UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Engineering, Built Environment and Information Technology

Fakulteit Ingenieurswese, Bou-omgewing en Inligtingtegnologie / Lefapha la Boetšenere, Tikologo ya Kago le Theknolotši ya Tshedimošo

Department of INFORMATICS

Newsletter March 2020

Better together!

Department of Informatics team photo—March 2020.

In this issue:

Teams come in many shapes and sizes, and there is not a single team model that is suitable for all scenarios. The concept of a team is perhaps something we do not think about explicitly, yet, it is the way in which work outputs are delivered. Executive teams manage organisations across all industries, Marketing and Sales teams design and deliver new products and services to their customers, and project teams are constituted to deliver specific outcomes – whether it is to develop software solutions, build infrastructure or execute a research project.

High-performance work teams are distinguished by their ability to function in the most efficient and effective manner possible for extended periods of time. A high-performance team is a group of people with **specific roles** and **complementary talents and skills**, aligned with and committed to a **common purpose**, who consistently show **high levels of collaboration and innovation**, which **produce superior results**.

Let's take a look at 5 foundational characteristics that seem to underpin most high-performance teams.

Continued on page 2

From Prof Carina's desk

At the end of the first quarter of our academic year, we are in the midst of unique circumstances—actually, never experienced before conditions! COVID-19 also has an impact on SA and the ways in which we were used to work and live. As a team, we had to put strategies in places to still engage with our students, while no one is on campus.

I would like to thank The Informatics team for the positive way in which you considered how your modules may proceed through means that we have at our disposal. Please continue to share ideas and suggestions with the rest of the team or highlight lessons learned that may also assist other team members in optimising their teaching and learning.

In the rest of this issue we celebrate achievements, we share some research elements and we also provide an overview of our involvement in the South African Institute for Computer Scientists and Information Technologists. We also share a small glimpse of the JCP annual function, celebrating great success in the partnership between our faculty and the community!

I would like to wish you all of the best for the few weeks ahead. Let us continue to support one another as you have done so during the past 2 weeks.

Stay safe!

Prof Carina

From page 1

Diversity

Effective teams are composed of members with a wide range of skills and experiences from which to draw for support, guidance and motivation. Dynamic teams have members with particular strengths that complement one another and a variety of personalities to fulfil different roles. Effective teams respect and embrace differences of opinion. An individual is not perfect, but a team can be!

Clear Goals and Expectations

Clear goals and timetables drive high-performance teams, as does a knowledge of professional expectations. To have multiple people work toward objectives of a common goal, must be clearly understood by all team members, and each person must know exactly what his responsibilities are in relation to the achievement of team objectives. Progress toward goals should be measured at regular intervals to ensure the different elements of the team work are progressing together in a timely fashion.

Effective Communication

Teams rely on effective communication to pool their work efforts. Effective oral and written communication is clear and concise. It is important that each team member feels comfortable discussing their responsibilities to allow for the expression of creative ideas and to ensure that questions are raised before mistakes are made. Regular group meetings and written communication should keep everyone up to date on team progress and new developments.

"Individual commitment to a group effort--that is what makes a team work, a company work, a society work, a civilization work."
--Vince Lombardi

Trust

Members of high-performance teams trust one another to pull their own weight and get their jobs done to the best of their ability, within the time frames set out. When team members don't trust one another to successfully complete their tasks, time gets wasted monitoring others' working habits, which can take away from other tasks and lead to animosity in the work environment.

