scientific and Technological Research Council of Turkey (Grant # 113K693), the alteration in one of the teachers' talk from authoritative to dialogic will be presented.

Keywords: teacher discourse, class discourse, dialogic talk



INVESTIGATION OF PRESERVICE TEACHERS' BRAIN WAVES IN THE PROCESS OF SOLVING NUMERICAL PATTERN PROBLEMS PRESENTED IN DIFFERENT PRESENTATION FORMS

Sefa DüNDAR, Hakan Yaman, Ülkü Ayvaz

The aim of this study to examine brain activities of preservice teacher electrophysiological in the process of solving numerical pattern problems presented in different presentation forms to contribute to the understanding of neural mechanisms of such types of problems. The participants of the study was determined by purposive sampling method. 13 of 74 primary teacher candidates educating at 2nd grade were determined as the participants according to 13 criteria. The study was conducted in the first semester of 2014-2015 academic years. A pattern test, created by the researchers in the light of the literature, was used as data collection tool. For each presentation form, there is one question as in the form of table, number series, verbal problem and figure, in the test. Apart from the test, neuroheadset tool, EEG data record software and SIMSS interface program developed through MATLAB program were used to determine brain activities of the participants while solving the test, record data of neuroheadset tool and analyze of recorded data, respectively. The pattern test was presented to the participants in the form of animation software (adobe flash supported) while the brain waves of the participants were being recorded. As a result of analyses of wave band, it appeared that differences were found in the brain activation structures of the participants in terms of delta, alpha, theta and gamma waves when the presentation forms of numerical pattern problems were different. It was also found that these were also differed in terms of different parts of the brain as frontal, occipital, parietal and temporal lobes when the presentation forms and wave bands were changed. In the light of these findings, it can be assessed that presenting numerical pattern problems in different ways leads to differentiation of different parts of

individuals' brains and wave bands. Therefore, the necessity of use of all presentation forms in the process of presenting pattern problems can be suggested.

Keywords: brain activity, numerical pattern, presentation forms, preservice teacher



THE POWER OF SELF-EFFICACY BELIEFS AIMED AT LEARNING AND PERFORMANCE TO PREDICT THEIR ENGAGEMENT IN MATH CLASS

Neşe Özkal, Cengiz Erdik

The objective of this study is to examine the power of self-efficacy beliefs of students aimed at learning and performance to predict their engagement in Math class. The study was carried out with the participation of 699 middle-school students in Alanya district of Antalya province. The study data were collected with the help of the "Efficient Participation Scale" and the "Scale for Self-Efficacy Aimed at Learning and Performance". The data were analyzed with spearman's rho correlation analysis and regression analysis. As a result of the analysis of the study data, it was determined that there was a moderately positive relationship between students' self-efficacy beliefs and behavioral and affective participation and a moderately negative relationship between their behavioral and affective disaffections, and the self-efficacy beliefs of students aimed at learning and performance predicted their efficient participation in Math class.

Keywords: self-efficacy, math, student engagement



EXAMINATION OF PROSPECTIVE PRE-SCHOOL TEACHERS' COGNITIVE STRUCTURES ABOUT CONCEPT OF CIRCLE, CIRCUMFERENCE, RING THROUGH WORD ASSOCIATION TEST

Feride Gök Çolak, Mehmet Nur Tuğluk

The purpose of this study is to examine the cognitive structures of the Prospective Preschool Teachers' ring, circle, circumference and to identify of the misconceptions about the geometric shapes. In this study Word Association Test (WAT) was used as the data collection tool. 120 prospective preschool teachers were administered WAT in fall semester of 2014-2015. Prospective Teachers were given three key concepts related to the concept of geometric shapes and they were asked to write down the associations they thought of in 30 second for each concept. Data obtained from key concepts and answer words were recorded in a frequency table. Concept maps that presented the cognitive structures of the prospective preschool teachers were figured with respect to the data in the frequency table. Breakpoint method was used to figure concept maps. Furthermore all parts, which were developed by breakpoint method, were also constructed based on Prospective Pre-school Teachers' all responses for each concept. Then, they were categorized and analyzed according to meaning and various features. The findings show that prospective preschool teacher' answers corralete the concepts with daily life experiences. Moreover, the findings reveal that prospective preschool teachers have misconceptions about these concepts and they have difficulty to mention the differances among the geometric concepts.

Keywords: misconception, word association test, ring, circle, prospective preschool teachers.

THE RELATIONSHIP BETWEEN INTERNET ADDICTION AND CYBER BULLYING AMONG THE PUBESCENT: SAMPLE OF KONYA

Nurten Sargin, Hacer Tor

Like adolescence, puberty, a comparatively short development period in human life poses some risks. During this period, pubescents display undesired behaviours; gain negative habits and adopt some risky conducts such as bullying. Internet addiction may also be considered as another risky behaviour like bullying. This study aimed to investigate the relationship between internet addiction and bullying among the pubescents. The sampling group consisted of 216 female and 184 male students, 400 in total, who were studying at two middle schools in Konya. The data gathering instruments were Personal Information Form, the Cyber Bullying Scale, developed and tested in terms of reliability and validity by Kinay and Tanrikulu (2011), and the Internet Addiction Test, developed by Young (1996) and adapted into Turkish by Bayraktar (2001). The study findings revealed that male pubescent participants adopted internet addiction and bullying behaviours more than their female peers. As for the relationship between internet addiction and cyber bullying, the correlation value was found .45 in a positive direction. In view of the findings of the study, recommendations were also offered.

Keywords: internet addiction, cyber bullying , pubescent



INVESTIGATION OF PRIMARY SCHOOL TEACHER CANDIDATES' PROBLEMS THEY POSE REGARDING ADDITION, SUBTRACTION, MULTIPLICATION AND DIVISION IN NATURAL NUMBERS

Ali Şenol, Sefa Dündar, Hasan Temel

The aim of this study is to investigate primary school teacher candidates' problems that they pose regarding addition, subtraction, multiplication and division in natural numbers. The participants of the study are 122 senior teacher candidates studying at a state university, faculty of education, department of primary school education in 2014-2015 academic year, spring semester. Descriptive method as a research method was used in this study. Problem posing test that was developed by the researchers was used as data collection tool for the study. The teacher candidates were asked to pose problems regarding addition, subtraction, multiplication and division in natural numbers and the problems that they posed were analyzed in details.

Keywords: primary school teacher candidates, operations in natural numbers, problem posing



PRESERVICE SCIENCE TEACHERS BELIEFS ABOUT ASTRONOMY CONCEPTS

Gülbin Özkan, Hakan Akçay

The purpose of this study was to investigate preservice science teachers conceptual understandings of astronomy concepts. Qualitative research methods were used. The sample consists of 118 preservice science teachers (40 freshman, 31 sophomore, 47 junior). The data for this study were collected with Astronomy Conceptual Questionnaire (ACQ) that includes 21 open-ended questionnaires, and measured various aspects of astronomy such as sun, planets, and moon. Moreover, semi-structured interviews were

carried out in order to examine further thoughts of the participants. The results indicate that preservice science teachers have several misconceptions about astronomy concepts. Each misconception is generally based on a common incorrect astronomy knowledge. The results also reveal that students have difficulties to express and interpret visuals of astronomy concepts.

Keywords: astronomy concepts, preservice science teachers, science education, misconceptions



A STUDY ON UNIVERSITY STUDENTS' FACEBOOK CONNECTION STRATEGIES AND LIFE SATISFACTION

Ahmet Oğuz Aktürk, Barış Emlek, İsmail Çelik

The purpose of this study is to investigate university students' Facebook connection strategies and life satisfaction. The study was conducted during the 2014-2015 academic year and 281 university students constituted its research group. Relational survey model, one of the survey models, was used in the study, which aimed at describing the current situation. "Facebook Connection Strategies Scale" was used to identify the students' Facebook connection strategies and "Life Satisfaction Scale" was used to determine their life satisfaction. The data obtained from the study indicated a positive and significant correlation between the students' life satisfaction and Facebook connection strategies (initiating, maintaining and information-seeking). Moreover, research findings also indicated that the students' Facebook connection strategies (initiating, maintaining and information-seeking) and life satisfaction varied significantly by the variables of the type of school they attended, computer ownership and duration of their Facebook use. The results also showed that the students' Facebook connection strategies differed significantly according to the variables of gender (in initiating, maintaining and information-seeking sub-dimensions), internet ownership (in initiating, maintaining and information-seeking sub-dimensions), accommodation places (in the initiating sub-dimension) and their hometown (in the information-seeking sub-dimension).

Keywords: facebook connection strategies, university students, life satisfactions



DEVELOPMENT OF A THREE-TIER DIAGNOSTIC TEST TO DETERMINE STUDENTS' UNDERSTANDING OF THE LIVING THINGS

Musa Dikmenli, Seda Cakmak, Emine Sule Ozcan

Concepts are structural units which underlie the knowledge in people's minds. Misconceptions are mindscapes that are developed by the students through several means as alternative to the scientifically accepted concepts and conflict with scientific knowledge. Misconceptions are one of the biggest obstacles for a meaningful learning. Misconceptions primarily need to be diagnosed and their sources should be determined in order to overcome misconceptions. A number of tools are used in this context. Three-tier diagnostic tests are one of these tools. The purpose of this study is to determine the understandings of the concepts about living things by the high school students. A three-tier test was developed in line with this purpose. This test was applied to 220 high school students in Konya. It was revealed as a result of the analysis of this test that the students had some misconceptions about living things. The results demonstrate that the students admitted most knowledge before structuring them in their minds. It is remarkable that the concepts are learned as patterns by the students and the reasons of these patterns

are not investigated. Teachers, education programs and lesson teaching techniques, textbooks and students are given great responsibility so as to overcome misconceptions.

Keywords: three-tier diagnostic test, misconceptions, living things



MIDDLE SCHOOL STUDENTS ' STUDY OF THE OPINIONS OF SMART BOARD USE OF PERMANENCE IN SCIENCE AND TECHNOLOGY

Osman Karpuzcu, Cumhuriyet Sancaktar Selamet

Towards the end of the last millennium, information technology is very rapid change and development have demonstrated. Even for those who want to follow developments in this fast-changing and has become virtually impossible to keep up. However, this rapid change for people who at the moment has become normal. Normal life in this technological developments affecting the education of this degree, and not become a part of the education system is unthinkable. The teacher is not only source of information in today\'s technology is an unavoidable fact. Therefore, the primary source is the books, schools and teachers in training functions will vary significantly. Technology changes and evolves, they need people\'s communication patterns, and lifestyles began to change. Therefore, schools had better bend to this change, education and learning environments should designed according to him. In our country, the education technology used in television, video, Cine-replace tools such as smart boards began to pick up. Smart boards, in our century have shown a great improvement in educational technology. This new concept becomes an effective solution in achieving the information began to pick up quickly. Some educational institutions that make up the halls or facilities, technological developments to follow, quick and practical training in order to ensure the possibility of learning environments by supporting education technology with smart Board is an important step in the sense that it pioneered. Is in the process of collecting data in this study, secondary school students are against the use of smart board lessons to identify their views and the results obtained according to the evaluations and recommendations intended to give.

Keywords: smart board, technology, reviews



INVESTIGATION OF QUALIFICATION MODELS FOR THE GRADUATES OF DEPARTMENT OF PRINTING TECHNOLOGIES TO BE A VOCATIONAL TEACHER

Mehmet Oğuz

Education has a great importance and role for the societies which can adapt to changes, continuously improve themselves and consist of happy individuals. Around the world and in Turkey, Typography and Printing sector is a dynamic key and important sector which maintains its own development and innovations depending on the developments in other sectors. Various machines, hardware, software and materials, which are the products of advanced technology and studies, are used in this sector. A qualified manpower trained in different fields is needed in order to use all these factors in an effective and accurate manner. For the supply of manpower trained in printing sector, printing vocational high schools and printing departments of several vocational high schools providing education at high school level are available in our country. Printing teachers who will work at these high schools in the future have to bear many qualifications. Technical teachers graduated from Printing Education department of Technical

Education Faculty are appointed for printing vocational high schools. Technical Education Faculties are closed with Council of Ministers decision No. 2009/15612. The Graduate School of Applied Sciences, Marmara University is opened in 2013 (with Council of Ministers decision No. 2013/4428). Printing Technologies Department is established within the Graduate School of Applied Sciences at the same year. The first students are enrolled in the department in 2014. It is considered as reasonable that students to be graduated from the Printing Technologies department should have some criteria such as initial teacher training and a master degree as qualifications to be appointed as teachers. However, no concrete study has been set forth yet by the Ministry of National Education regarding this issue. A literature survey is performed in this study in relation to the qualifications a vocational teacher has to have. Furthermore, 23 survey questions are prepared and then, these are applied to experienced academics and teachers who are working at the universities and vocational high schools training personnel for typography and printing sector. Percentage and frequency distributions of the obtained data will be presented and then, they will be evaluated by way of their arithmetic means.

