Report on Visit to CDIO Conference at University of Calgary, University of Alberta, University of British Columbia, Learning of Common Wealth, Canada

From 15th June 2017 to 24th June 2017

Team of 5 Academicians & Administrators from Somaiya Vidyavihar including
Dr. Rajan Welukar, Provost, SVV
Dr. Suresh Ukarande, Principal, KJSIEIT, Sion
Dr. Shubha Pandit, Principal, KJSCOE, Vidyavihar
Dr. Sunita Patil, Vice Principal, KJSIEIT, Sion
Mrs. Aarti Phadake, Asso. Prof. KJSCOE, Vidyavihar visited Canada from 15th June 2017 to 24th June 2017 to attend CDIO Conference at University of Calgary (UoC) and to visit University of Alberta (UoA), University of British Columbia, office of Learning of Common Wealth, Canada.

The main focus of the visit was:

To learn, understand and adopt the best practices at Canadian universities, Faculty, student training & opportunities for collaborative projects and the International Collaborations between SVV & Canadian higher Education Systems.

The Visit Scheduled as :

1. Attending Conceive, Design, Implement & Organize **(**CDIO) Conference from 18th Jun 2017 to 22nd Jun 2017 at University of Calgary, CA visiting various departments, laboratories, workspaces & meeting heads of various sections of the same university.
2. Visiting delegates & various department and section heads of University of Alberta, Edmonton, CA for International Collaborations.
3. Visiting delegates & various department and section heads of University of British Columbia Institute of Technology for International Collaborations.
4. Visit to Learning of Common Wealth for various student projects at British Columbia

I. CDIO Conference from 18th Jun 2017 to 22nd Jun 2017 at University of Calgary and visit to various departments, laboratories of UoC.

In contemporary undergraduate engineering education, there is a seemingly irreconcilable tension between two growing needs. On one hand, there is the ever increasing body of technical knowledge that it is felt that graduating students must command. On the other hand, there is a growing recognition that young engineers must possess a wide array of personal, interpersonal, and system building knowledge and skills that will allow them to function in real engineering teams and to produce real products and systems.

In order to resolve these seemingly irreconcilable needs, education systems must develop a new vision and concept for undergraduate education. MIT has developing this new educational concept by applying the *engineering problem solving paradigm*. This entails first developing and codifying a comprehensive understanding of the skills needed by the contemporary engineer. Next to develop new approaches to enable

and enhance the learning of these skills. Simultaneously explore new systems to assess technical learning, and to utilize this assessment information to improve our educational process. Collectively these activities comprise the **Conceive, Design, Implement & Organize (**CDIO) program at MIT which is growing yearly by joining more & more institutions every year through last 12 CDIO conferences worldwide.

The CDIO Initiative adopted 12 standards to describe CDIO programs. The main role of these 12 CDIO Standards is to serve as a guideline for educational program reform and evaluation, create benchmarks and goals with worldwide application, and provide a framework for continuous improvement.

The 12 CDIO Standards:

- Define the distinguishing features of a CDIO program;
- Serve as guidelines for educational program reform and evaluation;
- Create benchmarks and goals with worldwide application; and
- Provide a framework for continuous improvement.

The 12 CDIO Standards Addresses:

1. Program Philosophy (Standard 1),
2. Curriculum Development (Standards 2, 3 And 4),
3. Design-Build Experiences And Workspaces (Standards 5 And 6),
4. New Methods Of Teaching And Learning (Standards 7 And 8),
5. Faculty Development (Standards 9 And 10), And
6. Assessment and Evaluation (Standards 11 and 12).

STANDARD 1: The Context -Adoption of the principle that product. Process, and system lifecycle development and deployment are the context for engineering education.

STANDARD 2: Learning Outcomes-Specific, detailed learning outcomes for personal, interpersonal, and product, process and system building skills, consistent with program goals and validated by program stakeholders.

STANDARD 3: Integrated Curriculum-A curriculum designed with mutually supporting disciplinary subjects, with an explicit plan to integrate personal, interpersonal, and product, process, and system building skills.

STANDARD 4: Introduction to Engineering-An introductory course that provides the framework for engineering practice in product. Process, and system building, and introduces essential personal and interpersonal skills.

STANDARD 5: Design-Implement Experiences-A curriculum that includes two or more design implement experiences, including one at a basic level and one at an advanced level.

STANDARD 6: Engineering Workspaces-Workspaces and laboratories that support and encourage hands-on learning of product, process, and system building, disciplinary knowledge, and social learning.

STANDARD 7: Integrated Learning Experiences-Integrated learning experiences that lead to the acquisition of disciplinary knowledge, as well as personal, interpersonal, and product, process, and system building skills

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STANDARD 8: Active Learning-Teaching and learning based on active experiential learning methods.

