SMARTSIM

DL SMART-HYDRO

HYDRAULICS APPLICATIONS
TRAINING

DE LORENZO

SMART SIMULATOR FOR HYDRAULICS APPLICATIONS TRINING

The DL SMART-HYDRO is a software that has been developed to teach applications such as mechanical losses on pipes, francis turbine, and hydraulics basics in a unique and effective way.

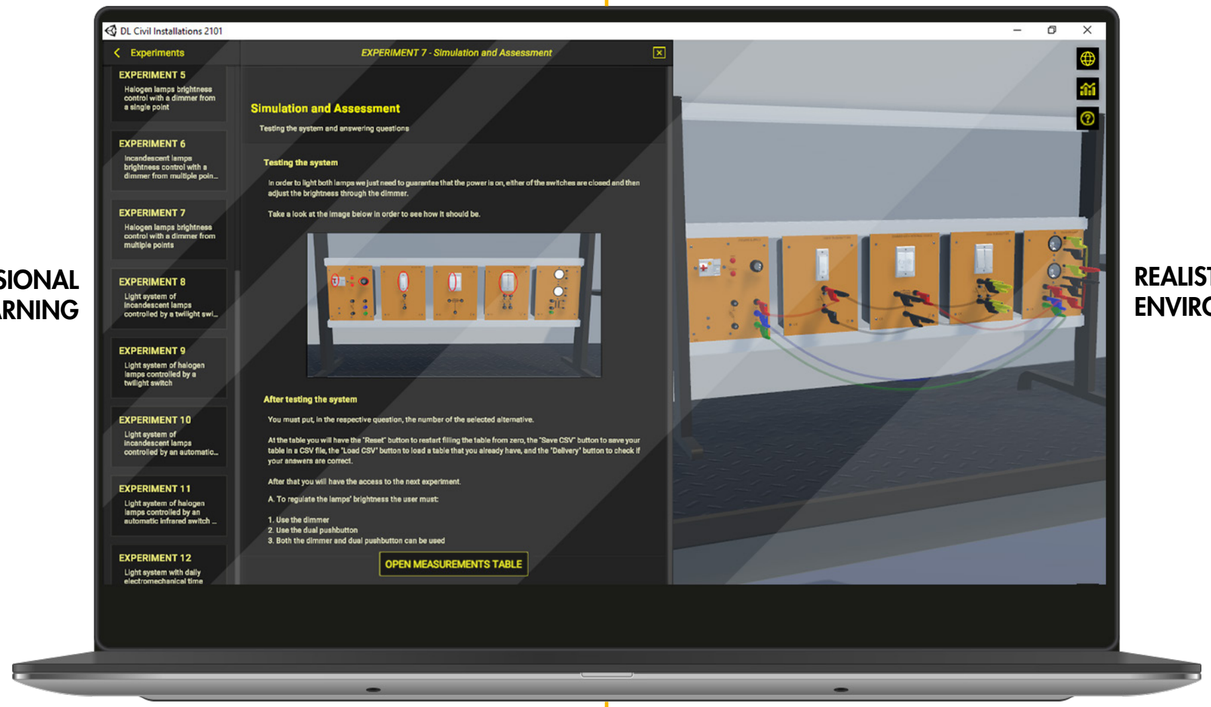
With this software, students can improve their individual experience on studying hydraulics applications in practice.

Students will be able to develop several projects dealing with the following topics:

- **Components presentation and theoretical contents**
- **Mechanical losses**
- **Francis turbines**

ELECTRICAL TOOLS | POWERFUL 3D SIMULATOR

PROFESSIONAL LEARNING



REALISTIC ENVIRONMENTS

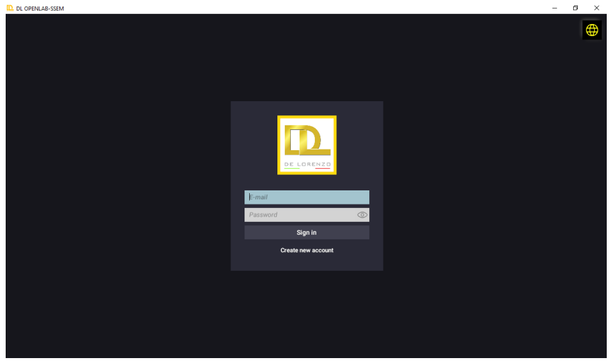
PROFESSIONAL EXPERIENCE | REAL-LIFE SITUATIONS

This software will be able to reproduce the features and behaviours of the DE LORENZO Hydraulics installations trainer.

