

AIR®

POLE
IN COOPERATION WITH ELICA

Organisation POLE

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POLE - A Platform for Learning and Teaching

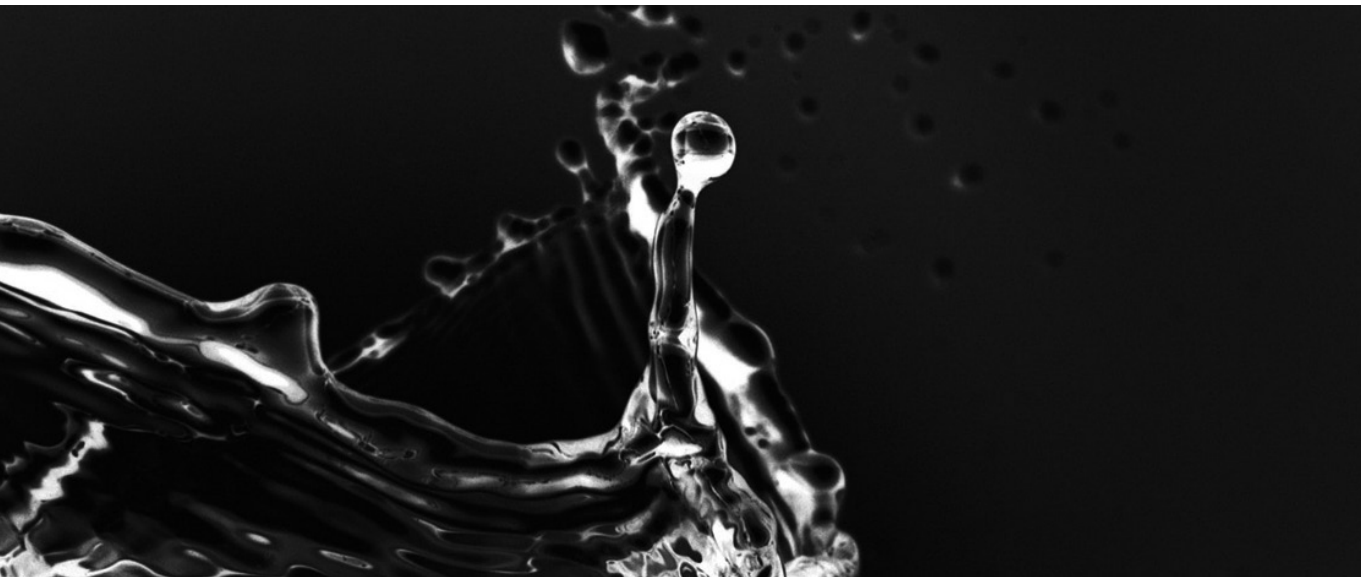
University students are nowadays increasingly challenged within their specific core disciplines; in addition however, they are also supposed to develop skills in order to apply this particular knowledge in practice. This ideally goes hand in hand with a sense of maturity of the individuals' characters vis-à-vis the social, cultural, and economical environment. The practical application of theoretical knowledge can thus only be implemented successfully if these three basic elements are taken into account.

In addition to university students' disciplinary knowledge, the ability to work efficiently within multicultural environments has become increasingly important. Universities are therefore looking to expand and deepen this particular aspect in order to provide the necessary expertise in this field. This realisation has led to universities becoming more proactive with regards to networking and offering joint courses, which is where POLE (Project Oriented Learning Environment) is actively involved in. In the course of this new collaboration, it has become apparent that the complementary aspect has gained in importance. An example for this is the liaising between strongly research-oriented and more practically oriented universities with the common goal of being able to implement the according results as soon as possible. Apart from contributing to more comprehensive and efficient process work, the POLE courses lay particular emphasis on improved cultural know-how.

In order to do this, students are encouraged to contribute their experiences within international teams, regardless of geographical and language barriers.

POLE sees itself as a learning system cooperating with other European or international universities. It does so within a reflexive context, taking into account the various cultures involved in order to create new methods of resolution regarding teaching and learning methods. The students are at the core of this concept, and are given the option to develop process-oriented expert knowledge through interdisciplinary teamwork. Simultaneously, they learn to work independently and to deal with current problem cases through the use of modern information and communication tools.