Keywords: teacher qualifications, printing teacher, professional development, printing technologies.



DETERMINING VOCATIONAL AND TECHNICAL EDUCATIONAL PROBLEMS AND ANALYZING THE SOLUTION OFFERS

Mehmet Oğuz

Technical education has a huge importance in societies' reaching the developed level of prosperity. Vocational and technical education must be planned rationally according to the man power, economical activity and sectoral requirements of this country. Plannings and investments which are not done according to the needs of the country cause to waste of resources and disappointment. One of the most important issues that must be paid attention after planning is students' being guided to the occupations according to their abilities and achievements. It is an obligation that in this period in which the notion of lifelong learning is valid, formal and non-formal education that proceeds from pre-school to postdoctoral is determined appropriate for today's needs and continuity in education is ensured. Another important issue is the necessity of appropriateness of vocational teachers' abilities for our age. High investment finance of vocational and technical education is the other issue. In vocational and technical education there are lots of problems similar to the primary problems mentioned in this study. Different vocational education models and applications exist in the world. Success level of these also differs from others. In the solution of vocational and technical educational problems of our country, models and structures of other countries should also be considered. The aim of this research is to make suggestions to be able to perform vocational technical education according to today's needs and to be able to get successful results. In this study, the problems of vocational and technical education in our country are determined by considering the research and activities about this issue. In addition, while researching solution offers, the relevant workshops organized previously in our country is also examined.

Keywords: vocational technical education, current problems of vocational education, vocational educational workshop, professional development, high-quality workforce, finance of vocational education, school-industry cooperation



REVIVAL OF DEMONSTRATION EXPERIMENTS IN SCIENCE EDUCATION

Josef Trna, Eva Trnova

Experiments play an essential role in science research and also in science education. First experiments were part of science teaching/learning at universities, already at the beginning of the nineteenth century. The effectiveness of science education through practical student's activities was preferred and also doubted. Contemporary constructivist approach in science education promotes student's experimentation because of more shares of student's activity and inquiry. Not only student's experiments are important for teaching/learning science, but also teacher's demonstration experiments have got an important role as well. The goal of our design-based research (Reeves) is to answer the question: Does a demonstration experiment have a place in today's science teaching/learning? Our study presents examples of appropriate methods of implementation of demonstration experiments in science education which combined student's and teacher's activities. As the result of our design-based research we found several rules for the effective implementation of these demonstration experiments in teaching/learning science: emphasis on the objective of demonstration experiments, controlled observation of demonstration experiments, and development of students' thinking and creativity in demonstration experiment. It is very important for students to acquire experimental skills needed for their own meaningful experimentation under the guidance of teacher. These skills include the ability to observe consistently and accurately, to use the apparatus correctly, to measure, to create and to test hypotheses of observed phenomena, to analyze results of experiments and to draw conclusions. The appropriate implementation of these demonstration experiments in science education may help to better understand the nature of experiments and to increase required educational objectives. The revival of demonstration experiment as the results of our design-based research is necessary to implement in teacher pre-service and in-service education and school practice.

Keywords: constructivism, demonstration experiment, science education




TECHNOLOGY- BASED TEACHING AND LEARNING :A QUANTITATIVE ANALYSIS ON EFFECTIVENESS OF ICT INTEGRATION IN SCHOOLS

Simin Ghavifekr, Ahmad Zabidi Abd Razak

The rapid global technological advancement and development of ICT(Information, Communication, Technology) has placed teaching and learning processes into a more challenging profession, where teachers are required to integrate technology and replace the traditional tools and facilities with a technology-based teaching methods. This is because, ICT incorporation strengthen students' learning performance in terms of critical thinking, problem solving and practicing the lessons' main focus through surfing in online resources. In Malaysia, ICT has been included as one of the main elements in transform shift in the latest Malaysian Education Blueprint (PPPM) 2013-2025 as the national education future development focus. The Ministry of Education insight the importance of technology-based teaching and learning into the schools' national curriculum. The main focus of this paper is to identify the effectiveness of ICT integration for teachers and students in teaching and learning English language in public secondary schools. A survey questionnaire was distributed randomly to the total of 101 teachers from 10 public secondary schools in Kuala Lumpur, Malaysia for the further data analysis. The data for this quantitative research were analyzed for both descriptive and inferential analysis using SPSS (version 21) statistical software. The overall findings show that ICT integration has great effectiveness for both teachers and the students in teaching and learning English language. Results show that teachers should always be ready and well-equipped in terms of ICT competencies and positive attitude to provide technology-based learning opportunities for students to improve learning outcome. For the future study, there is a need to consider

other aspects of ICT integration specially from management point of view such as strategic planning and policy making . For the future study, there is a need to consider other aspects of ICT integration specially from management point of view such as strategic planning and policy making .

Keywords: ICT integration, teaching and learning, technology effectiveness, education, Malaysia.



THE RELATIONSHIP BETWEEN MIDDLE SCHOOL STUDENTS' ACHIEVEMENT IN THE SCIENCE AND TECHNOLOGY COURSE CENTRAL EXAM AND THEIR PERFORMANCE IN FORMATIVE ASSESSMENT PROBES

Nermin Bulunuz, Mızrap Bulunuz, Funda Karagöz, Ömer Faruk Tavşanlı

The science curriculum renewed by the Ministry of National Education in 2013 emphasizes, similar to the "formative assessment approach," the learning of students by enhancing their knowledge, searching, questioning, and posing arguments beyond doing experiments and discovering things. Previous research shows that the formative assessment method increases students' attention to lessons and improves their skills for understanding conceptually and for posing arguments by raising their motivation. The formative assessment process provides feedback in teaching, regulates learning, and aims to enhance student success in educational outcomes. The present study has two aims. Firstly, it aims to determine eighth grade students' conceptual understanding of floating and sinking through formative assessment probes. Secondly, it aims to determine whether or not there is a relationship between students' performance in formative assessment probes and their achievement in the central exam. After the first TEOG [The Transition from Primary Education to Secondary Education] exam was conducted, 4 two-stage formative probes were addressed to 66 eighth grade students from a central middle school in Eskişehir. In these two-stage probes, the first part contained choices related to probes, and the second part involved scientific explanation of relevant choices. The answers of the students to the two-stage probes were scored by use of a rubric. An average scores achieved by the students in the first part containing choices related to formative probes and the averages of success scores they achieved in the TEOG science and technology test were compared. Students' TEOG science and technology scores averaged 73.49; their average success score was 65.15 when only the test parts of the formative probes were taken into consideration; and it reduced to 44.55 when both the test and the explanation parts of these probes were taken into consideration. This finding indicates the poorness of students' explanation and interpretation skills in formative assessment probes. The relationship between the TEOG science and technology scores and the scores achieved in the formative assessment probes was analyzed based on Spearman's correlation coefficient and found to be ($r=.61, p<0,01$). This value points out that there is a moderately positive relationship between the scores. These research findings, suggest that students should be exposed to teaching practices based on "formative assessment" that promotes the development of students' skills of explaining, interpreting, and reasoning rather than multiple-choice tests in science lessons.

Keywords: formative assessment, science teaching, TEOG

THE EXAMINATION OF PRE-SERVICE MATHEMATICS TEACHERS' THOUGHTS ABOUT MATHEMATICS LEARNING ACTIVITIES AND THE ACTIVITIES THAT THEY DEVELOPED

Melike Yigit Koyunkaya, Berna Tatarođlu Taşdan, Işıkhan Uğurel

The importance of mathematics learning activities is pointed out in many academic research, learning model, standards and teaching programs that explains mathematics teaching and learning. Designing good tasks/activities and training qualified teachers who are able to implement these tasks/activities take place among the fundamental conditions to reach the goals in mathematics teaching. Naturally, one of the competency domains of a qualified teacher is having knowledge and skills related to activities. In other words, a qualified mathematics teacher should acquire enough knowledge and skills regarding activities. The purpose of this study is to examine pre-service mathematics teachers' thoughts about the activity and to examine the activities that they developed in line with their thoughts of the activity. Participants of this study were 31 fourth grade pre-service mathematics teachers enrolled in the Mathematics Education Program during the 2014-2015 school year. Pre-service teachers were divided into groups (11 groups). Data was collected via the pre-service teachers' written answers to the question "what is an activity?" and the activities that they developed by choosing an acquisition from mathematics curriculum (Ministry of National Education, 2013). The data was analyzed by using content analysis. Results of the analysis indicate that pre-service mathematics teachers defined an activity as "practice/activity work/process/material/technique/act/competence level" which is "related to the acquisitions that take place in mathematics curriculum", "enabling students' active participation", "matching with students' levels", "facilitating learning", "targeting to improve some skills for students", "connected with real life and other disciplines", "involving prior knowledge", "attracting student's attention", and "performing in or out of the classrooms". Additionally, it is found that pre-service mathematics teachers made a limited reference to the properties of the activity in the examples that are developed depending upon an acquisition from mathematics curriculum. Depending on the results of the study, it is concluded that it is required to notice the studies that are related to improving pre-service mathematics teachers' theoretical knowledge of activity, mathematics learning activities, and the properties and classification of activities throughout their undergraduate education and transferring their knowledge to the practice. Therefore, it is required to contribute pre-service mathematics teachers' professional development by adding courses related to activity based mathematics learning to their education programs. The studies that will be conducted considering this goal will be an important step on the way of educating qualified teachers.

Keywords: task, activity, mathematics learning activity, pre-service mathematics teacher



INQUIRE OF THE ELECTRICAL CIRCUIT

Gonca Harman, Aytekin Çökelez

Elektrik devresinin kurulması basit bir uygulama gibi düşünülse de alanyazında farklı eğitim kademelerindeki öğrencilerde kavram yanlışlarının saptandığı çalışmaların bulunması dikkat çekicidir. Bu çalışmada, öğrencilere doğrudan doğru bir elektrik devresi göstermek yerine hatalı devreleri, bu hataların nasıl giderilebileceğini, yeni fen bilimleri öğretim programında da vurgulanan rehberli araştırma-sorgulama yaklaşımı temelinde ifade etmeleri istenmiştir. Bu şekilde öğrencilerin kavram yanlışlarını tümevarımcı bir yaklaşımla saptama bağlamında elektrik devresinde lambanın yanma-yanmama durumunun nedenlerini sorgulamak amaçlanmıştır. Bu amaçla alanyazında konuyla ilgili kavram yanlışlarına ait modeller incelenerek ve uzman görüşleri alınarak hazırlanan 8 açık uçlu sorudan oluşan veri toplama aracı konu öğretilmeden önce 98 beşinci sınıf öğrencisine uygulanmıştır. Öğrencilerden hatalı devrelerde lambanın yanıp yanmayacağını gerekçeleriyle belirtmeleri istenmiştir. Betimsel araştırma yönteminin kullanıldığı

çalışmada alanyazındaki kavram yanlışlarına ait modeller doğrultusunda analizler yapılmıştır. Çalışma sonucunda öğrencilerin anahtarın devredeki şekline bakarak açık-kapalı olma durumunu karıştırdıkları, anahtar açıkken lambanın yanacağını, devre elemanlarının yerindeki değişikliğin lambanın yanmamasına neden olacağını düşündükleri tespit edilmiştir. Alanyazında “Lambayla güç kaynağının kutuplarından biri arasında tek bir bağlantı olması yeterlidir” ifadesi ile benzer nitelikte bazı öğrenciler lambayla pilin kutuplarından herhangi biri arasındaki tek bir bağlantının yeterli olacağını ifade ederken farklı olarak bazı öğrenciler de pilin enerji veren tarafının pozitif kutbu olduğunu ve lambanın yanması için sadece pilin pozitif kutbuyla yapılacak tek bir bağlantının yeterli olacağını belirtmiştir. Yoğun olarak tespit edilen önemli bir yanlış pillerin aynı kutuplarının yan yana geldiği durum için öğrencilerin büyük çoğunluğunun lambanın yanacağını ifade etmeleridir. Öğrencilerle pillerin aynı kutuplarının ve zıt kutuplarının yan yana olacağı iki ayrı devre kurularak somut bir şekilde lambanın hangi durumda yanacağı gösterilmelidir. Anahtarı açık olan devrede lambanın yanacağına yönelik düşüncenin de günlük yaşamda lambayı yakmak için “anahtarı aç”, lambayı söndürmek için de “anahtarı kapat” ifadesinden kaynaklanabileceği düşünüldüğünde günlük yaşam dilindeki bu ifadeye rağmen devrede lambanın yanması için anahtarın kapatılarak devrenin kapalı devre olmasının gerektiği somut örnekler üzerinde gösterilmelidir.