STANDARD 9: Enhancement of Faculty Competence-Actions that enhance faculty competence in personal, interpersonal, and product and system building skills.

STANDARD 10: Enhancement of Faculty Teaching Competence-Actions that enhance faculty competence in providing integrated learning experiences, in using active experiential learning methods, and in assessing student learning.

STANDARD 11: Learning Assessment-Assessment of student learning in personal, interpersonal, and product, process, and system building skills, as well as in disciplinary knowledge.

STANDARD 12: Program Evaluation-A system that evaluates programs against these 12 standards, and provides feedback to students, faculty, and other stakeholders for the purposes of continuous improvement.

This year, the 13th annual CDIO conference was hosted by the Schulich School of Engineering at University of Calgary, Canada. CDIO is a huge success of last 13 years efforts with total 136 collaborating institutions, representing 35 countries across the world and this year total 13 countries attended the Conceive, Design, Implement and Operate conference where the basic theme was "For engineering education how the project based learning can be incorporated to help and produce the next generation of engineers with foundation of engineering with social & ethical aspects as an global human being".

CDIO covered various Keynote speeches on worldwide education systems & scenarios with CDIO standards. The contributions presented using four different formats, i.e. Podium Presentations, Poster Presentations, Workshop Presentations and Roundtables.

On 18th June 2017

CDIO started on 18th June with the welcome speech of **Dr. Ron Hugo, Conference Chair** & Li Ka Shing Foundation Chair in Engineering Education Innovation, Schulich School of Engineering, University of Calgary. He stated that this conference is an excellent opportunity to reconnect with colleagues and forge new friendships by bringing together world leading educators to chart the future of engineering education. UoC honored to play a role in facilitating this.

We interacted many times with Ron and our Provost invited him to conduct a training program for our SVV faculty on CDIO standards to be incorporated in our education system. He was very delighted to collaborate with SVV and promised to conduct the workshop in near future which will be designed as per SVV requirements & considering best implementation of CDIO standards.

Dr. Bill Rosehart, P.Eng., Dean of the Schulich School of Engineering, UoC welcomed all delegates and briefed conference agenda through this year's theme, "Engineering Education in the Digital Age, reflecting the shift in how our students learn, interact with each other and engage with their instructors". He thanked to the up

gradation in the technology for CDIO as, it is building a critical framework, Conceiving - Designing - Implementing - Operating, to help produce the next generation of engineers.

Dr. Johan Malmqvist, Co-directors of the CDIO Initiative stated that the CDIO Initiative started as do - with an idea - but its future success relies on the support of its strong global network. He was proud that CDIO is now comprised of 136 collaborating institutions, representing 35 countries across the world. As tomorrow's engineers move on to become society's leaders, they require a tempered understanding of the technical, economic, environmental, and human factors that need to be balanced if they are to become effective problem solvers. He guide this year's conference topics include curriculum design, project based learning, emerging technologies in education, sustainability, entrepreneurship, and many more. He said that all keynotes promised to be thought-provoking, workshops to be stimulating, and the CDIO Academy to be inspiring. He assured that the conference experience will be enriching, educational, and exciting, as you immerse yourselves in fascinating discussions, re-connect with old friends, and forge new relationships!

<u>On 19th June 2017</u>

Dr. Edward Crawley, Ford Professor of Engineering at MIT delivered a Keynote Address on "NEET at MIT - an Instance of CDIO"

Dr. Edward Crawley shared that the New Engineering Education Transformation (NEET) is an undertaking of the School of Engineering of MIT. The aim is to rethink engineering education – what students learn and how students learn – in a fundamental way across the school. He elaborated that the approach rests on four guiding principles: that we should educate our students for the technological challenges they will face in their future, and not be constrained by the traditions and silos of the past; that we should prepare students for roles in life on the spectrum from makers to discoverers; that we should build our pedagogy around the way our students learn, and aggressively experiment with blended digital learning; and finally that in an era when information is ubiquitous, we should focus our education on teaching students how to think and how to learn.

<u>On 20th June 2017</u>

Dr. Kathy Perkins is Director of the PhET Interactive Simulations Project at University of Colorado Boulder (https://phet.colorado.edu) delivered **a Keynote Address on "PhET Interactive Simulations: Engaging students and supporting learning"**

Dr. Kathy Perkins highlighted that as faculty, we are faced with the challenge of addressing multiple educational goals in our courses – from achieving specific content learning, to developing disciplinary practices and habits of mind, to growing student's appreciation and engagement in STEM. In this talk, she examined how education technology – specifically interactive simulations – can be designed and integrated into our instructional practice to open up new opportunities to support these diverse goals. She elaborated that over the past 15 years, the PhET Interactive Simulations project at the University of Colorado Boulder has developed 135 free interactive simulations for teaching and learning STEM topics (<u>https://phet</u>. colorado.edu). Each simulation is based on education research, and provides a highly interactive environment which supports exploration, makes the invisible visible, includes the visual models that experts use, and emphasizes the connections between real life phenomena and the underlying science. Today, these simulations are translated into 80 languages and used nearly 100 times per year. All the examples shown by her highlighted a variety of instructional uses that create productive learning opportunities for engineering students, aligned with CDIO standards.