Processes within POLE are largely organised within the individual teams themselves. The according goals are set and committed to within the teams; in case of resulting conflicts, weight is given to iterative processes in order to find solutions. A further characteristic of POLE is an increasing tendency for the overlapping, or even amalgamation, of various lines of work in order to give way to new, holistic, and interdisciplinary perspectives. POLE is a comprehensive platform which gives students the opportunity to contribute their full potential. Each individual's attitudes, characteristics, and abilities are taken into account as a whole in order to allow as much space as possible for in-



dependent development of students' responsibilities and skills. A contribution to the concept of 'Campus in Mind' is made by POLE in providing the multi-disciplinary teams with learning facilities that are based on experimental and interactive technologies.

The teamwork in the POLE courses allows the students to further expand their specific professional skills, on the other hand, it also gives them the opportunity to develop more generic competences, which nowadays is one of the key qualifications in order to be able to adapt to a continuously changing environment. The course also enables students to evaluate their ability to function in a team and to analyse their styles of communication. Through practical examples, students are given the opportunity to explore how well they are able to work in a team, and to what degree they are flexible to accept members' concerns from other disciplines, i.e. how they can integrate these into their own work and patterns of thinking.

Experts and mentors which do not form part of the university, but are active members of businesses and the industry in general, are an essential part of POLE courses. Their participation contributes a high degree of practical knowledge to the projects, pointing out the actual 'state of the art'. In this manner, POLE manages to link academic education and professional practice. The intensive inter-

action between these two elements guarantees a rapid transfer of technology, while at the same time ensuring that the students involved are motivated to a high degree. POLE is not only about to significantly remould the landscape of teaching and learning at universities, but it also intends to yield substantial influence concerning decision-making and the creation of practical work processes. In association with university teaching staff, the mentors are instrumental in contributing expert knowledge and regular feedbacks to the teams, while they are also actively involved concerning the evaluation of processes and related products. The latter will be of increasing importance in the future, as scientific research has been initiated in connection with reflections of certain POLE processes. It is the intention of this kind of research to support students with regards to the awareness of their personal learning styles. The findings will then be made accessible for future work in a broader context.

Further POLE research issues include for example the creation of knowledge databases, which will serve as a tool for more rapid evaluation of solutions and decision making processes in the future. These efforts are based on the knowledge that a large part of creational, construction, and design processes are substantially shaped by re-design.



The initial POLE courses had been launched as a result of the ever increasing demands in the current building trade, which is of a highly complex, segmented, and competitive nature. Experts from the fields of architecture, civil engineering, and construction management are clearly demanding a broader education, along with more diversified core skills for engineering students. The POLE learning environment and its associated methodology is not limited to this initial context, but allows students from practically any discipline to apply their theoretical knowledge in practical cases. Through collaboration in interdisciplinary teams guided by process management students, students from fields such as architecture, urban planning, civil engineering, interior design, plastics engineering, mechanical engineering and economics were given the opportunity to cooperate in POLE projects and thus better understand the individual processes involved and acknowledge their relation to the social, economical, and political dimensions.

In 2011 POLE goes into its 11th year. It will bring together the disciplines of industrial and product design, mechanical engineering, electrical engineering, mechatronics, computer science, plastics technology as well as material science and process management. POLE invites students and faculty from University of Applied Sciences Northwestern Switzerland (as leading house), Swiss Federal Institute of Technology ETH Zürich, Aalborg University (Denmark), Tecnológico de Monterrey (Mexico), Universidad Politécnica de Madrid (Spain), Windesheim University, The Netherlands and Stanford University (USA).

Responsibilities of POLE and its Partner Universities

POLE considers itself as a learning platform which enables and facilitates interdisciplinary processes. It has also proven to offer an excellent test bed for research in the field of modern teaching and learning as well as in the field of evaluation of novel learning spaces. At the same time it is important to put on record that the responsibility for the disciplinary supervision of the students remains with the sending home universities. This relates also to the grading of the students' contribution. POLE on the other hand will provide a qualification on the team processes and on their interaction patterns. (It is suggested that students who successfully participate in POLE projects receive academic credits based on the ECTS.)

The experience during the previous POLE courses has revealed that this double responsibility of the student towards his/her POLE team and towards the home university and professors, respectively, may also bear conflicts. POLE demands that team decisions be respected what the approach and the agreed objectives is concerned; POLE leaders are convinced that within this frame work there is still ample tether to adhere to high academic standards in the disciplinary work.

Saying this makes it obvious that a close accompaniment and monitoring of the project by the faculty of the partner universities is essential and highly welcomed by POLE. The involved faculty will receive full access to all docu-



ments of the POLE project. Their participation during the kick-off events, the reviews and the final presentations will add to the interdisciplinary depth and thus to the quality of the project and to further developments of POLE.