Keywords: science education, electrical circuit, inquire, model, misconceptions



COMPARE OF ELEMENTARY STUDENTS' IMAGES OF SCIENCE TEACHING FOR TURKISH, SCOTTISH, DUTCH, GERMAN SCIENCE CLASSROOMS

Hakan Türkmen, Elif Ünver

The purpose of this study is to investigate elementary students' image of science teaching by using a Draw-A-Science –Teacher-Test Checklist (DASTT-C). 128 elementary students from four different countries elementary school participated for this study. The results of study showed that Turkish elementary students' perspective of science teaching style is 30 % student-centered, 42 % teacher-centered, and 28 % between student-centered and teacher-centered. The results of study showed that Scottish elementary students' perspective of science teaching style is 40 % student-centered, 26 % teacher-centered, and 34 % between student-centered and teacher-centered. The results of study showed that Dutch elementary students' perspective of science teaching style is 19 % student-centered, 61 % teacher-centered, and 20 % between student-centered and teacher-centered. And also the results of study showed that German elementary students' perspective of science teaching style is 28 % student-centered, 35 % teacher-centered, and 37 % between student-centered and teacher-centered. The DASTT-C was further modified and included characteristic of science classrooms and science teachers, calling the instrument the Data-A-Science-Teacher Teaching Checklist (DASTT-C) BY Thomas and Pedersen in 1998 and modified again by Thomas, Pedersen, and Finson (2001). They expected to illuminate the knowledge and beliefs pre-service elementary teachers construct prior to coursework in elementary science teaching methods. The main concept of DASTT-C is a listing of teacher-centered and student-centered attributes of an elementary science teacher rather than a scientist (Yılmaz, Türkmen, Pedersen, Cavaş, 2007; Carnes, 2003; Carnes, Brown, Munn, & Schull, 2002; Pedersen & Thomas, 1999, Thomas & Pedersen, 1998a-1998b; Thomas, Pedersen & Finson, 2001). The purpose of this study is to investigate four different countries' elementary students' image of science teachers and of science teaching using DASTT-C.

Keywords: DASTT-C, science education



TEACHERS AND TEACHER CANDIDATES' THE OPINIONS AND AWARENESS LEVELS ABOUT PROJECT BASED LEARNING

Keziban Orbay, Murat Gökdere, Bilal Öncü

Education system processes with the traditional approach to education teacher's knowledge transferring, student's taking the information in the teacher-student-knowledge of revolution. Instead of this, there should be established an environment which solves the identified problems a variety of teaching methods and techniques, the case of realization in access to learning information the student's playing an active role, guiding teacher of this, which is associated with everyday life issues and problems. In this environment student should be able to use problem-solving skills, reveal the direction of research, be able to create the ability to make decisions and be able to contribute to the development of a number of outstanding ability. In recent years in our country studies in science and mathematics education, are concentrated on the impact of the learning of students of various learning approaches. Project-based learning approach is one of these approaches. The aim of this study is to investigate comparatively the perspectives of project-based training and the application level of primary school teachers and the teacher of candidates. The study was carried out under the specific case study. As data collection tool semi-structured interview form consisting of 15 questions was used and validity study was prepared by the researchers. The sample of the study consisted of 20 teacher candidates and 21 primary school teachers. The data obtained from this study were analyzed using NVIVO program. By using data obtained from the study, candidate teachers' and teachers' the levels of awareness and information on project-based learning and a significant relationship between them will be discussed.

Keywords: new approaches in education, project based learning, primary school teachers, teacher candidates



IMPACT OF ENCRYPTED MULTIPLE CHOICE EXAM ON STUDENT SUCCESS

Mehtap Köse Ulukök, Zehra Borataş Şensoy

Due to the rapid advancement of technology in daily life and take place in, the science of cryptography increasingly gained importance. Basically, the encryption algorithms used to encrypt the message or data. This work is motivated from ÖSYM (National University Entrance Exam of Turkey in 2011). The main aim of this study is to analyse the impact of encrypted multiple choice exam on student success in Computer I course which is offered to Faculty of Law at Cyprus International University. Therefore, the encrypted multiple choice exam is used in Computer I course final examination in two different semesters for more than 200 students. In each of these semesters, midterm examinations are done as regular multiple choice examination having two booklets. Encrypted multiple choice exam involves individual question sheets for each student having their own answer keys. For this, the original exam questions are differently ordered for each student. Thus, a separate answer key is created for each one. There is no assigned priority to any questions. In the implementation, the generated one-time pads (keys) are permutations of n numbers where n is number of questions. There is another group of students who attended regular multiple choice examinations in different semesters. This work aims to compare effect of encrypted multiple choice exam on different groups of students success, using descriptive and inferential statistics. Additionally, it is observed that the encrypted multiple choice exam demotivates students for cheating.

Keywords: encrypted multiple choice exam, multiple choice exam, student success

WHICH ONE IS BETTER; JIGSAW II VERSUS JIGSAW IV ON THE SUBJECT OF THE BUILDING BLOCKS OF MATTER AND ATOM

Hakan Türkmen, Didem Büyükalıtay

In the recent research the jigsaw techniques of cooperative learning has positive effects on learning science. The purpose of this study is to examine the effect of Jigsaw techniques and compare the effects of Jigsaw II and Jigsaw IV on learning the subject of “The Building Blocks of Matter and Atoms” taught in 6th grade. Therefore, the study has been applied to two 6th grades at Samiye Nuri Sevil secondary school in Manisa, Turgutlu during fall semester. These 6th grade students were selected randomly by cluster sampling method among 20 secondary schools. The experimental group consisted of 24 students and the control group consisted of 24 students. In this research, pre-test and post-test experiment design with control groups has been applied. The intervention took 2 weeks, including 6 lessons. The researcher applied Jigsaw IV technique (separating and combining techniques) to the experimental group and Jigsaw II technique to the control group. In order to gather data “Science Achievement Test” including 12 multiple choice questions was used in this research. Independent and paired groups “t” tests were used to analyze the data. As a result of the study it was found that Jigsaw II and Jigsaw IV techniques of cooperative learning approach had positive effects on student’s achievement scores on that subject. But when compared with each other, the results showed that there is no statistical difference between Jigsaw II and IV at achievement post-test ($P=0.259$).

Keywords: cooperative learning, jigsaw ii and iv technique,



AN EFFICIENT MICROCONTROLLER COURSE WITH AN AFFORDABLE AND EASY TO USE DEVELOPMENT SETUP

Mehmet Yükksekaya, Orhan Erdem Haberal

Microprocessors/Microcontrollers have been widely used in electronic products so they have been taught to electrical, computer and mechatronic engineering undergrads. Since medical electronics devices are also use microprocessors/microcontrollers, biomedical engineering undergrads should have knowledge and programming experience in microcontroller based systems. Due to this fact microprocessors/microcontrollers have been taught as a 5 hour/15 week lecture and laboratory course at the 5th semester in Baskent University Biomedical Engineering Program Ankara, Turkey. The main difficulties in microcontroller programming course for a multidisciplinary program such as biomedical engineering are insufficient allocation in the curriculum, shortage of lab space and budget constraints. Also the complexity of the development setups and spending too much time to understand the setup instead of experimenting it are problems for students and instructors. Students lose their attraction while spending time to effectively use of development tools. For this reason an efficient microcontroller course with its laboratory and a project work is developed which puts emphasis on learning the futures of microcontroller based system and applying many instrumentation designs. In order to increase the efficiency of the course a virtual system modelling and circuit simulation application and an affordable, easy to use and modular development board with a free compiler for 2K program code and a free programmer software are used and important improvements are applied. Throughout the paper the details about the lectures, laboratories and development tools and their improvements are described. The methodology for active learning and syllabus design and determination of learning objectives are discussed. The efficiency of the course is tested by overall grades of students. A remarkable success observed on the results.

Keywords: microcontroller education, instrumentation, biomedical engineering, high-level design tools, active learning methodology,

PRE-SERVICE SCIENCE TEACHERS' PERCEPTIONS ABOUT GREENHOUSE EFFECT

Behiye Akçay, Hakan Akçay

The aim of this study is to determine pre-service science teachers' conceptions about greenhouse effect. The participations of this study were 51 pre-service science teachers. Data were collected using The Green House Effect Questionnaire, and draw-and-explain task. The results indicated that pre-service science teachers' had some alternative conceptions about what greenhouse effect is as well as causes, consequences, and cures of the greenhouse effect. More than half of the participants were unable to explain the greenhouse effect as well as to draw it. Additionally, they had confusion about causes and the results of the greenhouse effects.

Keywords: greenhouse effect, science education, pre-service teachers



PROMOTING CRITICAL THINKING IN PHYSICS TEACHING THROUGH INTERACTIVE DIGITAL GAMES

Gökhan Serin

This paper focuses on the development of an interactive digital game and how to use it in enhancing critical thinking in physics teaching. The game was developed by using Unity 3D program. It is called as "green wave system in traffic". There are a car, four traffic signal poles, and a road in the game environment. Two traffic lights, red and green, were used. Each colored light turns the other in three seconds. The car stands two meters in front of the first traffic signal pole. The distance between each traffic signal pole is three meters. The aim of the user is to complete the road through driving the car without encountering red light. The user specifies velocity of the car for each time interval and then it moves according to this command. The game forces the user to think about some parameters such as distance between the car and the first traffic signal pole, time from red light to green light, and time the car starts moving. The aim of the game is to discover characteristics of uniform linear motion. The game actually presents an open-ended problem situation. For example, when the game is played two times with the same velocity values, different results can be obtained. In this case, the user should take into account the time the car starts moving and the color of the traffic light at that time. Each failure after playing the game triggers the user to think about the reason. Then, the user needs to apply kinematics equations to find a solution. The game can be used in teaching uniform circular motion or in practicing uniform circular motion after it is taught. In this scope, implications for physics teaching are discussed.

Keywords: physics education, uniform linear motion, digital game, unity 3D



HADOOP AND ITS COMPONENTS IN THE ANALYSIS OF THE BIG DATA

Hakan Çetin, Erokan Canbazoğlu

Today, with the traditional methods, it is quite difficult to process, analyze and manage the "big data" that is formed with data from multi sources. In the current time period, which lacks relational databases, and models, the size of the data forced the businesses to find several solutions in terms of reducing the increasing costs, and saving of time. In that sense, the development of distributed, and parallel-processing

technologies triggered the emergence of possibilities to benefit wisely from the "big data". In this work, while Hadoop, which is a distributed system software that enables the big data to be analyzed fast, scalable and accurately, and its components were investigated, components of 5V were also elaborated in order to understand the "big data".