Kathys simulation tool is very much useful to all the learners from secondary school to higher education systems. We interacted with her & she promised to support in all the ways as per SVV requirements in coming future collaborations.

On 21st June 2017

Mr. Armen Pischdotchian, Academic Tech Mentor for IBM Watson delivered the Key Note Address on "IBM Watson and the future of cognitive services"

Mr. Armen Pischdotchian explored the cognitive era and the role that algorithms play in the economy. He shown few video examples of corporates & industry giants like Netflix recommends movies from the long tail, Amazon recommends the popular, cars that learn when to take over a vehicle that is in front, robots that distinguish trash from dishes to be washed. In his lecture, he uncovered the blackbox that lurks behind artificial neural networks powering IBM Watson cognitive services that enables the magic of machine learning. He challenged everyone to construct the stochastic gradient descent algorithm. How fitting that we will end the lecture with a glimpse into year 2025: the rise of the bots and the sunset of apps, natural language processing (NLP) has led to natural language understanding (NLU), and block chain is now in the fabric of bots. Armen currently mentors university faculty and students and conducts enablement sessions for both IBMers and partners pertaining to the IBM Watson Solution offerings. Armen has consulted and deployed various cognitive solutions at universities around the world.

Our team was very much positive with the way Armen brought the technology in front of 135 institutions across world, our Provost invited him to visit SVV campus in his coming visit to India and Armen was impressed with the working of SVV group. Armen promised Provost to make the arrangement to visit IBM innovation Laboratories at Boston in the next visit of all SVV administrators.

Following workshops and sessions were attended by Dr. Suresh Ukarande & Dr. Sunita Patil to understand & incorporate CDIO standards in SVV institutions:

Detailed Objectives and Outcome of the Sessions Attended are as follows:

1. **TEAM BASED LEARNING AND PROJECT BASED LEARNING AS INNOVATIVE METODOLOGIES IN ENGINEERING EDUCATION:A COMPARISON BETWEEN THE ASSESSMENT OUTCOMES**

Cleginaldo Pereira de Carvalho , Centro University of Salesiano, Mechanical Engineering Department, Lorena, Sao Paulo, Brazil.

Universities around the world are adopting innovative methodologies in applied science education. The conception takes into account that the students are the center of knowledge acquirement and is becoming a mandatory guide for the engineering courses. One innovation methodology is project based learning (PBL) in which, the students learn the technical concepts through one multidisciplinary project which they conceive, design, implement and operate one prototype. On the other hand, there is a methodology which stimulates the students to develop transversal skills through a team work conception called team based learning (TBL). In session shown a comparison between both methodologies is presented considering the assessment outcomes from each methodology, applied to a group of students from an industrial engineering course. The results obtained from the students' assessment under both methodologies application are treated statistically and the

results were compared and discussed. Finally, the conclusion is shown as well as suggestions for further works were presented. The justification for this session was based on the rare comparison of the performance results between the two innovative learning methodologies. Team based learning (TBL) and Project based learning (PBL).

2. **EXPERTS IN TEAMWORK - A LARGE SCALE COURSE FOR INTERDISCIPLINARY LEARNING AND COLLABORATION**

Patric Wallin, Reidar Lyng, Department of Education and Lifelong Learning, Norwegian University of Science and Technology (NTNU), Trondheim, Norway
Bjørn Sortland, Sven Veine, Department of Industrial Economics and Technology Management, Norwegian University of Science and Technology (NTNU), Trondheim, Norway

Experts in Teamwork is a mandatory course at the Norwegian University of Science and technology (NTNU) for all master students, regardless of program, where the students work in interdisciplinary teams on real world projects, with detailed and explicit intended learning outcomes for personal and interpersonal skills using active and experiential learning approaches. In this study, we used a mixed method research approach with a quantitative analysis that capitalize on the course evaluation data from the last 10 years and a textual qualitative analysis of the project descriptions of some of EiT villages. Based on the empirical data, we discuss the extent to which the students perceive EiT as a valuable preparation for their work life, and what factors are important for the development and success of the EiT.