Ownership

High-performance team members are empowered by a sense of ownership for what the team produces; they feel they have a stake in the success of team projects. ■ *From Characteristics of a High-Performance Team by Chris Wolski and The Cements of a High Performing Team by Luis Costa*

DARE TO DREAM

I previously wrote about my journey back to competing in athletics after recovering from health issues. Although this article is somewhat related, it is also about life in general. You see, although I could remember the exact day I became addicted to running, I don't remember at all when I became a track athlete. I have always regarded myself as a 'fast road runner', but never even considered lining up to compete on a track. How do you even train for track events? How far and how fast is fast enough? And then I met my current training partner at the Athletics Gauteng North (AGN) cross country championships in 2018. At the time, she was competing in my current category, and although I only saw the back of her in all the races, we immediately 'clicked' (Luckily she is in another category now and still lightning fast at the age of 50). It was not until the next year that we started training together and she and her husband guided me to a very successful provincial and national track championships in 2019. Never in my wildest dreams I imaged that 2020 will be even better. We both in the meantime joined a track running group and have a track coach, train with a bunch

Sunet Eybers and Marili Munnik—Sunet received her National Colours (age group 45-49). She would have received her Springbok blazer on 2 May and compete in the Masters World Championship in Canada in July—unfortunately, all events have been cancelled.

of super talented super fast youngsters (of which I am 3 x their age) and I can do 40 x 200m's (yes, the numbers are correct). But the dilemma is, as mentioned before, they are fast … and my training partner is fast. In fact, she is 1 second away from the national record in the 800m in her age category and is ranked amongst the best in the world. That leaves me, the slowest snail in the group … always being last and they are always waiting ... cheering.

Sometimes I feel like just giving up, but then I remember that I should focus on my own goals and looking after my own well-being. It is not about how fast they are, but how fast I can go. It reminds me of life. It is not about the car my neighbour drives or the awards their children win. It is about being the best YOU can be with what YOU have. If you need to drive an old Volkswagen beetle car and not a Rolls Royce … that is OK. You will also get to the finish line.

Luckily, we meet wonderful people along the way if we dare to step out of our comfort zone. They cheer us on when the going gets tough like that last 100m of a 1500m race. Without my coach, my training partner and her husband and my 70 year old dear friend (and SA record holder over 10,000m), I would have given up long ago. My message therefore is:

- Surround yourself with people that have your best interest at heart;
- Focus on your own goals and dreams;
- And never ever stop dreaming!

Off we go to provincial, national and world athletics championships (virus permitting of course).

■ *Sunet Eybers*

What is Society 5.0

and why should we in Information Systems take note of it

The concept of Society 5.0 was introduced in Japan in the 5th Science and Technology Basic Plan. It follows the hunting society (Society 1.0), agricultural society (Society 2.0), industrial society (Society 3.0), and information society (Society 4.0) (CAO, 2020). The Cabinet Office of Japan (CAO,2020) defines Society 5.0 as "A human-centered society that balances economic advancement with the resolution of social problems by a system that highly integrates cyberspace and physical space."

In Informatics or Information Systems, we are concerned with development of systems in organizations where the human aspect is becoming more and more important. We include therefore aspects of Human Computer Interaction (HCI) into our curriculum. Society 5.0 is linked with the fourth industrial revolution (4IR), which is the current and developing environment in which disruptive technologies and trends such as the Internet of Things (IoT), robotics, virtual reality (VR), augmented reality (AR), and artificial intelligence (AI) are changing the way we socialize, live and work (Techtarget, 2019).

In Society 5.0 we are living in a society where there are a vast amount of information available. The access to information also links to the opportunities for skills training where humans can now not only have access to unlimited online courses, but institutions are constantly

Take cognisance of our user base that will be living in this world of infobesity

renewing curricula to be more relevant in a changing world. We are therefore faced with the possibility of information overload. We often find ourselves asking what should I do next – at what should I look next – what are the most important – how do I distinguish what to spend time on and what not. Information overload, also known as infobesity, is where we struggle to make decisions since we have too much information pertaining to an issue.

For us in Informatics (Information Systems) we need to understand that our client is often not only the organization that we design our systems for, but we need to take cognisance of our user base that will be living in this world of infobesity. How do we engage with our user in such a way that he or she is not overload with information? How do we design our systems for users that are exposed to information that they cannot always believe is true – how do we ensure trust in our systems.