Keywords: big data, hadoop, distributed systems, mapreduce



THE IMPACT OF LEARNING STYLE OF PHYSICS TEACHERS ON LEARNING PRACTICES

Aysegul Saglam Arslan, Engin Kangal

The aim of this study is to determine the effect of physics teachers who have different learning styles, on teaching practice and to reveal the effect of these teaching practice on students' academic achievement. The study sample is consisted from 110 students who have been carrying out their education 4 physics teachers who have been conducted physics lesson at secondary schools in the province of Sivas. Kolb's Learning Style Inventory and Lesson Observation Teachers who have identified their learning styles are observed three of them throughout 10 hours and one of them throughout 5 hours. Following the end of the observation, students learning styles are determined by using Kolb Learning Inventory. The points of frequency used of each teaching practices is determined for obtaining of observation data's analysis. The frequency used of teaching activities is determined, by assuming if the points of frequency used of teaching activities are 2 or above 2, these teaching activities are applied at sufficient level. The results of learning style inventory of students and teachers are analyzed with the help of SPSS 21.0 package program. Chi-square Test is used in order to determine between ranges of student groups of learning styles that is belonging each teachers that there is a significant differences whether or not. Kruskal Wallis Test is used to determine between ranges of students' groups exam points of each teacher that they have different learning style that there is a significant difference whether or not. As a result of study, researcher determine teachers that have different learning styles use similar learning practices and also their learning practices are not affected their learning activities. In addition to those results, exam points of students groups that have different learning style are not affected their learning styles.

Keywords: learning style, physic education, teaching activities



COMPUTER AND EDUCATION INSTRUCTION TECHNOLOGY OPINIONS OF THE PROSPECTIVE TEACHERS ABOUT INNOVATION IN EDUCATION

Yakup Yilmaz

The aim of this research is to determine prospective teachers studying at Ereğli Education Faculty opinions about innovation in education. This research utilized qualitative research methods. Qualitative data collection techniques is used in research semi-structured interview technique. Participated prospective teachers were studying last year of their teacher education at Ereğli Education Faculty at Necmettin Erbakan University during 2014-2015 spring semester. Twenty-five prospective teachers participated in the research. The interview data obtained were analyzed through discriptive technique. The results were presented by considering research questions. In order to reflect prospective teachers opinions direct quotations were used.

Keywords: prospective teachers, innovation in education, opinions



TEACHING THROUGH LEARNING STYLES: APPLICATION FOR GENERAL CHEMISTRY TEACHING

Servet Yatin

Teaching through Learning Styles (TLS), developed by Keith Cotroneo et al., is a guide and exploration tool for classroom teaching. In general, teaching style of a teacher closely match with his/her learning style. It is very thought-provoking to realize the mismatch between the learning styles of pupils and teaching style of the teacher. The knowledge and creativity of the faculty takes on after this realization. There are many tools/methods including charts, visual arts, group work, step-by-step approach, concept maps, and analogies to target the learning style of different learners. Effectiveness of these tools depends on their match with students' learning styles. Using tools that target learner's style is especially important with unprepared students. Concept map is a great tool for the faculty to teach chemistry, to assign homework, and to diagnose misconceptions. This study found that employing concept maps in TLS-guided group work is very effective in teaching and learning chemistry. When asked to draw individually, students who are Thinkers and Relaters were most successful in utilizing concept maps. Stormers generated many nodes but were not able to relate some of the nodes appropriately. Drivers and Framers were able to learn through concept maps but not successful in showing their knowledge via concept maps. When assigned in groups with diverse learners all students but Framers successfully displayed connections of the chemistry concepts. Interestingly, Framers performed much better when a computer program (C-map) was used to draw the concept map. Another tool that targets learning several learning styles is analogies. This study incorporates use of analogies in teaching chemistry. Targeting learners with the style that they like to learn with adds value in many ways but most importantly helps students to learn quicker, to understand complex chemistry concepts, to relate knowledge gained in different courses, and to retain information longer.

Keywords: learning styles, concept map, analogies, chemistry education, teaching methods



MOBILE VIEW ON MARKETING EDUCATION: MARKETING GENIUS APPLICATION

Nilgün Özdamar Keskin

The aim of this study is to introduce the mobile marketing education application named Marketing Genius which is developed for Android and IOS platforms and to examine the undergraduate students' views about this application. Recently, especially along with the widely use of smartphones and tablets , it has been observed that many mobile applications having different capabilities such as sending messages, chatting, noting, playing games, following the news have been uploaded to mobile markets such as Apple Store and Google Play. However, it was stated that the education purposed use of the developed applications in Turkey was considerably little. (Ozdamar Keskin et al, 2015). Therefore, the views of higher education students about developed applications with education purposes have become more important because they mostly prefer using smartphones and tablets. For the aim of the study, the opinions about the mobile marketing education application was asked to 64 students from Education Faculty and 63 students from Business Faculty in Anadolu University. The findings obtained in this study may be useful in design of mobile learning applications for higher education students.

Keywords: mobile learning, mobile application, marketing education



A SHORT COURSE ON SPECTROSCOPY AND SPECTROPHOTOMETRY TRAINING FOR WORKERS IN INDUSTRY

Yener Deryal, Mehmet Yükksekaya, Şule Berna Ayan, Mehmet Ali Özer, Mustafa Sayın,

The use of spectrophotometers pass beyond academic research laboratories and become widely used in many industries including plastics, medical, chemical, textile, food, painting, paper, pharmaceutical etc. They are used for processing, quality control, testing and research purposes. Although they become more common as a tool in industry, mostly, industry workers do not have scientific knowledge and practical usage experience. These unexperienced workers cause misinterpreted results and loss of time and money. Due to this fact we offered a two days course for introduction to spectroscopy and practical usage of a common spectrophotometer. The course includes lectures and experimental work. Contents are introduction to spectroscopy, safety usage requirements, sample preparation for testing, calibration of device for different references, two experiments and data processing of the results. This paper describes the need for the course, learning objectives of the course, the detailed explanation of the course contents and used tools for experiments. The goal of this lifelong learning course is to help industry workers to study the fundamentals of spectroscopy, to use modern spectrophotometer instrumentation safely and correctly and to obtain accurate results.

Keywords: spectroscopy, spectrophotometer, lifelong learning, industry education



EFFECT OF TRAINING ON THE WORKING MEMORY

Kemal Altıparmak

The working memory consists of four sections. These are, the central administration, the phonological loop, the visual-spatial sketch and the episodic buffer. The results of the harmonious working together of these parts become the permanent information. But, the sophistications of these sections are not the same in every individual. The activities offered to people can be effective in the development of the working memory. In this study, the effects of mental abacus training on the working memory were studied. Therefore, in this study, the five experiments were planned. In those experiments, fourteen students took the mental abacus training and were treated as the experimental group and the fourteen students who did not take the mental abacus training were treated as the control group. The sections of the phonological loop, the visual-spatial sketch and the episodic buffer function in the working memory were examined in those experiments. According to the results of the experiments, the students who received the mental abacus training had more developed visual-spatial sketch than the students who did not take the mental abacus training. The impact of the mental abacus training on the phonological loop was not observed. In addition, the students who took the mental abacus training had their episodic buffers function more effective than those who did not take the mental abacus training.

Keywords: working memory, abacus, visualion.

IMPROVING THE EFFECTIVENESS OF ELECTROMAGNETIC THEORY EDUCATION BY INCREASING THE LEARNING MOTIVATION

Mehmet Yükksekaya, Şule Berna Ayan

Electromagnetic theory course is currently taught in many institutions and in many disciplines. However, this course usually have difficulties in capturing the glance of students especially for undergrads in disciplines which are not focused on concentrated mathematics education. The common reasons are that the course has mostly theoretical concepts, it needs a well mathematics background and it usually does not have any practical application. Since active and experimental education are usually more attractive to the undergrads in engineering, theoretical courses are difficult for them especially for biomedical engineering undergrads. For this reason an electromagnetic theory course with its laboratory and a project work is developed to increase the motivation of the students and it is planning to be taught for sophomores in Başkent University Biomedical Engineering Program. In order to make the course more attractive firstly a survey has been completed for different electromagnetic course taught worldwide and syllabus has been updated. Secondly visual and practical teaching materials are searched for the electromagnetic concepts and they are classified. Thirdly laboratory experiments are organized and test devices and materials are ordered. Finally a plan for teaching electromagnetic theory is advised. This paper explains the walkthrough to make the electromagnetic course more attractive to the students. In the paper the methodology for efficient and attractive learning and syllabus design are discussed.

Keywords: electromagnetic theory, learning motivation, electromagnetic laboratory, active learning.



A STRUCTURAL MODEL ON MIDDLE SCHOOL STUDENTS' PERCEIVED TASK VALUES, ABILITY EXPECTANCIES, TASK DIFFICULTIES AND MATHEMATICS ACHIEVEMENT

Eyüp Yurt

One of the most important factors affecting the math performance of middle school students is motivation. Motivation is closely related individuals' expectations, values and emotional reactions for a task. Determining which one of the factors that constitute motivation can help in the planning process of teaching mathematics more effectively. In this context, This study aimed to investigate the relationships between secondary school students' perceived task values, expectancy, task difficulty and mathematics achievement. The study was conducted on 200 secondary schools receiving education in the city of Konya. 50.5 % of the students (n=101) were female whereas 49.5 % of them were male (n=99). 29 % of the students (n=58) were 6th graders, 35 % (n=70) were 7th graders and 36% (n=72) were 8th graders. The self and task perception in the the domain of mathematics scales were used to determine perceived task values, expectancy, task difficulty of middle school students and end-of-term mathematics grades were used to determine their mathematics achievement. The collected data were analyzed using the Path Analysis Model. According to the results obtained, especially, students who has more perceived intrinsic interest and expectation and less perceived task difficulty is more successful in mathematics. Also, the variables "task value", "attainment value-importance", "extrinsic utility", "expectancy", " task difficulty" and "required effort" were witnessed to account for 68% of the variation in mathematics achievement. The findings are discussed in light of theoretical explanations.

Keywords: expectancy-value theory, motivation, mathematics achievement, middle school

AN ACTIVE LEARNING MODEL OF BIOMEDICAL CALIBRATION COURSE: HOSPITAL CALBRATOR APPLICATIONS

Arif Koçođlu, Onur Koçak

Calibration refers to comparing a reference measuring device which is sure to be accurate (traceability ensured) with a device which is not sure to be accurate and reporting measurement results. The Biomedical Calibration Training and Applications course is one of the important courses for technical sciences students. 75% of the medical devices used in hospitals have to be subjected to periodic calibration and preventive maintenance. Thus, technical staff to be employed in hospitals has to have deep theoretical and practical knowledge on this subject. The Biomedical Calibration course is taught 4 hours (2 hours in theory + 2 hours in practice) a week for 14 weeks in the 3rd semester of Bařkent University Vocational School of Technical Sciences Biomedical Device Technology Program. The Biomedical Calibration course involves both theoretical and practical difficulties for students and academics. The main problems are as follows: medical devices have a wide variety of types and models; new devices are introduced continually; and standardization has not been achieved yet. The educational model adopted by considering these problems involves teaching medical devices to students through classifying them by working parameter and grouping them by clinical department. To this end, relational database management systems are used (SQL). In this database, risk levels of medical devices and parameters of calibration (e.g. flow, humidity, pressure, temperature, vacuum, leakage current, electrophysiological signals) are determined in the first place. Then devices are grouped by department through relational methods. In this way, theoretical knowledge, database management applications, and planning about calibration workflow are taught to students (5 weeks in practice). After that, students apply calibration procedures to medical devices in the hospital environment via traceable calibrators (7 weeks in practice). This study deals with the practice-based education model developed for the Biomedical Calibration course, the software used, and the planning of the calibrators used. The study also presents the planning of the new in-hospital practical training that has been carried out recently. This renewed model was evaluated by students via questionnaires, and results were interpreted statistically. The practical training was found to be successful in that it was carried out in the hospital and prepared the students for the sector.