3. **CDIO STANDARDS COMPLIANCE: MONITORING PERCEPTION OF STUDENTS' PROFICIENCY LEVELS** **Marcia Muñoz, Claudia Martínez**, Computer Science Department, Universidad Católica de la Santísima Concepción (UCSC)
Chile Cristian Cárdenas, Industrial Engineering Department, UCSC, Chile

A mechanism for monitoring a program's effectiveness in reaching its intended educational goals across the curriculum was demonstrated by this team of Chile. Since 2011, UCSC has been implementing a CDIO-based curricular reform. UCSC developed tools and mechanisms to systematize data gathering for continuous evaluation processes. The achievement of student learning outcomes associated with CDIO Syllabus levels 2, 3 and 4, at the end of the second, sixth and ninth semesters is measured. At each milestone, it was interesting that not only in analyzing data associated with traditional course-level grades, but also in how student achievement levels were perceived by students and instructors. Then, we measure the gaps between these perceptions and present them in easy-to-understand radial graphs. This information is used to detect low proficiency levels and to manage instructors and students expectations of their proficiency levels at each milestone. Also, students have done a summer internship at the end of the ninth semester. Students fill a self-evaluation performance survey regarding their internship, while employers evaluate the student's performance. These surveys focused on personal and interpersonal skills and attitudes. The gaps between these results were also measured. This mechanism has been applied every semester since 2015. Their preliminary results have shown that student and instructor perception of proficiency levels show a larger variance for the first two milestones. However, by the end of the ninth semester, these gaps have been reduced, which shows that both students and instructors have a better understanding of their proficiency levels. Moreover, students are slightly more critical of their competence levels than their instructors and employers.

4. **THE CDIO APPROACH TO ENGINEERING EDUCATION: Designing and Integrating Design-Implement Experiences, Dr. Ron J. Hugo, University of Calgary, Canada, hugo@ucalgary.ca**

This workshop covered the rationale for design-implement experiences, to give examples of design-implement experiences in representative CDIO programs, to propose ideas for effective design-implement workspaces, design-implement experiences are instructional events in which learning occurs through the creation of a product, process, or system. The Design-Implement Experience may change from year-to-year, but the learning

objectives remain the same. Learning Objectives can be defined as - Work effectively in a team with proper communication, Analyze technical problems, Solve technical problems, Use appropriate Engineering methods, Learn how to make estimates, Develop concepts, Use acquired knowledge, Assess the quality of work. CDIO Standard 5 -- Design-Implement Experiences focuses on curriculum that includes two or more design implement experiences, including one at a basic level and one at an advanced level. It adds the realism to the curriculum, illustrating connections between engineering disciplines, Fostering students' creative abilities are motivating aspects for students. Conceive state-allows students to envision new systems, understand user needs, and develop concepts. It emphasizes reflections, reinforces human interaction largely a technology-free zone, model of cooperative, digitally supported design, design state- allows students to design, share designs, and understand interactions. Make the central room and team breakout rooms, *Design* space is near the *Implement* space to reinforce connections. Implement State- allows students to build small, medium and large systems. Mechanical, electronic, and specialty fabrications, Software engineering and integration, Safe, yet accessible as much as possible during "student hours". Operate state -Opportunities for students to learn about operations. They can operate their own experiments and projects. They can operate facility class experiments. Provides simulated operations of real systems. Workspace Usage Modes should reinforce disciplinary knowledge, community building, system building and knowledge discovery. Workspace Considerations must look at - flexibility, connectivity, safety, hours of operation, staffing, security, scheduling and use, ownership, display devices and areas, storage of equipment, materials, and works in progress, social space, furnishings, public address areas and systems, cost

5. CDIO-BASED ENTREPRENEURSHIP COURSES AS DRIVERS OF INNOVATION IN INDUSTRIAL SEGMENTS

Charlotte Norrman Project Management, Innovation and Entrepreneurship, Department of Management and Engineering, Linköping University, Sweden
Olof Hjelm Environmental Technology and Management, Department of Management and Engineering, Linköping University, Sweden

This session described and discussed how in two CDIO-based entrepreneurship courses at Linköping University, Sweden, encouraging the students to identify and solve challenges and problems in two adjacent industrial sectors, i.e., environmental technology and agricultural/green industries. Both courses are offered to a broad range of engineering programs. The industrial sectors chosen give the students a delimited context incorporating direction, business culture and technology that forms a basis for the students on which to build their entrepreneurship cases. Working with real challenges gives real-life experience of how models and frameworks can be utilized and correctly executed. In addition, it increases project relevance, student motivation and learning. One challenge to overcome is the fact that many students lack previous work-life experience and a thorough knowledge of the industrial sectors in focus. Experiences from earlier courses
told us that this made it difficult for students identify and develop realistic, yet challenging and new business ideas on their own to. To remedy this, we tested facilitating interaction with industry, and through this help the students to detect real problems. Furthermore, it was anticipated that interaction with external factors, such as established businesses, organizations and potential customers, helps students to adjust and fine-tune needs and demands to create business ideas that could have real potential. As an added benefit, this approach could enable academia to act as co-creator in industrial problem solving, i.e., to put academic knowledge to practical use in society. Based on our own experiences and student feedback we discuss how this approach forced the students out of their comfort zones, challenged their creativity and enhanced their learning.