For the user there is a danger in the overload of information that may cause a threat that we are so focused on what is out there that we don't distinguish between information and knowledge. The role that society plays in the digital world open up worlds of application domains for the Informatics (Information Systems) practitioner. The opportunities are not only limited to organizations in the traditional sector e.g. banking, but also include opportunities in sectors such as health where the advancement of the use of digital technologies are moving at an enormous pace.

We are living in a fast changing world – technologies are being used more innovative and business models needs to change and be agile to make provision for all the disruptors while still conducting business on a daily basis. Humans need to adapt to the digital world both at work and in our home environment – we need to understand how living in the digital age will impact us. It is necessary therefore for humans to be aware of the change, look at the opportunities, and use these opportunities to educate ourselves and also be ready for the digital change. ■ *Alta van der Merwe*

References:

Salgues, B (2018) Society 5.0: Industry of the Future, Technologies, Methods and Tools, Wiley.

Techtarget (2019) Fourth Industrial Revolution, Online available at https://whatis.techtarget.com/definition/fourth-industrial-revolution, Accessed October 2019.

Joint Community Program—looking back on a wonderful year!

The Community-based Project Module (code: JCP), the compulsory undergraduate module of the Faculty of Engineering, Built Environment and Information Technology had its yearly function on Wednesday, 19 February 2020. The JCP groups of 2019 did excellent community projects and 206 students were acknowledged for their outstanding JCP project as well as the eight volunteers that joined some of the groups.

The best groups for 2019 were Group 74 that worked at Speranza Akademie in Bethlehem in the Free State. They built a jungle gym and managed to receive sponsors for more than R15 000. Their YouTube on their project can be viewed at https://youtu.be/-6QkgmTxPng. Group 199 indexed and photographed more than 500 gravestones at the Irene concentration camp and uploaded the images on a website they created (https://www.ireneconcentrationcamp.co.za). Their Youtube is available at https://youtu.be/T2u8mosn5PU.

Special awards were given to Captain Colette Weilbach from the Brooklyn Police Station, Annemarie Carelsen from Smuts House Museum and Marietjie Engelbrecht, Johann Engelbrecht and Solly Chaane for Sunnyside Pre-Primary School for their commitment and dedication as supervisors and mentors to the JCP-students. Altus Bisschoff, as well as David Toma, were acknowledged for managing numerous large scale JCP-projects. Altus Bisschoff was the project leader for The Community Park (https://www.up.ac.za/news/post_2851951-up-students-restore-hatfield-community-park) and David

Toma has been mentoring students since 2010 at the Swartkop Air Force Museum. ■ *Martina Jordaan*

Community partners and students at the function of the JCP module. ***(Back to front)*** *Dr Martina Jordaan (Lecturer of the JCP module), Prof Sunil Maharaj (Dean of the Faculty), Captain Colette Weilbach from the Brooklyn Police Station, Solly Manaiawa (Of the JCP-office), Annemarie Carelsen from Smuts House Museum, Marietjie Engelbrecht, Johann Engelbrecht and Solly Chaane for Sunnyside Pre-Primary School and JCP project leaders Altus Bisschoff.*

South African Institute of Computer Scientist and Information Technologists

Mission

The Institute focusses on research and development in computing and information technology (IT) in South Africa.

Strategic objectives

The objectives of SAICSIT are

- To enhance the communication amongst members and all interested parties regarding research and development projects by means of services and links with other professional bodies;
- To support education and training; To monitor the availability of human resources for research and development;
- To seek solutions to technical and socio-economic problems in South Africa by means of research and development projects;
- To strive for professionalism and excellence amongst members.