Keywords: active learning, biomedical calibration, database management, field based practice



A STUDY TO IMPROVE EFFICIENCY IN THE PROCESS OF INTERDISCIPLINARY UNDERGRADUATE EDUCATION: NEW APPROACHES IN INTRODUCTION TO BIOMEDICAL ENGINEERING COURSE

Onur Koçak

Biomedical engineering is an engineering discipline that is responsible for effectually designing, producing, and operating diagnostic, treatment, medical research, and laboratory instruments and devices. Undergraduate education in this field, which is a mix of many disciplines, involves many difficulties for students and academics. In the first grade, Basic Physics, Mathematics, Chemistry, and Computer Software courses are intensely provided at Bařkent University Department of Biochemical Engineering, as at many universities. In this process, students have to take interdisciplinary courses whose acquisitions are a must for them, and they have to be provided with capabilities such as learning effectively, study techniques, and having a technical perspective on the profession. Within the scope of the course, the history of science and the history of engineering are taught visually. In this way, an attempt is made to increase students' motivation in engineering. In addition, main disciplines, study areas, and scientific research topics of biomedical engineering are presented with up-to-date examples. In this sense, sector representatives and engineers having a successful career in biomedical calibration, R&D and production of medical devices,

clinical engineering, technical service, and sales & marketing of medical devices are invited to ensure information exchange with students for 5 weeks. Moreover, students are divided into working groups to prepare interactive projects about current biomedical engineering practices. These projects are supported with actual data obtained from hospitals. By this means, it is made sure that even the first grade biomedical engineering students take a step in hospitals – the places they are going to perform their profession. This study deals with the planning of biomedical engineering educational process which students are to go through within the scope of the Introduction to Biomedical Engineering course as well as the new approaches followed in the interaction of students, academics, and the sector. This course is taught in the 1st semester. It is taught 2 hours a week for 14 weeks. Improvements made in the course were evaluated by students via questionnaires administered at the beginning and at the end of the semester. Innovations such as interactive project, field applications, and mutual information exchange with graduates and sector representatives were found to be statistically effective. It was determined that this course, which was developed based on active learning method, makes positive contributions to students in the biomedical interdisciplinary educational process.

Keywords: Interdisciplinary education, business-student interaction, clinical engineering



ASSESSMENT OF INTERDISCIPLINARY PARTS IN UNDERGRADUATE EDUCATION OF BIOMEDICAL ENGINEERING

Onur Koçak, Büşra Özgöde

Biomedical Engineering undergraduate education program at Baskent University is a interdisciplinary model which consist of 240 ECTS (European Credit Transfer System) and 150 credits. Courses of the department are composed several areas, such as basic engineering , engineering laboratory applications, electrical and electronics engineering , fundamental and technical English, basic medicine and medical engineering, engineering science, business management and analysis, field application and research and technical project courses. In this study, the courses of Baskent University Biomedical Engineering undergraduate program were analyzed with questionnaire that applied to senior students. Students assessed course requirements, course contents, duration of courses, ECTS weight, range of applications in industry, teaching methods, course goals, and laboratory conditions issues gradually. Specifying adjustments and innovations that they propose have also been requested from the students in the questionnaire. The survey was realized with 25 last year students and the results were interpreted as statistically. According to results, courses that are mainly practical and applicable are founded more necessary than courses that have theoretical training model. In addition, contents of electrical- electronic based courses have to be enriched with interdisciplinary courses. Moreover we determined that the increasing course hours of laboratory practices would be useful. Finally rather than technical elective courses based on a single branch, they have to content of at least one from each branches. This study will be a reference for improvements of the course catalog at Baskent University Department of Biomedical Engineering which is in MUDEK (Association for evaluation and Accreditation of Engineering Programs) application process.It will also be a reference for lecturers in terms of revising the course contents and the improvement of laboratory facilities with feedback of the senior students.

Keywords: biomedical engineering, interdisciplinary education, course assessment, catalog, last year students

STEM EDUCATION PRACTICES IN TEACHING OF BALANCE AND FORCE AT 6TH GRADE – DESIGNING A BRIDGE

Ayşe Savran Gencer, Sefa Çoban

STEM is acronymic word that constituted from comprehensive fields of Science, Technology, Engineering and Mathematics. STEM education means that guiding students for solving a problem to use a collaboration among these STEM disciplines. In that, purpose of STEM education is to provide students moving from low-level cognitive tasks to high order thinking skills. The core of STEM education is to engage engineering practices with science education rather than considering it in addition to curricula. By this way two purposes can be reached; first, students having positive experiences will be expected to choose a high school or pursuing a career about STEM fields, as a long term outcome these countries may have a competition at an international level. The second purpose is that if students have some experiences and innovative skills about STEM fields, they can find creative solutions for questions that they encounter in daily life. The integrated STEM in science curriculum can be applied as parallel with 5E model; ask, imagine, plan, create and improve. In this case study, we aimed to explore STEM education practices at five steps in teaching of balance and force unit. The participants of the study were the 6th grade students from a primary school placed in Turkey. The study included an application of engineering activity about designing a bridge associated with balance and force concepts that were covered in science curricula. In this activity, students provided to think a problem and they made an effort to solve problem with engaging engineering practices.

Keywords: STEM education, science education, engineering practices



STUDENTS ' ALGEBRAIC THINKING LEVELS AND THE LEVELS OF USE OF THE REPRESENTATIONS

Deniz Sevcan Ökşen, Ayten Pınar Bal

The aim of this study is to determine the algebraic thinking level of secondary school students as well as to address it in terms of some variables. The study is a descriptive research in scanning model directed to identify the existing situation. As the schools in Adana province central villages form the population, the students having middle social economic level form the sampling of the study. 31% (102) of these students are from sixth grade, 25.9% (83) of them are from seventh grade and 44% (148) of them are from eighth grade. Also when the academic success of these students are examined according to the grades on school reports of first semester of 2013-2014 academic year, 3% (9) got 1, 6% (19) got 2, 21% (69) got 3, 50% (167) got 4 and 21% (69) got 5. In the study, Chelsea Diagnostic Algebra Test was used as data collection tool. This test is a measurement tool developed to identify algebraic thinking level of children and to obtain their mistakes (Hart, Brown, Kerslake, Küchemann and Ruddock (1985). Algebraic thinking test is consisted of four levels. At the end of research it was found out that students have different levels of algebraic thinking, academic success and class level variables are effective on algebraic thinking levels of students however in terms of gender variable there is not any significant difference on algebraic thinking levels.

Keywords: algebra, students, thinking levels



THE EFFECT OF PROJECT BASED TEACHING ON THE STUDENT'S SUCCESS IN TEACHING LIVING THINGS AND ENERGY RELATIONS UNIT

Şerife Değirmenci, Osman Çardak

The purpose of this study is to determine the effects of project based teaching on the 8th grade students' understanding of the concepts in relation to living things and energy relations. The study was realized with 39 8th grade students from two different classrooms at an elementary school. One of the classrooms was assigned as the random experimental group (n=19), and the other one assigned as the control group (n=20). While teaching the students in the experimental group based on project based teaching approach, the students in the control group was taught by traditional teaching approach. The practice lasted about 4 weeks. In the study, both groups were applied the success test on living things and energy relations which consisted of 39 questions in the form of a preliminary test and a final test for data collecting purposes. The data was analyzed by using t test. The results show that students in the experimental group who are applied project based teaching were more successful than the students in the control group who were applied traditional approach in understanding the concepts of living things and energy relations. This difference in success was also found significant in statistical terms ($p<0,05$). Based on these results, it is recommended to use project based teaching in science and technology lessons.

Keywords: project based teaching, science and technology lesson, living things and energy



THEACHER'S VIEWS FOR SOROBAN ABACUS TRAINING

Kemal Altıparmak

Soroban abacus is called mental arithmetic education in our country. Mental arithmetic is known to increase students' skills in four operations. How is success and status of students have received training of Soroban abacus about problem solving, creativity, concept development, courses of interest, success in other lessons and social relations in their classes? This study aims to investigate in order to answer this question, the impact on students of mental arithmetic training through interviews with 14 student teachers trained in mental arithmetic between 7 and 12 years of age. These students were reached using snowball sampling. In this research, the effect of Soroban abacus training on students' problem-solving skills, creativity, the concepts of learning, the state interest in the mathematics class, success in other lessons, and the impact on their relationship with other friends in the classroom. For this purpose 6 items has been determined by tree experts. In this study it was interviewed with class and mathematics teacher of these 14. Descriptive analysis was performed on the data obtained. The results suggest that children with mental arithmetic knows problem solving, creativity, concept learning, the state interest in the mathematics class, and success in other lessons can be said to be better than the other students. There are no advantages over others in the children's social relationships.

Keywords: soroban abacus, mental arithmetic, problem solving



BIOLOGY TEACHERS' METAPHORS FOR SCIENTISTS

Faruk Kaçak, Musa Dikmenli

The purpose of this study is to reveal the biology teachers' perceptions about scientists via metaphors. The participants for this study consisted of 123 biology teachers worked in schools of the Ministry of Educations in the central districts of Konya in 2012-2013 education year. As a data collection tool the participants were asked the question: "The scientist resembles / because". The data obtained from the answers were analyzed using metaphor analysis method. According to their search the metaphors of participants about scientists are grouped under 7 categories; "a scientist as a person beneficial to society", "a scientist as a person directing the society", "a scientist as a hard working and productive person", "a scientist as an innovative person", "a scientist as an interrogator and inquisitive person", "a scientist as a wise person". As a result of the study the metaphors depicted by the biology teachers are seen mostly under the categories of "a scientist as a person beneficial to society", "a scientist as a person directing the society". As examples to some of the metaphors used by the biology teachers: sun, child, fruit tree, detective... etc. The perceptions of the biology teachers about scientists are generally positive. Besides there are negative perceptions as well. Their results were compared with the literature and recommendations were provided.

Keywords: scientist, biology teachers, metaphor



SCIENCE EDUCATION: BEYOND A LIMINAL UNDERSTANDING OF KNOWLEDGE PRODUCTION/DISSEMINATION

Sandra Abegglen, Jessie Bustillos

The present paper is based on a first year BA Education Studies module that explores a number of important questions about the relationship between technology, knowledge and society and begins to think about how our ideas about each of these contribute to an understanding of what education means. Following a Foucauldian perspective on truth, power and the subject, we look with our students at science –and science education – to explore the production of knowledge in a context where many initiatives promote scientific literacy for children and young people. The present paper argues that it is important to reflect with students on these forms of knowledge production and dissemination so as not to see – and teach – science from a consumerist perspective but rather to embrace the idea of science education as a discourse that shapes our understanding of the world and ourselves.

Keywords: science education, knowledge production, discourse, power, Foucault



DETERMINE MISCONCEPTION STUDY OF COMPLEX NUMBER WITH DIAGNOSTIC BRANCHED TREE

Gökhan Karaaslan, Necla Turanlı

Concepts are learnt by association with the concepts already exist. So, in order not to construct the knowledge on misconception, it is necessary to identify and eliminate the misconceptions. Misconceptions can be specified by various methods. One of these methods is "Branching Tree" (BT) used for identification

of what the students have learnt on the topic or which misconceptions they had. This method, misconceptions on students' mind, wrong strategies and eventually wrong knowledge is aimed to find out. This may serve a major function in time course of effective learning and teaching. BT is stated to be used for revealing the misconceptions students have. However, none of the studies of BT have been shown to detect the misconceptions. The aim of this study is to identify the misconceptions about the complex numbers by using BT method. Mixed approach was adopted in this study is to determine student's misconceptions and errors of current, research method is case study. This research sample is 356 grade 11 students who studying Anatolian high schools in Burdur, chosen according to typical case sampling method. "BT of Complex Numbers" that preparing in this study by researchers, applied to the students for determine misconception about complex number. In the analysis of the data descriptive statistics and descriptive analysis used. Determine misconception and error by BT is about; making rational denominator of complex numbers, order relation in the set of complex number and finding the root of a complex number. In the literature there are very few studies showing that BT is used as learning and assessment techniques. So, this study is thought to contribute to both the related area and the teachers who are the executives of the application.

Keywords: complex numbers, misconception, diagnostic branched tree



THE PREDICTIVE POWER OF GIFTED STUDENTS' MATHEMATICAL COMPETENCES AND SPATIAL ABILITIES ON MATHEMATICAL ACHIEVEMENT

Ahmet Kurnaz

In this research, the relationships among mathematical competences, spatial abilities and mathematical achievement of gifted students are investigated. The research is performed on 296 (51% boys and 49% girls) who are 7th grade students and study at Science and Art Centers (SAC) in Adana, Bursa, Çorum, Elazığ, İzmir, İzmit, Kayseri, Konya, Manisa and Salihli in Turkey. Mathematical reasoning and problem solving scale are used for determining mathematical competences, mental rotation and paper folding are used for determining spatial abilities and mathematical achievement test is used for determining mathematical achievement of the students. Pearson product-moment correlation coefficient (PPMCC) and multiple linear regression analysis are used to analyze the data in the research. According to the results obtained, high and medium level meaningful relationships are seen between mathematical competences and mathematical achievement of gifted students. The order of importance on mathematical achievement of gifted students' mathematical competences is spatial thinking, mathematical reasoning and problem solving. Spatial thinking, mathematical reasoning and problem solving are meaningful predictor of mathematical achievement. The variables predicting mathematical achievement clarify almost 59% of the changes on mathematical achievement. When considering the findings, the teaching methods should arrange for developing the students' spatial thinking abilities, reasoning activities should be increased in mathematic teaching and taught problem solving strategies.