6. ACTIVE LEARNING METHODS

Dr Matt Murphy, Director of Mechanical Engineering Programmes, University of Liverpool, UK
Dr. Sc. Juha Kontio, Dean, Faculty of Business, Turku University of Applied Sciences

This Workshop covered the importance of Activating Learners what are the teacher's fundamental task is to get students to engage in learning activities that are likely to result in their achieving the desired outcomes. Remember that what the student does is actually more important in determining what is learned than what the

teacher does." Constructive alignment: Aligning competences, activities and Assessment. What activities are appropriate for students in order to develop the desired competencies? How can students demonstrate that they have acquired the desired levels of competencies? What should students know or be able to do as a result of the course? So, the intended learning outcomes for this session are to understand what active learning means and to learn five active learning methods and to experience active learning in practice.

7. **TECHNOLOGY AND TEACHING IN ENGINEERING EDUCATION: A BLENDED COURSE FOR FACULTY**
M. Cleveland-Innes, S. Stenbom, S. Gauvreau Athabasca University, KTH Royal Institute of Technology

This session provided a case study description of a teaching development course for engineering faculty. Findings indicated that faculty engaging in a blended course about online and blended learning perceive significant benefited to the learning design. Perceived benefits far outweighed concerns about this alternative to classroom teaching alone. The reports resulted from an exploratory case study of a teaching development course at KTH Royal Institute of Technology in Stockholm, Sweden. This research method chose to "allow the research community to be able to better address questions around key engineering education challenges ". The challenges addressed through this research referred to the larger education reform movement in higher education. Findings indicate a notable range of responses from faculty to the design and use of blended learning but a definite interest in the use of technology for learning. Including 1) a description of the context in which the course is offered to faculty, 2) information about how this blended course about blended teaching and learning was created, and 3) conceptual themes that emerged from analysis of discussion forum posts about the use of blended communities' of inquiry for engineering education.

8. **EMERGING TECHNOLOGIES IN ENGINEERING EDUCATION: CAN WE MAKE IT WORK?**
Pieter de Vries, Renate Klaassen, Aldert Kamp, Delft University of Technology

This session presented an explorative research into the use of emerging technologies for teaching and learning. An important stimulus for this session was the skills gap. The rapid changing demand puts a lot of pressure on education and the promise is that technology might help to solve the problem. The expectation is that indeed the next generation of technologies will affect education more profoundly, because of the increase and the vast integration of these technologies in our society at large. Engineering education has been reluctant in accepting technologies for learning, but the speed of change needs to be acknowledged and education cannot continue to say that the demand for new skills is a world we do not know yet. This exploration started with an assessment about what kind of technologies are at stake and what their contribution might be for education. Session showed recent research and report used to value the educational technological developments; representatives from industry and education were interviewed and a small number of experiments were executed to gather further knowledge and experience. At the time of writing these experiments allowed to zoom in on Virtual Reality (VR) as one of the most promising technologies. The focus in this research was on the perceived value for education and therefor the exploration is very much related to the triangle perspective of student – teacher – organization as interrelated stakeholders and decisive for the usability of technology. The guiding questions were: what is the perceived value for the students; what is the value for the teacher and what are the consequences for the organization? The one thing that emerges is that engineering education needs to be much more proactive to master the question about technology in teaching and learning. This ongoing exploration is an initiative of the 4TU Centre for Engineering Education being an alliance of the four technical universities in the Netherlands.

9. **COMMUNICATION ACTIVITIES IN ENGINEERING EDUCATION –INTEGRATING CONTENT AND LANGUAGE**
Carl Johan Carlsson, Chalmers University of Technology, Department of Communication and Learning in Science, Chalmers

This workshop covered the main aspects of incorporating *CDIO Syllabus 3.2 Communication* in engineering education. Various aspects of communication and writing *as a cognitive tool*, *writing for disciplinary socialisation*, and, *communicate disciplinary knowledge*.

10. HOW TO RE-IMAGINE THE CDIO FRAMEWORK AND COMMUNITY TO BETTER PREPARE ITS MEMBERS FOR TOMORROW'S NEEDS?

Aldert Kamp, Delft University of Technology, Faculty of Aerospace Engineering, the Netherlands

This workshop covered that "CDIO is a worldwide collaborative to conceive and develop a new vision of engineering education". Through this graduates should be able to conceive, design, implement and operate complex value-added engineering systems in a modern team-based engineering environment can be created for systems and products to prepare tomorrows engineers and fulfilling their needs.

