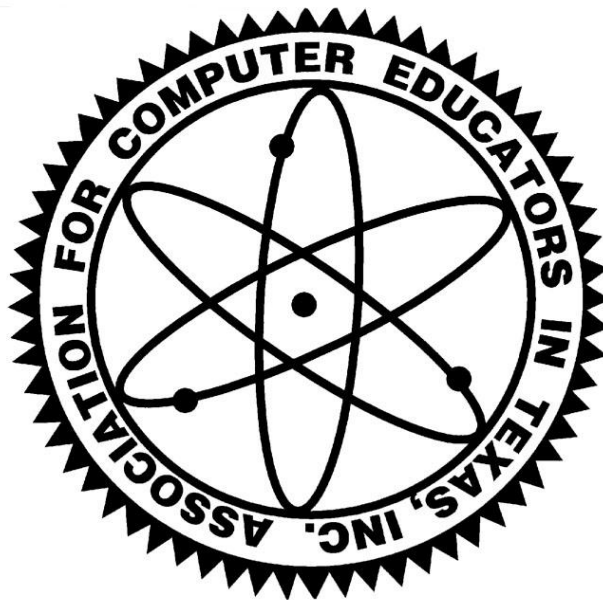*Proceedings of the 50th ACET Annual Conference*
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Preparing Students for the Microsoft Private Cloud

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This year's hot topic —The Microsoft Private Cloud. This presentation answers your questions about how to bring this important technology to your students. With the advent of Windows Server 2012 R2, Hyper-V virtualization, System Center 2012 R2 Virtual Machine Manager, and System Center 2012 R2 Application Manager, Microsoft has upped the ante for the private cloud. This presentation starts with the basics of "cloud speak" and ends with an action plan to bring the Microsoft Private Cloud to your students. Your presenter will share his experiences as the Lead Principal Investigator for a $248,000 National Science Foundation (NSF) grant to increase the number of technicians who enter the IT workforce with competencies in server virtualization and cloud computing. With more than 20 years of computer experience with both small and large organizations, author Ron Carswell is a practically focused, proficient writer and successful instructor.

Keywords: Microsoft, Private, Cloud, Virtualization, Cloud Speak

Gamification: A Place to Start

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Games have been around for thousands of years, while gamification is only now an emerging field. Gamification of learning is bringing game-related activities and ideas to learning settings, be it earning points, stars and badges or using a computer game to support a learning objective. We will look at the definition of a game and how it is used in educational settings. See some examples of gamification at companies, educational computer games and results of research around educational computer games. Find out where to find some computer games for most any academic area at searchable database at www.wingz2fly.com. Find out a possible place to start something to gamify your classes.

Keywords: gamification, computer games, educational games, gamify learning

Reflections on My Undergraduate Course Taking

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The newness of new ideas, though sometimes very discomforting, is a good thing, a very good thing. Marvin Minsky (polymath cognitive psychologist) wrote that he had learned to enjoy the "feeling of awkwardness" triggered by having to learn something new. "It's so thrilling," he says, "not to be able to do something. It's such a rare experience to treasure. It won't last."

In my field of study, I am a terminally-qualified expert and because of my expertise, I can no longer remember when I did not know what I have come to know so well. That ungainly awkwardness Minsky describes is long gone. I find it difficult, nigh impossible, to understand why the students I teach cannot understand what I understand (smile), which admittedly, is not a really a laughing matter.

This paper describes my experience taking undergraduate courses for credit over the past four school years and some of the lessons I have learned. I also list the advantages that accrue as a result of taking undergraduate courses, advantages that can accrue to you as a neo-undergraduate [Greek *neo* new, revived], to the students who populate your courses, and to your peers who actually teach the courses you enroll in.

Keywords: expertise, student learning, curiosity, pedagogy

Replacing a Network Laboratory with Virtual Machines

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Enrollment in the upper division Computer Network Course at the University of Texas Pan American averages twenty-five students per semester. Maintaining a laboratory suitable for this number of students, 25 computers, servers, routers and switches, requires many hours of planning, preparation and maintenance.   Our network lab is shared with the Cyber Security and Forensics class. When the author was teaching both courses, it was not difficult to keep one group of students from changing the configuration of another group. However, when these courses were assigned to different faculty, maintaining the lab had become a daunting task.

In the school year 2013-14 a new approach was put in place to teach networking skills. It involved virtualizing students' own laptops. A quick survey revealed that all of our students in the networking class had their own personal computers. After reviewing available free virtual machine software Oracle VirtualBox was selected as the acceptable solution. Some students used VMware with the understanding the Faculty would not be able to assist them.

Two classes had been taught using the Virtual Machine approach with great deal of success and students in general have been very positive about the overall outcome. The paper describes this new approach to network practical instruction and gives specific laboratory exercises for the entire semester.