Keywords: gifted students, spatial thinking, mathematical reasoning, problem solving, mathematical achievement.



SUSTAINABLE DEVELOPMENT IN MEDITERRANEAN SMALL ISLAND DEVELOPING COUNTRIES: CASE OF CYPRUS

Ali Karaduman, Arif Sari

This research study investigates and highlights the developments of education sector and developments that exposed due to education sector's sustainable impacts on development of country's economy. Additionally, the impact of education and development of this sectors' led a variety of changes in small island developing states. North Cyprus, which categorized as one of the SIDS country, is investigated in this research. Since the education sector becomes a part of the global market, positive and negative impacts of education sector and this sector's impacts are discussed in details. The impact of variety of fluctuations in national and international level on educational institutions is investigated quantitatively that has significant effect on sustainable impact of education sector in North Cyprus to highlight impact of education in country's development.

Keywords: education, economy, education sector, sustainable development, economic development, small island developing states, North Cyprus



INVESTIGATION OF MATHEMATICAL THINKING PROCESS OF VOCATIONAL HIGH SCHOOL STUDENTS: EXAMPLE OF ANALYTIC GEOMETRY

Katibe Gizem Karaaslan, Gökhan Karaaslan, Necla Turanlı

The math not only teaches just numbers and the mathematical process; but also provides the people to gain abilities such as thinking, interrelating between events, reasoning, guessing and solving problem. The mathematical thinking includes using the thinking skills, discovering relationships between ideas and problem solving in order to understand the ideas. The mathematical thinking has so many features such as guessing, generalizing, to test with hypothesis, abstracting, reasoning, proving and reaching new information or concept. In this study, about analytic geometry the mathematical thinking process of vocational high school students was investigated according to specializing, generalizing, conjecturing, justifying and convincing components of mathematical thinking. In the renovated 10th grade mathematics course in analytic geometry curriculum, revealing the mathematical thinking skills of vocational high school students, who have lower degree than average levels of academic achievement, is the aim of this research. In this study, both the selection of analytical geometry topics and vocational high school students provides the mathematical thinking and the teachers working with students that have low achievement level to obtain information about thinking process of the students. The type of research is action research. In Burdur a vocational high school where one of the researchers work as a teacher, the 10th grade students of the vocational high school (16 students) are chosen as sample. Teaching the subject of analytic geometry lasted 16 hours. Activities were developed by the researchers for the subject of analytic geometry and the questions revealing the mathematical thinking skills of the students were continually asked. This education process was recorded the video and mathematical thinking skills of students were identified by researchers. It was determined that as a result of the data analysis the vocational high school students could make the specializing, while making generalization they could also express much more mathematical relationships verbally. The conjecturing, justifying and convincing process of the students were observed very little. That might be the reason why these students have solved the mathematical problems as multiple-choice questions since the primary school times. It is thought to be useful that the mathematical thinking components need to be discovered and then the open-ended questions need to be prepared in order to develop students' mathematical thinking with all components.

Keywords: mathematical thinking, analytic geometry, vocational high school

THE LEVEL OF THE ACQUISITION OF THE OBJECTIVES REGARDING THE “GRANULAR STRUCTURE OF MATTER” UNIT IN THE 6TH GRADE SCIENCE AND TECHNOLOGY PROGRAM

Ahmet Özön, Seyit Ahmet Kiray, Dursun Yağiz

The purpose of this study is to examine the level of the acquisition of the objectives regarding the “Granular Structure of Matter” unit in the 6th grade Science and technology program. The study conducted in the 2012-2013 academic year. Design of the study was survey type. The sample of the study is 6347 students enrolled in the 6th grade elementary students in the central district of Konya. Science achievement test developed by the researchers was applied as an instrument. The reliability coefficient of the tests' (1st Test KR20 = .826, 2nd Test KR20 = .834, 3rd Test KR20 = .820) Findings revealed that students have been achieved the more than half of the objectives (%51,8) regarding the “Granular Structure of Matter” unit in the 6th grade Science and technology program.

Keywords: science and technology program, program evaluation, granular structure of matter



MOTIVATORS, BARRIERS AND OUTCOMES IN 3D VIRTUAL LEARNING ENVIRONMENT THAT INCLUDE DAILY-LIFE ACTIVITIES REQUIRING MATH SKILLS: MATHLIFE CASE

Selahattin Arslan, Hüseyin Atalay, Serkan Coştu, Bahar Baran, Tuba Gökçek, Asst.Prof.Dr.Gönül Güneş

The secondary school maths curriculum draws an attention to easier and more meaningful learning; it is thereby proposing to establish real-life learning situations in which students may practice maths as a “sensible, useful, and worthwhile” field of study. Nevertheless, Turkey has a lack of non-school practices; therefore, schools prefer to establish and develop “everyday life” practices by themselves. However, it is known that these practices are mostly failed to fulfil the need because there is a big gap between established practises and natural living conditions. To address this issue, there are many recent studies approaching to 3D virtual environments. In this sense, this study aims to design a 3D world included activities of daily living requiring math skills, and so to investigate the dynamics of communities of practice in its development process. For designed environments, activities are determined based on the principles of design-based research methods, as such the cycle of ‘Practice>Evaluation>Correction>Application’. In design-based research methods, the cycle is repeated many times in order to make necessary and further adjustments so that desired level is reached. The findings of this study are discussed founded on Activity Theory which is one of the important theories which let us understand a complex learning environment and seek how to establish the necessary elements in this environment. To complete a detail analysis, two different applications have been completed, the first was with one participant and the second was with three participants. As a consequence, this research reveals stimulating and inhibiting factors of participating discussion and sharing information. While, some of the stimulating factors are: (a) learning by fun; (a) being friends with 3D avatar; (c) embodying visualization problems in the minds of the children; some of the inhibiting factors are: (a) unwillingness for the discussion due to previously failed math exam and (b) accessing internet and computer. PS.: This research is funded by TUBITAK.

Keywords: daily-life activities requiring math skills, 3d virtual learning environment, activity theory



PRESCHOOLERS LEARNING PROPORTIONALITY AND INTEGRATION THROUGH ICONCOUNTING AND NEXTTO ADDITION

Allan Tarp

Preschool allows rethinking mathematics outside the tradition of ordinary school. Seeing schooling as adapting the child to the outside world containing many examples of the natural fact Many, we can ask: How will mathematics look like if built as a natural science about Many? To deal with Many we count and add. The school counts in tens, but preschool also allows counting in icons. Once counted, totals can be added. To add on-top the units are made the same through recounting, also called proportionality. To add next-to means adding areas also called integration. So accepting icon-counting and adding next-to offers golden learning opportunities in preschool that are lost when ordinary school begins.

Keywords: preschool, proportionality, integration, number, count, add, early childhood



A COMPARATIVE ANALYSIS OF MATHEMATICS CURRICULA OF KOREA, SINGAPORE, HONG KONG, JAPAN AND TURKEY

Abdulkadir Öner, Erhan Ertekin

This study has been conducted to determine similarities and differences between K-8 level mathematics curricula of Korea, Singapore, Hong Kong, Japan, which are in top five countries according to TIMSS 2011 scores, and Turkey, with ranking 24 of 42, in regards four basic principles of education curricula; aim, content, learning/teaching process and evaluation. The data was obtained through document analysis which is a data collection method in qualitative researches. According to data analysis, whole curricula aim to enable students to obtain mathematical knowledge and understand mathematical skills, cultivate the ability to think and communicate mathematically in order to solve daily life problems and cultivate a positive attitude toward mathematics. In regards content principle, learning areas are founded in different numbers and names. Different from other curricula, the Korea curriculum includes approximate value, error and truth value; Singapore's includes speed, constant speed and average speed; Korea, Singapore and Japan's include function; Korea's includes trigonometry; Hong Kong and Japan's include sphere; and Korea, Japan and Turkey's include translation and rotation concepts. In regards learning/teaching process principle, different from other curricula, it is mentioned that having knowledge in history of mathematics will make students cultivate a positive attitude toward mathematics, and so, teachers are suggested to care about this. Moreover, Turkey curriculum seems to be more national than others, since famous Turkish mathematicians and founder of the Turkish Republic, Atatürk, who has translated mathematics and geometry terms into Turkish language and made compulsory to use international units are mentioned in the curriculum. In regards evaluation principle, different from other curricula, use of technology such calculators and computers are suggested to be used in Korea, Singapore and Hong Kong curricula, two methods of evaluation (continual and semestral assessment) and peer evaluation are suggested in Singapore and Turkey curricula, respectively. Finally, Turkey's ranking (24th) make us think that lower success shown by Turkish students in international assessment examinations does not stem from curriculum, since their curriculum is almost the same as other students who live in Korea (1th), Singapore (2th), Hong Kong (4th) and Japan (5th). Instead, the ranking difference seems to have originated from textbooks, application of instruction methods and quality of teachers.

Keywords: comparative education, mathematics curriculum, TIMSS



LEARNING AND USER ANALYTICS IN MOBILE TECHNOLOGY TOOLS: A LITERATURE REVIEW

Muhammed Emin Demirbaş, Mustafa Koç

The purpose of this study is to examine relatively new educational technology, learning and user analytics, in general and their potential usage in mobile tools and learning. In accordance with this aim, relevant theoretical and empirical research studies were found through an extensive literature survey and then they were subjected to content analysis. The reports of these studies conducted between 2010 and 2015 were reached through online search engines, thesis centers, databases and journals by using appropriate keywords. Findings from the content analysis were organized into two main themes as (a) learning and user analytics and (b) learning and user analytics in mobile tools. The former focused on the personalization of learning environments, evaluation of educational conditions, prediction of student performances, and the potential of learning analytics in development of new or alternative learning approaches. The latter explored such issues as mobile tools and their future importance, their usage as instructional tools, and the place and importance of learning analytics in mobile tools. Moreover, it also explored the consequences of increasing functions and uses of mobile tools in learning management systems. The findings of this literature review and implications were discussed within the context of mobile learning and suggestions were given to future research and educational practices.

Keywords: learning analytics, educational data mining, mobile learning, literature review



THE RELATIONSHIP BETWEEN CYBER BULLYING AND CYBER VICTIMIZATION AMONG ADOLESCENTS: THE SAMPLE OF KONYA

Nurten Sargin

Adolescence is the most stressful and stormy period in human's life. One of the most significant characteristics of this period is that adolescents both exhibit and face risky behaviors, such as peer pressure and violence, during this time. They exhibit these behaviors not only when they act face to face but also in the virtual settings. Some examples for these risky behaviors are considered to be cyber bullying and cyber victimization. This study aimed to investigate the relationship between cyber bullying and cyber victimization among adolescents according to several variables. The sampling group consists of 542 secondary school students, 308 girls and 234 boys, aged between 14 and 19. The data gathering instruments were personal data form, Cyber Bullying Scale, developed and validated by Arıcak, Kinay and Tanrıku (2012), and Cyber Victimization Scale, also developed and validated by Arıcak, Kinay and Tanrıku (2012). The results of the study revealed that boys exhibited more cyber bullying behaviors than girls. The participants who have personal computer were found to experience more cyber victimization than those who do not. Another finding was that the more time the participants spent in social media, the more possibly they become a cyber bully or a cyber victim. A significant and positive oriented relationship, at .45, between cyber bullying and cyber victimization was found. In view of the results, some recommendations were also presented in the study.

Keywords: adolescent, cyber bullying, cyber victimization.