11. A LEGO CHALLENGE TO DEVELOP ENGINEERING LEADERSHIP SKILLS

Robyn Paul, Emily Wyatt, Arindom Sen

There are many ways to engage first year engineering students into a conversation about Engineering Leadership. University of Calgary, have found that one of the most effective approaches is to have students participate in a fun and engaging activity followed by impactful and tangible reflection. The workshop provided attendees with the opportunity to 1) experience an engineering leadership related Lego activity and follow-up reflection; 2) participate in a discussion on the elements that make this activity effective; and 3) participate in a discussion on how to integrate similar engaged learning activities into an engineering leadership program.

12. APPROACHES FOR ADAPTING CDIO IN K-12 ENGINEERING OUTREACH

Stephanie Hladik, Emily Marasco, Laleh Behjat, Bill Rosehart, Anders Nygren
Electrical and Computer Engineering, University of Calgary

This workshop will outline two approaches to using the Conceive-Design-Implement-Operate method in K-12 outreach activities. The first approach is to use the C-D-I-O steps to develop such activities to be used to deliberately plan, create, and execute engineering outreach activities at the K-12 level. Alternatively, activities may be designed such that the K-12 students work through each of the Conceive-Design-Implement-Operate steps in the activity. The workshop will give attendees hands-on experience with both of these approaches. Attendees will have the opportunity to design an outreach activity about a specific STEM topic for students of a particular age, receive feedback, and learn tips and tricks for K-12 outreach.

13. MATLAB AND SIMULINK: LOW-COST HARDWARE, MOBILE DEVICES, AND THE CLOUD

Jerry Brusher, Ph.D., Education Technical Marketing, MathWorks

Hands-on, project-based learning directed toward the design, development, and deployment of engineering systems is critical to the preparation of students for professional practice. Model-Based Design enables students to develop and validate their designs in simulation and then automatically generate code for implementation in

hardware. This enables students to focus on the overall system design rather than the details of low-level coding. In this workshop, attendees will explore how to utilize MATLAB & Simulink to:
Implement Model-Based Design with low-cost hardware;
Acquire and analyze data with mobile devices;
Leverage the emerging connectivity of the Internet of Things.

14. BUILD A FACE RECOGNITION APP USING IBM BLUEMIX COGNITIVE SERVICES

Armen Pischdotchian, IBM Watson Academic Tech Mentor

In this workshop Armen told audience to imagine a situation entering a secure place that requires you to only look at the camera, if it recognizes you, regardless if you are wearing glasses or a hat, it lets you in and there is no need for swiping a badge. In this workshop you will build an app from scratch using the graphical interface of Node-RED. Your app will use IBM Watson Visual Recognition services to identify the faces of people; if those people happen to be in the millions of faces that the service is trained on, it will reveal their name; otherwise, distinguish gender and approximate age, with the confidence value visible.

Outcome of the CDIO conference:

This conference taught us new ways of teaching and learning process mostly applicable in the engineering as well as higher education system. These reforms can be made a part of SVV institutions to bring in the real life exposure to the students and faculty helping worldwide generation of creative, adoptive, student community having the understanding of social & ethical value based responsibilities in all aspects of life.

II. Visit to University of Alberta

We visited UoA on 16th June 2017. UoA as one of the best ranked Institutions in the world and expecting the opportunities with absolute experience of bringing about scholarly dimension from UoA prestigious academia to SVV institutions, we had a very fruitful discussion with the Deans and Directors of various departments & sections of UoA while understanding their pivotal role & contribution for placing UoA as one of the world's leading Universities in international education. SVV institutions aims to explore resourceful horizons in the allied field of emerging researches-with our inclination to collaborate with UoA through:

1. Collaborative projects between Science Faculty on Environment
2. Collaborative projects between engineering faculty on Energy.
3. Collaborative projects between Management faculty and;
4. Global Academic Leadership Program for our administrators & faculty

We proposed the collaborative venture with UoA for either 1/2 weeks or more duration to be designed fulfilling UoA program details and SVV institution requirements mutually. We are certain that our faculty will benefit immensely by gaining unparalleled resources across international avenues, while mutually exchanging-diversity in culture, education, curriculum and endless learning opportunities in mutual collaboration.

We are certain of providing and receiving adept guidance and mentoring by the collaboration programs in the allied fields and to initiate this global undertaking—on the parallel grounds of the programs UoA has designed for Chinese Universities and contribute significantly in the broader breadth of the specialized international endeavor between UoA and Somaiya Vidyavihar group in the progressive direction.