Keywords: Network, Virtual Machines, Success, Students, Practical, Instructions

Hadoop: What is it and why do I care?

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Hadoop is the Open Source version of the Google Map algorithm. Just imagine if you had to download the internet every night, index it and make it searchable. That would be pretty hard to do right? That is what Google does so you can find out about the latest escapade of Justine Beiber, or the best deal on green leather shoes whenever you want to.

Hadoop has established itself as THE open source platform for Big Data. Hadoop lets you store as much data as you need, in whatever form you need, simply by adding more servers to a Hadoop cluster. Each new server (which can include even low cost x86 machines) adds more storage as well more processing power to the Hadoop cluster. This makes data storage with Hadoop far cheaper than any prior method of data storage.

Keywords: Hadoop, big data

The Computer Literacy Course Revisited
Part One – Freshman Student Seminar

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Abstract

As mandated by the Texas Higher Education Coordinating Board, core curriculum in many Texas public colleges and universities has been revised drastically. Included in this revision is the removal of the required three-hour credit computer literacy course from the core curriculum. For many years, college students pursuing an undergraduate degree have been required to complete a course in or show mastery of computer concepts knowledge and skills as a part of their college studies. Although the assumption may be that today's college students have had ample opportunities to master computer concepts and skills in high school, the fact remains that many high school students do not choose to take a computer course in high school and have no formal computer education prior to their attending college. In addition to the aforementioned high school students, there are many college students who graduated from high school many years ago when computer education was not an option in their high school curricula. The removal of the computer literacy course from the core curriculum has the potential of "leaving behind" these and many other Texas college students who were not exposed to basic computer knowledge in high school and who do not have computer skills other than, perhaps, the ability to surf the net.

This paper examines the required computer literacy course content prior to its elimination from the Texas core requirement, and presents a freshman-level model course that adheres to the Coordinating Board's mandate while addressing computer literacy shortcomings of many first-time college students.

Using Case Studies to Teach Technical and Soft Skills in Systems Analysis and Design

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When computer science majors leave the academic world for the job market, employers expect them to have certain skills. They expect them not only to have book knowledge of the field of computer science, but they expect them to be capable of applying that knowledge to their real world problems. Therefore, successful computer science students must acquire knowledge that, in Bloom's Taxonomy terminology, extends from simply "remembering" all the way up to "evaluating" and "creating". Teaching a course such as Systems Analysis and Design effectively has its own set of challenges, as it requires imparting a broad mixture of both technical and soft skills, and demands fairly abstract problem solving capabilities. In order for the knowledge taught in the course to reach the upper levels of Bloom's Taxonomy, instruction must be done in the context of realistic problems, problems considerably larger than normally addressed in the more programming-oriented courses. Students need the opportunity to "apply" what they learn at the "remembering" and "understanding" levels to sizable, realistic problems. Such opportunity can be provided in the form of case studies, which provide a platform for students to apply what they are learning conceptually to problems that are large enough, and that extend over a significant enough period of time, to experience what it really means to do systems analysis and design. Appropriately used, case studies can provide tenable models of real world problems, offering students a sufficiently realistic experience so that the knowledge they acquire can transfer to the real world.

Keywords: analysis and design, case study, Bloom's taxonomy

The Computer Literacy Course Revisited
Part Two – Transfer Student Seminar

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Abstract

With the mandated changes to the public higher education core curriculum that included elimination of the required three-hour credit computer literacy course, many incoming college students who do not have adequate knowledge of computer concepts and lack basic computer skills are left with no option for a formal and for-credit course that would introduce them to computer knowledge and skills during their undergraduate studies. Since the authors believe that mastery of computer concepts and skills are essential for students to succeed in college and in their chosen careers, they devised two new courses to address college students' computer literacy needs while adhering to the new core curriculum as mandated by the Texas Higher Education Coordinating Board. The first course was developed with the "new" (student who had not attended a higher education institution previously) freshman students in mind, and the second course was developed for sophomore-level transfer students with prior college experience. Both courses were developed as communication courses, with emphasis on team work and group dynamics, and special attention given to college success strategies, technique, resources, and tools. Today, multiple sections of the aforementioned freshman and sophomore communication courses are offered as University Freshman Seminar and University Transfer Seminars, and incoming students can choose one of these courses to satisfy a three-hour communication component core requirement.

This paper presents the sophomore-level model course that introduces students to effective written, oral, and visual communication skills in face-to-face and cyberspace settings while presenting the previously required computer literacy course topics. In addition, this course model with its specifics is described in detail, and course syllabus and semester schedule are revealed.