Assessment

POLE has the ambition to continuously improve its learning and teaching platform. One step to do so is by integrating an external assessor into the process, who will participate in as many of the POLE design activities. POLE has co-operated in this field of evaluation and assessment with the Department of Education of the University of Applied Sciences Northwestern Switzerland and with Stanford University since the very beginning in the year 2000. The participatory assessment will focus on the effectiveness of the design processes and the adequate use of collaborative communication technologies.

Project Task: Innovative Concepts for Air-Treatment Appliances

Air is precious. Air, like water, is the element that makes life possible. Every day there is a great deal of dispute about pollution, smog and dust because everybody's life is threatened by them. It becomes obvious that health and wellness are no more negotiable issues: The problems need to be addressed immediately and cannot be postponed any more. Breathing is the most natural act that man does and the quality of air should be as pure as pos-

sible. Therefore, air quality must gain a high priority in our efforts towards a healthy society.

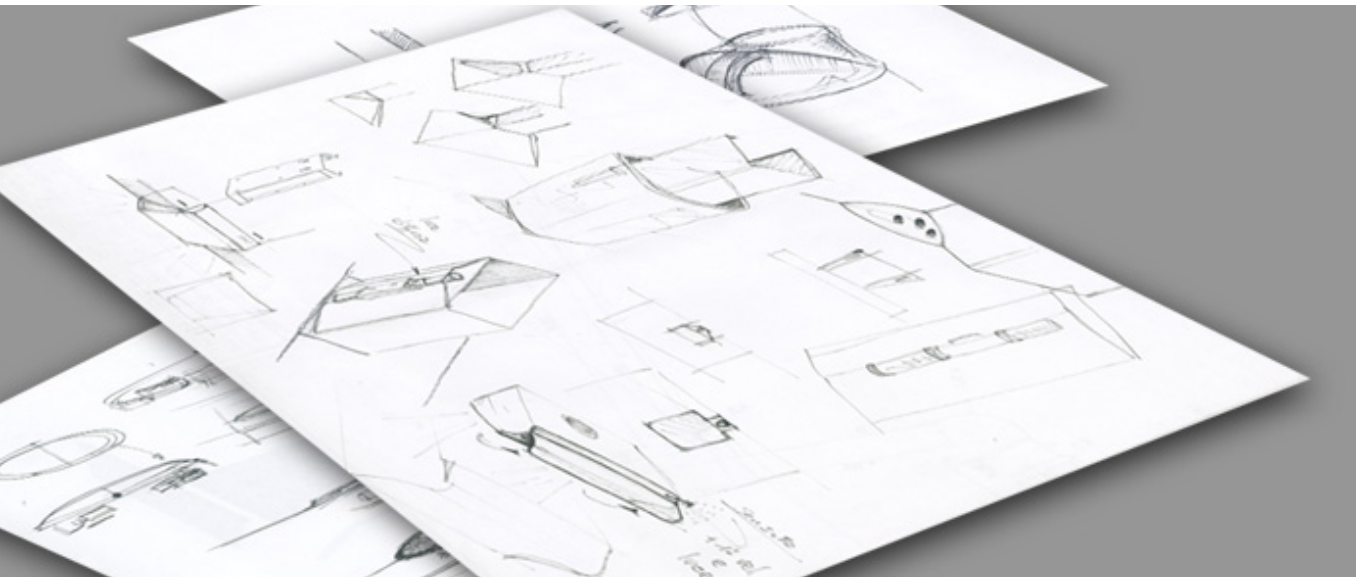
The Italy-based company ELICA Inc. is an international market leader in air quality equipment – in particular in domestic and kitchen applications. ELICA is the leader in domestic cooker hoods production and is recognized as a pioneer in air treatment appliances. The company's effort to innovate through technical improvements, investing in applied research and design studies is the key to maintain its leading role. It is ELICA's goal to consolidate and expand through innovative ideas and developments for everyday's air quality treatment by the cooperation with POLE.

The task of the present project Air® will be to conceive and design new multifunctional products, innovative purifying and aspiring systems, using modern technologies to improve air quality and, therefore, to improve health, wellness and – more generally – quality of life. A system is sought for that is enriched by features that prevents the environment from contamination by bacteria or pollen, considerably reduces noise and possibly adds new relaxing features like comforting (chromo-therapy) light. The anticipated product can be conceived for installations in a domestic environment; but it is also possible to evaluate options or product families for applications in bigger public spaces (e.g. fumoirs). The novel product will have to be ergonomic, easy to install and service. A user-friendly operation, an attractive design and a low energy consumption are considered self-evident requirements.