III. Visit to University of British Columbia Institute of Technology (BCIT), Vancouver

We mate Mr. Michael Galli, Manager-International Recruitment and Admissions, British Columbia Institute of Technology (BCIT) International, Centre for Applied Research and Innovation (CARI), British Columbia, Canada on 23rd June 2107. It was a very fruitful discussion understanding the pivotal role & contribution of BCIT as one of the world's leading Universities in international education.

The meeting was effective for exploring the possibilities for joint ventures between BCIT and SVV institutions in terms of following initiatives:

1. Designing Teacher Pedagogy Program as per SVV requirements & conducting a training program for SVV faculty either at faculty training center of BCIT, Canada or in India.
2. Conducting Joint Robotics Program at both places.
3. Instructional skill development program, Summer internship program can be conducted for SVV students.
4. Applied research development can be carried out between collaborative projects between SVV and BCIT faculty.
5. A prototype can be designed for collaborative research work.

We earnestly look forward to initiate this global undertaking on the parallel grounds of the programs between BCIT and SVV group contributing significantly in the broader breadth of the specialized international endeavor in the progressive direction.

Our provost agreed to have a confirmation for above ventures once we finalize our own requirements by having a discussion with all SVV HOIs.

IV. Visit to Learning of Common Wealth, British Columbia

We team from SVV group got the biggest opportunity to meet & interact with delegates from Common Wealth of Learning (CWL), Learning for Sustainable Development office at Burnaby, British Columbia, Canada on 23rd June 2017, Ms. Aasha Kanwar, President & CEO, Mr. K. Balasubramanian, Vice President, Mr. Venkataraman Balaji, Director, Technology & Knowledge Management. This meeting was only possible due to great friendship between theses delegates and our Provost.
It was a great learning experience for all of us to understand how CWL works for the Sustainable Development across 52 countries worldwide with the use of technology for distance learning through formal and informal ways of working in various sectors like:

a. Solutions to stop dropout rate of children from schools in countries like Africa, Nigeria etc.
b. Promoting skill development at open schools & secondary schools.
c. Teachers Training through Virtual University
d. Working with Blue Economy in small states.
e. In Agriculture field training farmers through mobile phones.
f. Learning to farmers through Commercial Banks.
g. Initiative of Farmer's Co. Op. Banks, Farmer Producer Company "To the

farmers by the farmers" in the countries like Uganda, Tanzania, Kenia etc.

h. Distance Learning through in-house designed, 27,000 MOOC courses.

By understanding the tremendous working of the CWL, we identified few areas where our students as well faculty can get the opportunity to work on few CWL project initiatives such as:

- Technology Enabled, ICT Based Learning
- Helping Institutes for Outcome Based Learning
- Developing Job Oriented Courses
- Project development in C- Delta (Common Wealth Digital Education Literacy in Technology and Advancements)

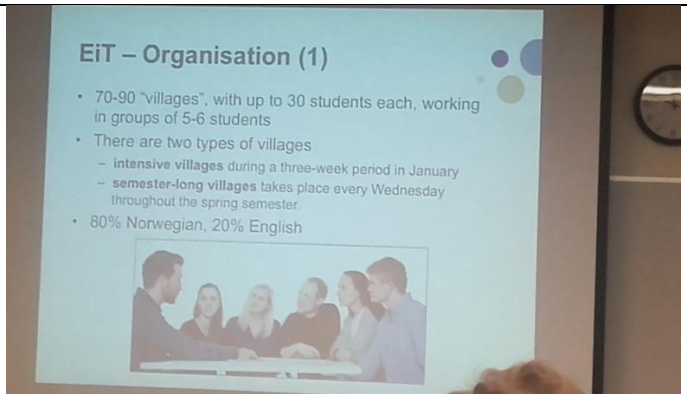
The meeting was very effective for getting the opportunities for collaborative projects for SVV students and faculty with CWL. We will share our experiences with all HOIs & SVV group of institutions will get the opportunity to work for the great cause with CWL.

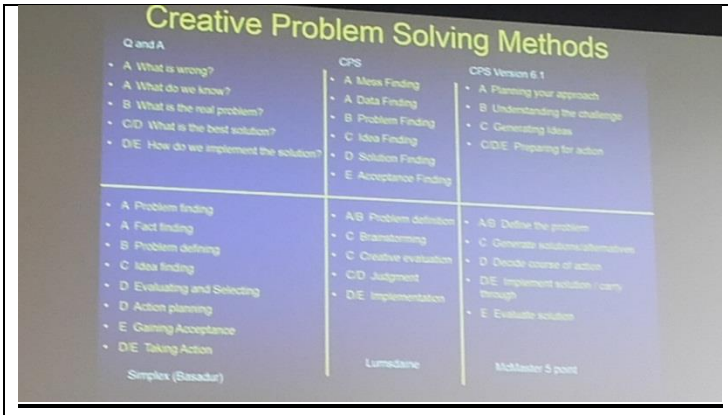
Few Snaps of The Visit:


Evolution of ideas


University of Alber
TELUS C


Thanks
Marcia Muñoz V.
Computer Science
Claudia Martinez
Computer Science
Cristian Cárdenas
Ingeniería Civil
ucsc.cl


EiT – Organisation (1)
70-90 "villages", with up to 30 students each, working in groups of 5-6 students
There are two types of villages
intensive villages during a three-week period in January
semester-long villages takes place every Wednesday throughout the spring semester.
80% Norwegian, 20% English


Creative Problem Solving Methods
Q and A
A What is wrong?
A What do we know?
B What is the real problem?
C/D What is the best solution?
D/E How do we implement the solution?
CPS
A Mess Finding
A Data Finding
B Problem Finding
C Idea Finding
D Solution Finding
E Acceptance Finding
CPS Version 6.1
A Planning your approach
B Understanding the challenge
C Generating Ideas
C/D/E Preparing for action
A Problem finding
A Fact finding
B Problem defining
C Idea finding
D Evaluating and Selecting
D Action planning
E Gaining Acceptance
D/E Taking Action
Simplex (Basadur)
A/B Problem definition
C Brainstorming
C Creative evaluation
C/D Judgment
D/E Implementation
Lumsdaine
A/B Define the problem
C Generate solutions/alternatives
D Decide course of action
D/E Implement solution / carry through
E Evaluate solution
McMaster 5 point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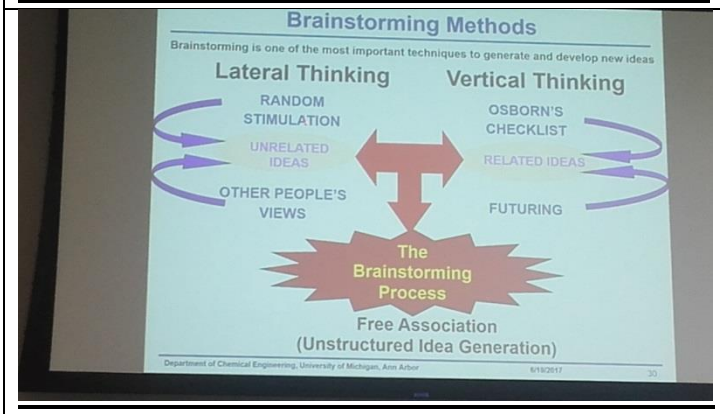
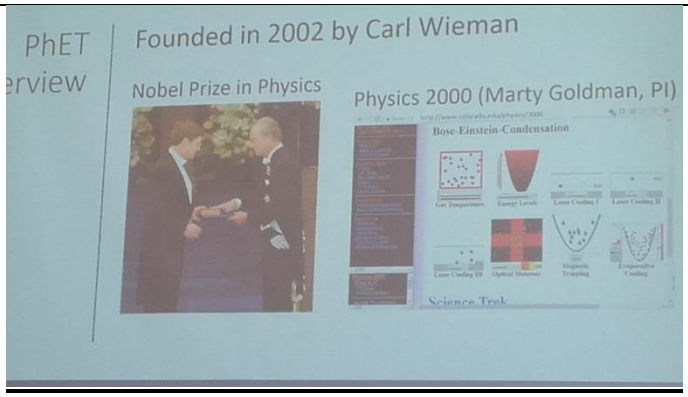
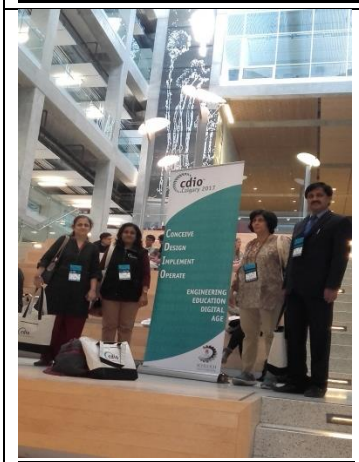

Brainstorming Methods
Brainstorming is one of the most important techniques to generate and develop new ideas
Lateral Thinking
Vertical Thinking
RANDOM STIMULATION
OSBORN'S CHECKLIST
UNRELATED IDEAS
RELATED IDEAS
OTHER PEOPLE'S VIEWS
FUTURING
The Brainstorming Process
Free Association
(Unstructured Idea Generation)
Department of Chemical Engineering, University of Michigan, Ann Arbor
6/18/2017
30


PhET
erview
Founded in 2002 by Carl Wieman
Nobel Prize in Physics
Physics 2000 (Marty Goldman, PI)
Bose-Einstein-Condensation
Science Trek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Conceive
Design
Implement
Operate
Engineering
Education
Digital
Age


JBL