Motivating Undergraduates to Engage in Scientific Research

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When I was an undergraduate student, I had very limited resources, background knowledge, and opportunities to be involved in research projects. After enrolling in graduate school at UTD to pursue my doctoral degree in Computer Science, I struggled in starting my research. I did not know how to conduct a literature survey to find out what was already accomplished on the topic in which I was interested; how to identify the limitations, pros and cons of these studies; how to formulate my thoughts into a feasible approach; how to design my experiments; and how to make meaningful observations and conclusions based on analyses of my data. I wish I had been given an opportunity to learn different research methods, to acquire skills in critical thinking and problem solving, and to improve oral presentation and technical writing skills. I also wish I had participated in a research program such as the REU experience at UTD when I was an undergraduate student.

Thinking back and looking forward, I know exactly the challenges and fears that undergraduate students will face when committing themselves to doing research. Based on my experience as a graduate student mentor for the REU program at UTD, I will address the following important issues which are key factors in motivating more undergraduate students to engage in scientific research: time management; teamwork & collaboration; confidence to achieve ambitious milestones; appropriate project selection; full commitment & persistence; and interaction with faculty supervisors and other students on related projects.

Keywords: undergraduate research, REU, NSF, graduate student mentor

Teaching Software Testing for Undergraduates: A Teaching Assistant's Perspective

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When I was an undergraduate student, the subject of software testing rarely appeared in my curricula. Although some aspects of software testing were covered, the actual application of testing practices was not explored in depth. Therefore, when testing my own programs, I applied ad-hoc and informal testing approaches. After entering graduate school and becoming a Ph.D. candidate with research focus on software testing, I learned advanced concepts and techniques in this area and realized the importance of testing in ensuring high software quality.

As a teaching assistant of the UTD software testing class for three years, I have observed that most CS/SE undergraduates do not know how to apply appropriate testing techniques to ensure the quality of their programs. Without being armed with proper software testing knowledge at an early stage of their studies, these students will not be adequately prepared to deliver high-quality work.

From my perspective as a teaching assistant, fundamental testing techniques should be emphasized in different courses, starting with the introductory freshman programming class, rather than postponing this subject until the junior or even the senior year. Students should be required to apply their software testing knowledge from the first programming assignment to the group-based semester-long capstone project course, required for every undergraduate before graduation, in which students adopt various software testing techniques to achieve the expected quality assurance. The ultimate goal is to make software testing an integral part of every programmer's coding practice, which will help produce more reliable software at reduced cost.

Keywords: software testing, teaching assistant

Checklist for Successful Team-Based IT Service-Learning Projects

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Service learning is emerging as an alternative teaching mechanism in the IT discipline. An essential aspect of service learning is the existence of a "third party" which is neither the instructor nor the student; this third party is the community client. Students work with this community client and develop an IT product. The community client mentors students, evaluates their work, and provides guidance for their future careers. In class, the instructor teaches the theory behind IT product development and supervises students.

Very often in IT, service learning takes on a project form done by teams of students – the main motivation behind team-based projects is that working cooperatively is an important program objective in almost all IT fields. In such projects, groups of students work for the same third party client, and the instructor is required to motivate and evaluate each team appropriately. It is also important for the instructor to ensure that all members of the team are doing their work and prevent any "freeloading" - else, the very purpose of service learning may get defeated.

The author has been conducting team-based service-learning projects for the past ten years and has developed a practical template for managing team-based projects; this template has evolved based on the experience with over seventy-five team projects performed for organizations in and around Tyler including NASA and Bell Helicopter. Author will discuss this checklist with several examples of students' work including the pedagogical tools used to successfully supervise and monitor student teams.

Keywords: service, learning, team, project, manage

Data in the Cloud: Risks and Mitigation

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Increasingly more and more organizations are opting for outsourcing data to remote cloud service providers (CSPs). This is primarily to reduce the maintenance cost and the burden of large local data storage. However, the fact that data owners no longer physically possess their sensitive data raises new challenges to the tasks of data confidentiality and integrity in cloud computing systems.

We investigate what risks are associated with outsourcing sensitive data (e.g., personal information, electronic health records, and financial data) to remote cloud servers. Such risks include unauthorized access and misuse of customers' confidential data. Moreover, correctness of customers' data in the cloud may be at risk due to different reasons: data loss for hardware failure, CSP may discard data that have not been or are rarely accessed, and cloud infrastructures are subject to wide range of internal and external security threats.

In addition, we provide some perspectives and methodologies that can be used to mitigate the risks of outsourcing data storage. We are interested with both static and dynamic data, where the data owner is capable of not only archiving and accessing the data but also updating and scaling these outsourced data.

We present prototype implementation on commercial cloud platform, namely Amazon S3. The prototype is developed using Amazon Web Services SDK for .NET, which is available for free download at http://aws.amazon.com/sdkfornet/.

Keywords: Cloud computing, data integrity, confidentiality, Amazon S3

The Role of Gamification in Higher Ed

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We may all agree that higher education is not a game, but the upcoming generation understands games. Gaming has integrated itself in their daily lives. We may argue whether it is too integrated, but none-the-less the incentives behind gaming can be a good motivational tool. The years of hoping that the fear of getting bad grades really motivates them may be gone forever. Can we use this concept to improve or motivate our students along their learning journey?