Considering these goals, it is clear why such an endeavour can only be tackled by multidisciplinary teams consisting of product and industrial designers, material scientists, mechanical and electrical engineers, physicians, experts in fluid- and aerodynamics, systems and mechatronics engineers, computer scientists as well as coordinating business engineers. Only an interdisciplinary discourse will allow for meaningful solutions, that make the seemingly impossible – namely, an atmosphere with unpolluted clean air – possible!

Process Design

POLE as a platform for learning and teaching not only focuses on the product but puts strong emphasis on the structuring of the design process. The following list of deliverables shall facilitate the work process for the teams as a back bone.



Deliverables

At the end of the physical kick-off week in Guadalajara (February 26, 2011):

- Written statement of team objective(s)
- Distributed collaboration and information management framework
- Description of the expected contributions of each team member

Stopover One

(March 25, 2011):

Detailed list of prioritized product requirements, complete with requirement categories, rationale, metrics, and target ranges for each requirement (Draft version); must be uploaded to the team's intranet platform.

Design Review I

(Videoconference; March 29 and 30, 2011):

(duration of presentations 20 minutes/team; discussion 30 minutes)

- Discussion of product requirements
- Discussion of initial product concepts (guided by the product requirements)
- Discussion of ideation process
- Reflection on distributed collaboration and information management framework (including the role of each team member)
- Project timeline and milestone check

Note:

FINAL versions of all of the materials that will be used in

the design review presentation (PowerPoint presentations, spreadsheets, sketches, etc.) must be uploaded to the team's intranet platform 1 day prior to the review to make sure that all sites have access to them.

Stopover Two

(April 8, 2011):

Detailed list of prioritized product requirements, complete with requirement categories, rationale, metrics, and target ranges for each requirement (Final version); must be uploaded to the team's intranet platform.

Design Review II

(Videoconference; May 3 and 4, 2011):

(duration 20 minutes/team plus 30 minutes discussion):

- Discussion of 3 down-selected product concepts (in accordance with the product requirements)
- Discussion of final product concept (if one has been selected)
- Discussion of decision-making process
- Reflection on distributed collaboration and information management framework (including the role of each team member)
- Project timeline and milestone check (including identification of remaining tasks and deliverables for project completion)

Note:

FINAL versions of all of the materials that will be used in the design review presentation must be uploaded to the team's intranet platform 1 day prior to the review.

Final presentation

(June 17, 2011)

All relevant final deliverables must be uploaded to POLE's AIR® Project intranet portal. (by June 15, midnight)

(duration: 30 minutes/team)

- Oral presentation of project outcomes for colleagues, faculty and jury
- Proof of concept demonstration (functional and visual via "works-like" and "looks-like" prototypes)
- Discussion of why and to what extent the proposed design fulfils product requirements
- Discussion of potential for future research and development of AIR®
- Reflection on distributed collaboration and information management framework (including the role of each team member)
- Discussion of individual learning insights

(duration: 10 minutes/team)
Oral presentation of an executive summary for a delegation of ELICA's directorate

Physical deliverables (due at final presentation)

- Physical prototypes of proposed design
- Copies of 3D renderings of proposed design
- 5 copies of a comprehensive final project report, which should include the following sections:
 1. Executive Summary clearly outlining the key points of the proposed design and why ELICA should pursue it.
 2. Background Research section documenting any relevant background research that was conducted.
 3. Requirements section documenting the final list of design requirement the team generated and the key stakeholders the requirements target.
 4. Design Development section documenting the different ideas that were generated and the decision making process that was used to select the final concept (with rationale).

5. Design Specification section documenting the specifications of the proposed design (detailed engineering drawings, including materials information should be placed here).

6. Design Process section documenting the overall design development and interdisciplinary processes that were used by the team (including reflection on the multi-cultural and interdisciplinary aspects of the project).