USE OF CLINICAL SIMULATIONS AS A DATA GATHERING TOOL

Osman Cil

Clinical simulations are essentially teaching and/or performance evaluation tools that have been heavily utilized in medical science over last forty years to educate doctors, nurses, and other medical professionals. Recently, this methodology has adapted by educational institutions and implemented as a microteaching tool to provide problem based teaching opportunities for pre-service teachers through as authentic school related issues and experiences as possible. For the purpose of this poster project, the presenter uniquely proposes the clinical simulations as a data gathering methodology. During the poster session, the presenter will introduce the concept of clinical simulation, provide examples from the traditional use of the methodology, define the process of implementing clinical simulations for data acquisition by exemplifying from an already completed study, and finally discuss the positive and negative aspects of clinical simulations as a data gathering methodology.

Keywords: clinical simulations, pre-service teachers, data-gathering



A COMPUTER SOFTWARE FOR THE EDUCATION OF COMPLEX NETWORK ANALYSIS

Ilker Türker, Alper Talha Karadeniz, Serhat Orkun Tan

Complex network analysis is an attractive tool for capturing the self-organizing principles underlying the social, physical or biological communities. Several software are developed for either analyzing or generating complex networks, including the visualization utilities. We developed an open source software in Microsoft .NET platform for generating networks based on the most common models like Barabasi-Albert, Erdos-Renyi, Watts-Strogatz etc. including the analyzing utilities defining the network like average separation, degree distribution, clustering coefficient etc. In contrast with the well-known software, this software includes some facilities as manual or automated link rewiring and node generation. It also forms a basis to further developments that should provide an extensive view to network construction. As an open source software, the opportunity of editing the core functions about network dynamics offer a pedagogical approach to learn more about self-organizing networks.

Keywords: complex networks, software, small world, scale free networks



E-LEARNING TOOLS: CONCEPTUALISATION OF DOMAIN KNOWLEDGE FOR FUTURE USE IN E-LEARNING CONTEXT

Lina Tankeleviciene

Semantic Web is a Web of new generation. The main difference from the Web of the first generation is that information presented is understandable not only for humans, but also for software agents or other software modules. Ontologies are most often defined as basic component in Semantic Web infrastructure. Domain ontologies provide shared and common understanding of a specific domain. They, as engineering artefacts, are used in different fields, including e-learning. In this paper, we present the development of domain ontology for future use in e-learning context. Domain of "E-learning tools" was chosen for implementation. The distance learning course "E-learning technologies" (3 credits) is elective and oriented

not only for students with strong background of information technologies. Among others, the expected ability of the study module is formulated as follows: students will be able to analyse, compare and in the real context to choose the most suitable tools for development of study materials, delivering distance learning course or making other decision in e-learning context. Our domain consists of three large parts: tools (software products), technologies in a wider sense of this word and didactics. The obstacle of our solution is that the domain is evolving quickly. But since we agree that “there is no single correct ontology for any domain” (Noy, 2001), we can freely experiment and foresee further use of developed ontology in e-learning.

Keywords: domain ontology, ontology development, e-learning, e-learning tools



PRESERVICE SCIENCE TEACHERS’ AWARENESS OF HISTORY OF SCIENCE

Isil Koc, Meltem Kuvac, Burcu Gelen

The purpose of this research was to investigate preservice science teachers’ awareness of history of science. The research was conducted with 60 preservice science teachers from Istanbul University, who registered for the Nature of Science and History of Science course offered in the Spring term of 2014-2015 academic year. Data were collected through History of Science Awareness Form, developed by the researchers. In analysis of data, descriptive analysis technique was utilized. According to results, preservice science teachers were aware of 41.42% scientists’ fields among 72 scientists given. And, invention of electricity (53.33%) was remarked by preservice science teachers as the most important scientific event in history. In addition, over 95% of preservice science teachers stated Edison, Einstein, and Newton’s fields accurately even over 85% of them mentioned the Egypt, Ancient Greeks, and Turkish-Islamic civilizations as they made invaluable contributions to the development of the sciences. Overall, the results indicate that more consideration be given to improve preservice science teachers’ awareness of history of science.

Keywords: scientists, history of science, preservice science teachers, teacher education



PRESERVICE SCIENCE TEACHERS’ MENTAL MODELS OF THE ENVIRONMENT

Meltem Kuvac, Isil Koc

The purpose of this research was to explore preservice science teachers’ mental models of the environment. The research was conducted with 91 preservice science teachers from Istanbul University in the Spring term of 2014-2015 academic year. The survey method was utilized in this research. Data were collected through preservice science teachers’ responses to the Draw-an-Environment Test (DAET), which consists of a draw-and-explain task. Data were analyzed with the content analysis technique using the Draw-an-Environment Test Rubric (DAET-R). Both DAET and DAET-R were adapted from Moseley, Desjean-Perrotta, and Utley’s (2010) study. According to results, nearly half of preservice science teachers did not consider humans to be an integral component of the environmental system. In specific, 40.7% of the drawings did not contain any human figures. Besides, 73.6% of the participants drew living organisms and 58.2% of the participants drew abiotic items with no integration. Instead, only 5.5% of drawings represented interactions within an environmental systems approach. Overall, the results indicate that preservice science teachers’ mental models of the environment were incomplete as proposed by the NAAEE Guidelines(2004).

Keywords: environment, mental models, teacher education, science education



MISCONCEPTIONS ABOUT BUOYANCY

Hamza Kaynar, Seyit Ahmet Kiray

During the learning, information constructions are combined mostly by the students' daily background experience. At science, daily experiences of students are sometimes similar with scientific informations which are taught to students, on the other hand; some experiences might cause students misconceptions. In many topics at science, it is showed some students have what kind of misconceptions and how these misconceptions affects how to learn is presented widely in literature. One of these topics is "buoyancy" too. During the teaching of buoyancy, it is worked on solving the misconceptions and fixing these which they gained before by the help of some kinds of techniques and methods. At this topic, it is necessary to start the duration of conceptual change in order to determine information constructions of students and the improvement of effective teaching strategy. This purpose of this study was encountered in the literatüre about the misconceptions of students about "buoyancy".

Keywords: science education, buoyancy, misconceptions



LEARNING MANAGEMENT SYSTEMS IN E-LEARNING

Mustafa Tevfik Hebebcı, İsmail Sahin

Bilgisayar ve internet teknolojisindeki hızlı gelişim bireylerin ve kurumların farklılaşmasına olanak sunmuştur. Özellikle internet ve web teknolojilerinde yaşanan bu hızlı ilerleme, eğitim uygulamalarından biri olan uzaktan eğitimi de derinden etkilemiştir. Bu hızlı değişimin en önemli ürünlerinden birisi, tek bir yazılım servisini kullanarak öğretim süreçlerini merkezi olarak yönetmeyi amaçlayan öğretim yönetim sistemleridir (ÖYS). ÖYS, eğitim etkinliklerini yerine getirmek üzere farklı dilleri ile programlanmış olan web yazılımlarıdır. İyi bir şekilde hazırlanmış olan ÖYS'nin genel hatları; kurs modülü, kayıt modülü, içerik sunum modülü, raporlama modülü ve ölçme değerlendirme modüllerinden oluşmalıdır. Ayrıca, öğrenme materyali sunma, sunulan öğrenme materyalini paylaşma ve tartışma, dersleri yönetme, ödev alma, sınavlara girme, bu ödev ve sınavlara ilişkin geribildirim sağlama, öğrenme materyallerini düzenleme, öğrenci, öğretmen ve sistem kayıtlarını tutma, raporlar alma gibi işlevleri yerine getirmek ÖYS'den beklenen temel görevlerdendir. Moodle, aTutor, Claroline ve Dokeos günümüzde en çok kullanılan açık kaynak kodlu ÖYS'dendir. Bu çalışmanın amacı, erişime açık olan ÖYS hakkında bilgi vererek bu konuda çalışma yapmayı düşünen araştırmacılara yardımcı olmaktır. Bu doğrultuda belirlenen ÖYS ticari ve açık kaynak kodlu olmak üzere iki başlık altında incelenmiştir.

Keywords: uzaktan eğitim, öğretim yönetim sistemi.



USING CLASSROOM SCENARIOS TO REVEAL MATHEMATICS TEACHERS' UNDERSTANDING OF SOCIOMATHEMATICAL NORMS

İsmail Ozgur Zembat, Seyit Ali Yasa

The purpose of this study was to understand teachers' level of sociomathematical norm awareness before entering into and observing their classes. We developed five classroom scenarios exemplifying classroom interactions shaped by certain sociomathematical norms to reveal mathematics teachers' level of understanding for sociomathematical norms instead of entering into their classes and making long-term observations. We applied these scenarios to 61 grade 1-12 teachers and collected their written responses and analyzed the data through relevant quantitative and qualitative techniques. First, the findings suggest that sociomathematical norm awareness is neither dependent on which school level teachers teach nor dependent on their background or demographic characteristics such as number of years they spent in teaching, specialty area, faculty graduated, highest degree earned, gender. Second, teachers' beliefs about sociomathematical norms are almost in contrast with what they actually know about these norms. This suggests that teachers need support in understanding effective ways of orchestrating classroom interaction that support students' mathematical development, which is an essential part of teacher knowledge. Third, use of scenarios was helpful in revealing teachers' level of understanding of sociomathematical norms more accurately than Likert-type questionnaires only testing teacher beliefs. Finally, there are three crosscutting themes that the teachers referred to in common for all sociomathematical norms: opposition (opposition to the core of the norm instead of supporting it), social facilitator (considering all targeted norms as supporting and regulating the social environment of classroom) and condition-based (believing that such interactions given in scenarios are only possible under certain conditions).

Keywords: sociomathematical norm awareness, in-service mathematics teacher education, role of teaching scenarios, testing teacher knowledge

AN INVESTIGATION OF KNOWLEDGE, ATTITUDES AND BEHAVIOURS TOWARD SUSTAINABLE ENVIRONMENTAL EDUCATION OF THE INDIVIDUALS POST GRADUATE EDUCATION

Sinan Erten, Tuğba Ecevit, Yasemin Büyüksahin

In recent days, environmental problems and preventions for these problems are at the first place of the world agenda. As the most important factor of the occurrence and the prevention of these environmental problems, people take place. There are three factors affecting environment and its sustainability: industrialization, urbanization and rapid population growth. Rapid population growth has been started in 18th century and brought along the environmental problems. With the improvements in the technology, usage of the natural resources has been increased. People seen the nature as an unlimited resource and used it in an abusive way. Hence, the emergence of the environmental problems began according to these situations. Because of the natural resources are limited, it is quite important to protect environment and its sustainability. The only way to reach this goal is to establish eco-friendly individuals. People who have environmental awareness and knowledge, people with positive attitude towards environment and eco-friendly individuals show environmentally friendly behaviors (Erten, 2004). Environmental awareness in society is primarily expected in the people with high level education. Therefore, it is aimed to determine graduate students' knowledge, attitude and behaviors towards sustainable environment education. The sample of the study is consisted of master and doctorate students of different universities in Turkey in 2014-2015 academic year. "Easily accessible sampling method" was used for the selection of the participants. The study is a quantitative research and screening model which is directed to the determination of the current state has been used. Sustainable Environmental Education Attitude Scale have been used as the means of data collecting. The scale which was used with the aim of determining knowledge, attitudes and behaviours towards sustainable of individuals taking post graduate education was 5 point Likert scale with 44 items which was developed by Afacan and Demirci Güler (2012) and it is composed of six sub dimensions called environmental awareness in consumption, negative thoughts concerning environmental events and activities, frugal behavior and thoughts for consumption, sensitivity and intervention on environmental problems, using recycled material and volunteering, and sensitivity for negative behavior towards animals and environment. Descriptive statistics, multivariate analysis of variance will be used for the analyses of the data gathered. It will also be evaluated whether the coefficients vary according to participant's age, monthly income, education level and gender.

Keywords: sustainability, environmental education, attitudes towards the environment, eco-friendly individuals



STEM APPLICATION IN SCIENCE SCHOOL

Mustafa Hilmi Çolakoğlu, Halil İbrahim Topçu, Hulya Ertürk KOÇ

The idea of establishing a Science High School, was discussed in a multilateral project at the beginning of 1963. In this project, Ministry of Education, Ford Foundation, METU and AID (International Development Agency) were participated. In Ankara, Science High School had been planned as a US funded project, carried out jointly by the Florida State University, METU and Ankara University. Science High School organizational goals were set as follows;- The ability of children to improve their prowess in science found in Turkey, the intelligence to progress,- In Turkey, the researchers needed to source the training of personnel for higher education and industry,- Country-level science education should play a role for the

development of laboratory science education needed, to be the center of research and development, Ministry of Education created a "Science High School Project Advisory Board" with six members from Ankara University, Faculty of Science and four members from METU to contribute to the scientific aspects of the project. Advisory Board selected 30 teachers from Mathematics, Chemistry, Physics and Biology disciplines by written and oral exam. Selected science teachers were subjected to special education for the development of the branch tests and curriculum at USA Universities. After the success of Ankara Science High School, Ministry of Education started Istanbul and Izmir Science School Projects. Today, 238 Science High Schools are in education. In this the article, some statistical data about Science Schools, their development and innovation activities, STEM projects and vision for the future were discussed.