Keywords: gaming, gamification, student motivation

Flipped classes: the Applications and the Pedagogy

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The idea started by thinking about how to increase students' retention, understanding and commitment to complete their degree on time. Flipped classes offer a different alternative from traditional teaching methods. Instructors will have more time to answer questions that might require additional explanation. The students, usually, are required to read related materials, watch short segments of videos, visit specific websites, and attempt seriously to do the assigned homework. Research has shown that interaction between instructor and students has improved as a result of changing to flipped classroom. Other have found some pitfalls to this approach of teaching. This presentation will examine the traditional teaching method by evaluating the relationship between the instructor and the students and whether the changes to flipped classes will enhance the learning process positively. Finally, this presentation will cover some of the web services, tools and software used in flipped classes. Our hope from this research is to get a better understanding about the practice and hopefully to start to apply some of the findings in some of our future introductory classes.

Keywords: Flipped Classes, Teaching Methods, Tools, Practices

Redundancy Requirements for Computer Networks

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Consumers have become so dependent on computer systems that it is very difficult for any organization to function without making proper arrangements for reliability, availability and serviceability (RAS) of computer networks. This paper, based on the author's experience as an IT consultant, examines the redundancy requirements and alternatives for practical implementations of redundancy at every stage of a computer system beginning with the power source and ending with data availability.

Power failures and power supply malfunction are common causes of inoperative servers. Servers should be equipped with redundant power supply and dual power sources. Broadband connection is another source of malfunction. More and more organizations are becoming dependent on cloud computing either as providers or consumers. Broadband unavailability can cripple such organizations. For maximum uptime dual broadband sources should be available along with routers capable of failover or load-balancing. Routers and switches should be connected to two power sources through a power transfer switch. In order to assure authentication services are always available, it is essential to create multiple domain controllers that replicate active directory and DNS.

Data can be stored across several hard drives using RAID technology. Though rare, hard drive controllers can fail, and dual controllers should be installed. In order to assure data availability in time critical operations, failover clustering should be implemented. Small organizations can implement failover clustering in virtual machines. This paper also examines backup options including cloud backup services.

Keywords: Redundancy, failover clustering, load-balancing, availability

Another visit to Knowledge Management and Business Intelligence Model

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This presentation is a continuation from a previous one that discussed a model of knowledge management and business intelligence. The addition will discuss data discovery and identify opportunities through the use of business intelligence. The model will add a realistic approach by exploring some of the limitations associated with business intelligence practices to avoid unexpected complexity and unwarranted cost in the long run. Further, this presentation will go over some of the futuristic applications of business intelligence and its contribution to many areas of our daily activities.

Keywords: knowledge, management, business intelligence, model, future

Challenges encountered when teaching how to design, to implement, and to test a Hunter VTail UAV/Drone in an embedded system class

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Embedded systems represent a ubiquitous aspect of our daily life. Engineering embedded systems is an increasingly interesting and lucrative topic for designs ranging from bicycles to medical systems to airplanes and beyond. One of the objectives of the Embedded Systems course at both undergraduate and graduate levels is to learn how to build embedded systems, namely how to design, to implement, and to test a Hunter VTail UAV/Drone. The components of the drone were purchased from Lynxmotion, acquired by RobotShop, a leading supplier for rigorous and innovative Science, Technology, Engineering, and Mathematics (STEM) education programs.

While teaching the Embedded Systems class, there were many challenges, such as carefully assemble the drone and doing the right testing according to the federal regulations (for example, the use of drone only below 400 feet in remote areas away from any airport and only for non-commercial purposes). Students work as a team coordinated by Dr. Andrei to design and implement the drone using the specifications provided by Lynxmotion/RobotShop and other references. This presentation will list the key features and the challenges occurred while working at this project.

Keywords: embedded system, teaching, drone, team work

Teaching a System Analysis class as real life project. Preparing the students for the real World

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It has been a rewarding approach to teach Systems Analysis and Design course as a real life project. The class requires the students to form their company. The company must have its mission, goals and objective. Students understand their business and technical roles before they get hired by the instructor to perform a real life project. This presentation will discuss all the steps required to create not only a rewarding learning environment, but also to design a functional information systems. This presentation will discuss the applied methodology in order to complete all the requirements to produce a well-designed system. The students are exposed to various activities to develop a solution. The class allows for a learning environment where the students act as system analysts and deal directly with the end users, management, IT staff and other types of stakeholders. The presentation also will discuss some of the frustration and the rewards, usually, encountered while teaching a class in a real world setting.

Keywords: Systems, Analysis, Design, SDLC, Real, Project, teaching