Information and Collaboration Technologies ICT

POLE is offering a modern infrastructure with respect to information and communication technologies (ICT). POLE encourages the partner universities to support their students with respect to ICT as much as possible, in particular granting them access to their own information technologies. The following list of ICT tools characterizes the minimum and necessary standards:

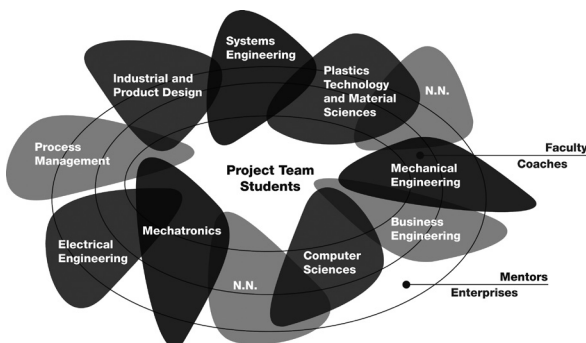
- 24 hours per day access to work stations, so students can work on their tasks and are able to communicate at all times
- Access to telephones with international access for conference calls
- Video conferencing facilities (available at least 2 hours per week and team)
- Suitable IT support (firewalls, basic support)
- Broad band internet access
- MS-Office including PowerPoint, Acrobat Reader, ZIP and FTP programmes

During the kick-off sessions POLE will provide instruction in the use of data transfer tools for the sharing of the use of video conferencing as well as in disciplinary applications. Restriction: It must be noted that for synchronous communication there is only support provided by POLE for operating systems Windows 2000 (and higher). The POLE ICT experts will also assist the teams in terms of security of internet interactions in the confidentiality context.

Team Composition

The POLE AIR® course 2011 is based on the partnership of University of Applied Sciences Northwestern Switzerland (with its faculties of industrial design, plastics engineering, electrical and mechanical engineering, computer science and process management) and Tecnológico de Monterrey (departments of design, computer science, mechatronics and mechanical engineering) in Guadalajara.

Approx. 30 students in five (evtl. six) interdisciplinary teams will work on the design and development of a novel concept for an "Improved Air Quality" under the guidance and supervision of more than 10 faculty members.



Evaluation Criteria

The evaluation of the project results will be in the duty of an international jury. It will consist of one member of each discipline and two members of the POLE directorate as well as of members of ELICA Inc.. Each team will receive a report with an acknowledgement of the contributions according to the following criteria: (1) fulfilment of ELICA's requirements (a list of specifications will be handed out during the kick-off week by the patron), (2) usability, (3) innovative potential of solutions, (4) presentation of product, (5) general impressions.

Confidentiality Agreement

Due to the high potential of such a novel product ELICA and POLE have agreed to respect a confidentiality agreement which in turn has to be signed by all partners involved in the project. Individual copies for each participant will be sent to the selected students in advance and shall be ready for signature at the kick-off event.

Budget for production costs

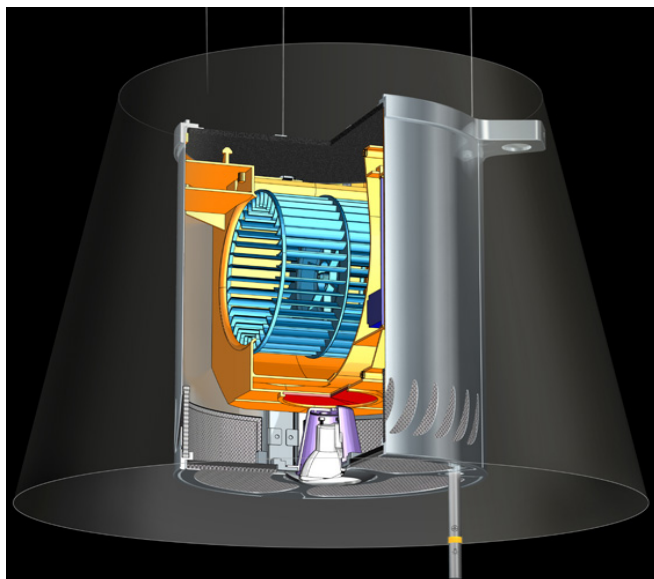
Each team is granted a budget of max. € 500 for material and production expenses. Payments can only be made by POLE against bills or (signed) receipts.

Cost of living and accommodation

Thanks to the financial support of sponsors and the industry partner ELICA, POLE is able to partially subsidize the cost of living and those for the documentations and hand-outs for the participating students.

Insurance

Note: Each participant is responsible for her/his own insurance matters.



Project Agenda

Virtual Kick-Off 1 (by Videoconference from Home Universities):

February 10, 2011

Virtual Kick-Off 2 (by Videoconference from Home Universities):

February 15, 2011

Physical Kick-Off at Tecnológico de Monterrey, Guadalajara, Mexico:

February 20–26, 2011

Review 1 (by Videoconference from Home Universities):

March 29 and 30, 2011

Review 2 (by Videoconference from Home Universities):

May 3 and 4, 2011

Final Presentations (all teams, faculty, jury, industry partners):

June 17, 2011



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