Annual conferences

SAICSIT has been holding an annual conference since 1985. Recent conferences are:

- 2019 Skukuza Carina de Villiers http://www.saicsit2019.org
- 2018 Port Elizabeth Sue Petratos https://saicsit.mandela.ac.za/
- 2017 Thaba 'Nchu Muthoni Masinde Pieter Blignaut/T. Stott
- 2016 Johannesburg Marijke Coetzee http://saicsit2016.org
- 2015 Stellenbosch Bruce Watson http://www.saicsit2015.org
- 2014 Pretoria Alta vd Merwe / Carina de Villiers http://www.saicsit2014.org/

SA Computer Journal (SACJ)

SAICSIT founded and supports the SA Computer Journal. The South African Computer Journal is an accredited specialist ICT academic journal, publishing research articles, technical reports and communications in English in the Computer Science and Information Systems domains.

The journal has been on Scopus since 2016, and now appears on the 2020 DHET sub-list of Scopus-indexed journals that qualify for subsidy for articles published by South African academics at public universities.
For more information on SACJ, see http://sacj.cs.uct.ac.za

Involvement from Department of Informatics

The Department of Informatics is actively involved in SAICSIT with the following members on the council:

- President: Prof Aurona Gerber
- Honorary secretary: Prof Hanlie Smuts
- Honorary treasurer: Dr Marie Hattingh
- Council members: Prof Alta van der Merwe, Prof Machdel Matthee, Dr Tendani Mawela

Pioneer award

The SAICSIT Council decided in 2008 to, as an ongoing process, recognize individuals who have played pioneering roles in promoting Computer Science and Information Technology as academic disciplines in SA. In 2019 Prof Carina de Villiers received the Pioneer award for her contribution to the field.

From left to right: *Prof Carina de Villiers, Prof Jan Kroeze (SAICSIT President 2019) and Prof Brenda Scholtz (SAICSIT Council Member)*

Research Feedback – SOTL Grants 2019

The Department of Education Innovation provides annual grants for research into teaching and learning to researchers from different departments across the university. The so called UP Scholarship of Teaching and Learning (SoTL) grants are meant for projects with focus the development and improvement of teaching and learning in the grant holder's discipline. The Department of Informatics was the recipient of five such grants in 2019. A short summary of the five projects and staff members involved are given below:

The development of a software application for the improvement of assessment practices in higher Education

Informatics: Carina de Villiers (Department of Informatics) and Elmien van Ameron (Department of Education Innovation)

To examine the phenomenon of scholarly assessment the research project attempted to find an answer to the question, "How can a more scholarly approach towards assessment design be improved?" The research question culminated into the development of an assessment application, embedded in a cognitive taxonomy, to provide structured guidance to university lecturers towards a more scholarly approach when designing assessment instruments such as test and examination papers. A blueprint was developed built around the revised Bloom's cognitive taxonomy dimensions for the classification of assessment questions (i.e. test and examination questions) and learning outcomes, which was then converted into a software application using Web2.0 technology. Sixteen lecturers were chosen to participate in the study. A pre-test and post-test were administered to participants before and after the workshop interventions as a means of measuring whether any growth in lecturers' assessment thinking has taken place.

Hybrid learning: The impact of using infographics and student designed textbook on higher education student – Phase 2

Informatics: Riana Steyn (Department of Informatics), Nita Mennega (Department of Informatics) and Adriana Botha (Department of Education Innovation)

This is a continuing study considering the impact of using infographics and student designed textbooks. A significant finding is that generation Z relies heavily on their peers for assistance even though literature says their social skills are underdeveloped. This means that as academics, we need to understand the generation Z and how they prefer to study, and then create content and tools for them so that they can indeed broaden their own knowledge and become life-long learners. The results revealed the students enjoyed the infographic but more so, they felt they could understand the content better and apply the knowledge in their semester test. Students further felt that the infographic could be used in explaining study material, learning activities and summarising the content. This paper also found that the majority still preferred to open and work through the infographic using a laptop.