Keywords: science school, STEM, MoNE



GRADE 5 STUDENTS' MENTAL MODELS ON ELECTRICAL CIRCUITS

Gonca Harman, Aytekin Cökelez

The topic of electricity is included in curriculum at all educational levels because of its importance and use in daily life. Various studies showed that there are different learning difficulties and misconceptions held by students. This study aimed to determine fifth grade students' mental models and misconceptions on the light given by bulb in a simple electric circuit. For this purpose, 98 fifth grade students have been asked to draw simple electrical circuit using a battery, a bulb, a switch and cable. The descriptive research method was used in this study and drawings were analyzed according to misconceptions and models in the literature. The results of this study showed that many students have drawn the short circuit model and the others drawn the unipolar model and these students believe that only one cable is enough to complete circuit. Connection made by the some students didn't complete, they drew switch on, switches and battery independently from circuit. Therefore, some students didn't draw battery and switch. Some students have used unnecessary connecting cables between the circuit elements. In this research some implications and conclusions have been discussed.

Key words: electric circuit, drawing, mental models, misconceptions



THE VALIDITY AND RELIABILITY STUDIES OF TURKISH VERSION OF THE SMARTPHONE ADDICTION PRONENESS SCALE

Ahmet Akin , Çınar Kaya , Lale Şentürk, Ümran Akin, Tuğba Çebiş, Erol Uğur

Computer gaming, internet, social media and smart phone addiction problems are taking place in the literature of addiction, alongside with the well-known substance addiction. Smartphone using rate is rapidly increasing with the impact of the facilities they provide for the daily lives of individuals supported by the advanced internet access infrastructure. The aim of this research is to examine the validity and reliability of the Turkish version of the Smartphone Addiction Proneness Scale (Kim, Lee, Lee, Nam, Chung, 2014). The validity and reliability of scale was investigated by internal consistency and confirmatory factor analysis methods. The participants of research were 304 (118 female and 186 male) university students. Results of confirmatory factor analysis indicated that the four-dimensional Smartphone Addiction Proneness model (disturbance of adaptive functions, virtual life orientation, withdrawal, and tolerance) was well fit ($\chi^2= 212.80$, $sd= 77$, $RMSEA= .077$, $NFI=.89$, $NNFI=.90$, $IFI=.93$, $RFI=.86$, $CFI=.93$, $GFI=.91$ and $SRMR=.074$). The internal consistency coefficients of four subscales were .80, .50, .76 and .78 respectively for subscales. The overall internal consistency coefficient of the scale was .88. The corrected item-total

correlations of the scale ranged from .34 to .70. Overall findings demonstrated that this scale had adequate validity and reliability scores and that it may be used in order to measure smartphone addiction proneness.

Keywords: smartphone addiction proneness, validity, reliability



PROBLEMATIC ONLINE GAME USE SCALE: VALIDITY AND RELIABILITY OF THE TURKISH VERSION

Ahmet Akin , Çınar Kaya , Ümran Akin, Erol Uğur, Elif Ak, Ali Seçgin

Many scales for measuring the problematic Internet use have been developed in the literature. However, those scales were developed for measuring various constructs, such as problematic computer gaming and gaming addiction. Problematic online game use has some discrete features such as the presence of three-dimensional simulation and social interaction. The aim of this research is to examine the validity and reliability of the Turkish version of the Problematic Online Game Use Scale (Kim & Kim, 2010). The validity and reliability of scale was investigated by internal consistency and confirmatory factor analysis methods. The participants of research were 333 (195 female and 138 male) university students. Results of confirmatory factor analysis indicated that the five-dimensional Problematic Online Game Use model (Euphoria, Health problem, Conflict, Failure of self-control, Preference of virtual relationship) was well fit ($\chi^2= 520.89$, $df= 151$, $RMSEA= .086$, $CFI= .92$, $IFI= .92$, $NFI= .90$, $NNFI= .90$). The internal consistency coefficients of five subscales were .92, .74, .87, .88, and .84 respectively for subscales. The overall internal consistency coefficient of the scale was .94. The corrected item-total correlations of the scale ranged from .46 to .76. Overall findings demonstrated that this scale had adequate validity and reliability scores and that it may be used in order to measure problematic online game use behaviors.

Keywords: problematic online game use, validity, reliability



ANALYSIS OF TEACHERS' SELF EFFICACY IN TERMS OF EMOTIONAL INTELLIGENCE

Ercan Yılmaz, Ali Murat SÜNBUİL

The aim of the study is to investigate teachers' self-efficacy with regards to their emotional intelligence. The relational model was used in the study. The participant of the study included 194 teachers from secondary schools in Konya. In order to assess teachers' emotional intelligence "Trait Emotional Intelligence Questionnaire-short form (TEQue-SF) developed by Petrides and Furnham (2013) and adopted by Deniz, Özer and Işık into Turkish was implemented. For teachers' self-efficacy, "Teachers' Sense of Self Efficacy Scale" developed Çapa, Çakıroğlu and Sarıkaya (2005) was used.

As a result of the study, a significant relationship is available between teachers' sense of self efficacy and their emotional intelligence. Teachers' emotional intelligence enucleates approximate 18 % of the variable in dimension named teachers' self-efficacy for the students' involvement. About 19 % of the variable in dimension "self-efficacy for teaching strategies is represented through emotional intelligence. Teachers' emotional intelligence demonstrates about 17 % of variable aimed at classroom management.

Keywords: analysis of teachers, self efficacy, emotional intelligence



AN ANALYSIS OF TEACHERS' EMOTIONAL INTELLIGENCE IN TERMS OF HUMANITY VALUES THEY HAVE

Ali Murat SÜNBL, Ercan Yılmaz

The study aims at determining emotional intelligence of teachers from their humanity values. Emotional intelligence is the ability to regulate emotions and utilize knowledge about emotion and power of it (Casper, 2003). Emotional intelligence is an ability to perceive emotions in the self and motivates others and conduct his relation successfully (Perides, Furnham).

Self-conscious, one of the aspects of emotional intelligence, involves emotional self-conscious, self-regulation, and self-confidence. Emotional self-conscious means an ability to sense and understand emotions and acknowledge their effects in the self. (Goleman, 2002). Individuals with self-conscious will experience the process of intrapersonal approval relating to understand their potential. Individuals with self-conscious and self-regulation will recognize their own values much more through increasing self confidence in the result of getting accurate knowledge about their abilities. Another aspect of emotional intelligence is self-management. Individuals ensuring self-management are able to regulate what they must do wherever and whenever. They either create opportunities or make use of opportunities well. They have optimistic attitudes towards problems and events. They endeavor to find out solutions. They have optimistic expectation for future. The sub-fields of social conscious, another aspect of emotional intelligence, are empathy, organizational conscious and emotional labor. An emphatic individual will realize perspectives of others. Individual places the self in others' realities and understand their conditions from their perspectives and postulates. For that, it is essential to be able to make aware of others and connect with their requirements and wishes; identify with them. Thanks to organizational conscious, the leader who makes out rules and behaviors in an organization can internalize stationary values and prevalent speechless rules among individuals (Goleman, 2002). For human affairs, the level that skills and attitudes of individual compete with these depends on how to use emotional intelligence ability. The humanity values of individuals may influence their emotional intelligence. That diverse definitions of the term "value" are available in other disciplines complicates how to define it (Dilmaç & Ekşi, 2007). The term "value" is designated as generated moral principles and faiths reflecting emotions, thoughts, aims and interests of majority of the society and acknowledged as necessary and truth to provide continuance of people and their treatments in their own society. The values are social representative for the goals regarded as leader principles and encouraging them in their lives (Rohan, 2000). In other words, the values, a kind of belief, are standards and criterions utilized by people in order to describe "favorable", "truth" and "pleasant" (Özkalp & Kirel, 2003). Individuals can change their values in the process of interaction they keep (Turan & Aktan, 2008).

The values may influence emotional intelligence of people. In the study, the aim is to assess emotional intelligence of teachers from humanity values. The participants of the study involve 214 teachers. In the study "Trait Emotional Intelligence Questionnaire –short form (TEQue-SF) developed by Petrides and Furnham (2001) and adopted by Dilmaç and Arıca (2012) into Turkish was implemented for analysis of teachers' emotional intelligence. To examine teachers' humanity values," Humanity Values Questionnaire" developed by Dilmaç and Arıca (2012). As a result of the study, a significant relationship was found between teachers' emotional intelligence and humanity values. Approximately, 13% of variable in factor called well-being of teachers' emotional intelligence is clarified by humanity values of teachers. Teachers' emotional intelligence has no significant effect on the variable for humanity values that teachers have in factor of "self-control and socialness". About 17 % of variable in emotion factor for teachers' emotional intelligence is demonstrated by humanity values. The humanity values of teachers represent about 15% of variable for the level of teachers' emotional intelligence.


Keywords: analysis of teachers, emotional intelligence, humanity values

SELF-EFFICACY BELIEFS OF PROSPECTIVE SOCIAL STUDIES TEACHERS TOWARDS THE USE OF TECHNOLOGY IN EDUCATION

Ozkan Akman

Innovations in communication technologies have been very effective in all areas as well as in education. Educational environment is changing rapidly with the technological developments. Educational tools and materials of renewal with these innovations in technology can respond to the needs of the day. Such developments should provide a technological quality to education. If education is not adjusted to the developments in technology, it cannot respond the needs and expectations of the society. The aim of this study was to determine the social studies teacher candidates' attitudes and ideas towards the use of technological tools in teaching. The study was carried out 165 students in social studies teaching department at University of Gaziantep in the academic year of 2015-2016. As data collection tool, "Technology Attitude Scale" consisting of 26 items and 5 factors was used. In addition, for the detection of ideas of prospective teachers, a semi-structured interview conducted on the use of technology in education with five students. The paired samples t-test was used to analyze the data. When the results 105 were analyzed, the pre-test and post-test means in the technology attitude scale were statistically significant difference in favor of the post test. Training teachers via using technological tools is effective to change teachers' attitudes in a positive way. They have also declared their positive ideas about using technology in education.

Keywords: technology, education, prospective social studies teachers, self-efficacy beliefs



THE RELATIONSHIP BETWEEN SOCIAL STUDIES PRE SERVICE TEACHERS' SELF EFFICACY BELIEFS IN TECHNOLOGICAL PEDAGOGICAL AND CONTENT KNOWLEDGE AND THEIR EDUCATIONAL INTERNET USAGE LEVELS

Ozkan Akman

Social Studies pre-service teachers' internet usage for educational purposes is very important nowadays. Pre-service teachers who are trained to be good citizens should be involved with appropriate technological developments. Due to the changes in needs of the society depending on the science and technology, teachers have become essential in adapting to this change. The purpose of this study is to find out the relationship between the pre-service teachers' self-efficacy perceptions of educational internet usage and their self- efficacy beliefs in technological pedagogical and content knowledge. This study has been conducted with a group of 176 pre-service teachers of social studies. For this purpose, "self-efficacy beliefs of educational internet usage scale" developed by Şahin (2009) and also "Social Studies Pre-service Teachers' Self-confidence in Technological Pedagogical and Content Knowledge Scale" developed by Akman (2014) have been used. Independent t-test and one-way analysis of variance have been performed by using SPSS 18.00 program. According to data obtained from these measuring means; significant differences have been observed according to gender and frequency of Internet usage while no significant differences have been detected in terms of grade level and department. In addition, significant relations have been detected between the educational usage of the Internet and self-efficacy beliefs in technological pedagogical and content knowledge.

Keywords: social studies pre-service teachers, educational internet usage, technological pedagogical and content knowledge



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