Towards a knowledge conversion platform to support Information Systems Analysis and Design industry ready graduates

Informatics: Marie Hattingh, Lizette Weilbach, Komla Pillay

The purpose of this research is to develop a web based platform that will facilitate the learning of INF 271 and INF 370 students. The INF 271 module provides the important foundation for preparing students to successfully complete the INF 370 capstone project. The initial framework of the platform has been developed and include theoretical content, examples, lessons learnt, links to videos to two of the main study units of the module. The initial version of the platform has been released to the students and feedback has been obtained.

Evaluating the effectiveness of teaching critical thinking, problem solving and design thinking to first year Informatics students

Informatics: Marita Turpin (Department of Informatics), Machdel Matthee (Department of Informatics) and Denis Kriel (Department of Education Innovation)

Key findings related to our first year Critical Thinking and Problem solving module (INF113) included the following. First, we found evidence of the value of exposing students to a maker philosophy as well as design thinking, when presented with tasks that required creative problem solving. From feedback surveys as well as a pre- and post-assessment on critical thinking skills, we found that the teaching of critical thinking assisted students not only to analyse arguments but also to better read/understand their exam questions and to better evaluate online information, so as to identify fake news. In terms of the problem-solving component of the course, feedback surveys indicated that students found the problem-solving approached and methods valuable beyond the classroom and also benefited from it in their personal life and everyday situations. In 2019, a computational thinking activity was introduced as part of problem-solving and it was found that the first year Informatics students generally lack computational thinking abilities, an area of concern that we would like to better address in the future.

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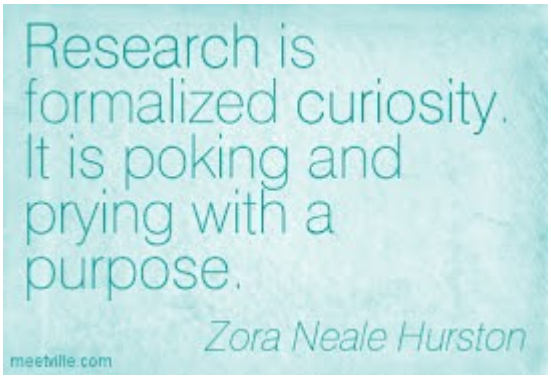
Using collaboration tools to enhance, support and assess Information Systems Analysis and Design (ISAD) teamwork

Informatics: Lizette Weilbach, Marie Hattingh and Komla Pillay

The purpose of this research was to understand the way in which collaboration tools could be used to assist with team construction and the enhancement, support and assessment of teamwork in the INF 271 and INF 370 modules. To gain a deeper understanding of the factors that contribute to successful / unsuccessful Information Systems Analysis and Design (ISAD) teams, data has been gathered on the way in which students in the INF370 module have formed their INF370 project teams. This data has been linked up with the iPeer assessment done throughout the year by the individual teams; members on their team mates; operations and teamwork skills as well as on the eventual project outcomes and success of each team. To improve the students' skills on the use of collaboration tools, Asana was implemented as a team collaboration tool in the second year module (INF271) (in preparation for the capstone project). The students were trained on the use of the software to do the planning for their projects; to distribute the work between the team members; to communicate on all project aspects and issues; and to submit their project contributions. Finally, to enhance teamwork in ISAD by utilising collaboration tools to improve the way in which IISAD teamwork is assessed, the INF370 students will be required to use ASANA as PM tool for their projects in 2020. In this way, the process followed by the individual team members, as well as their individual contributions, will be clearly visible and this should assist the lecturers with resolving group conflicts and the assessment of individual team member participation and contributions. The results of this part of the research will be published in 2021.



.....WINNER.....WINNER.....

***Paul Poteete (right)**, University of Pretoria, New Brighton, USA for the PhD on Sychometric Modeling of Cybersecurity Roles*

Prof Rennie's international student, Paul Poteete, won the best PhD paper award at the International Conference on Cyber Warfare and Security (ICCWS).

His paper is titled *Sychometric Modeling of Cybersecurity Roles.*

The website showing the award : https://www.academic-conferences.org/conferences/iccws/iccws-future-and-past/