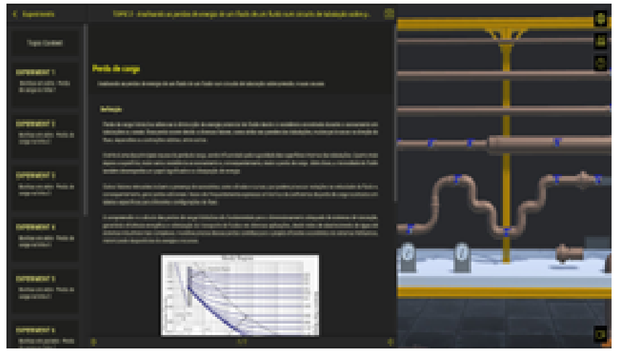
With this type of software developed by DE LORENZO, students can learn in their own rhythm and teachers have more time to support the class, manage and improve the process because – unlike any other simple simulator – it grants the following benefits:

1. EFFECTIVE GUIDE FOR STUDENT

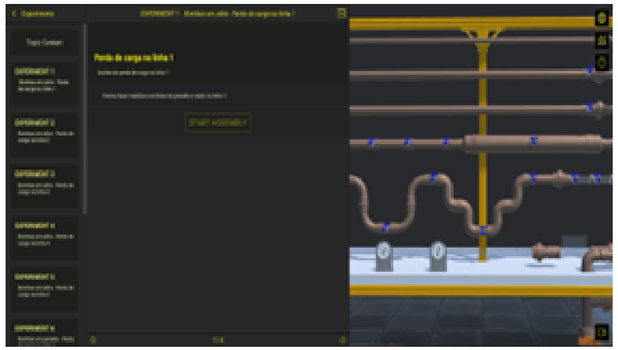
Possibility to access learning topics, with theory, instructions and experiment proposals. The software includes a virtual version of the DL 2102 system;



Student logs in, so his progress can be tracked.



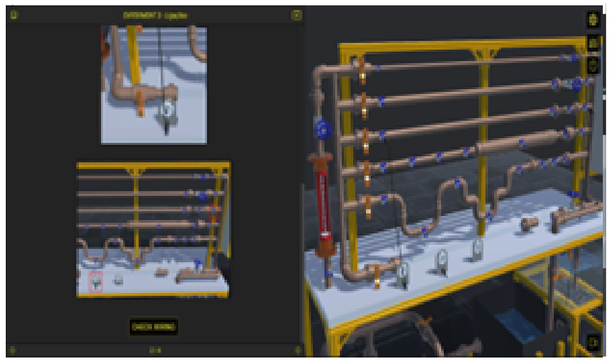
...chooses one of the learning topics



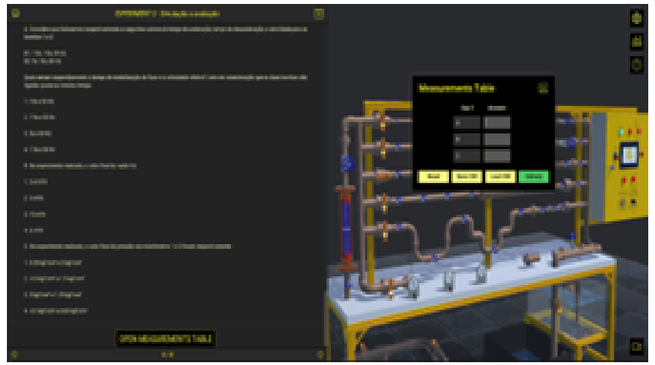
...accesses theory, experiments proposals and instructions.

2. AUTOMATIC VALIDATION OF STUDENTS' TASKS

The software automatically verifies if the student completed successfully each task in order to allow him/her to go ahead with the next one;

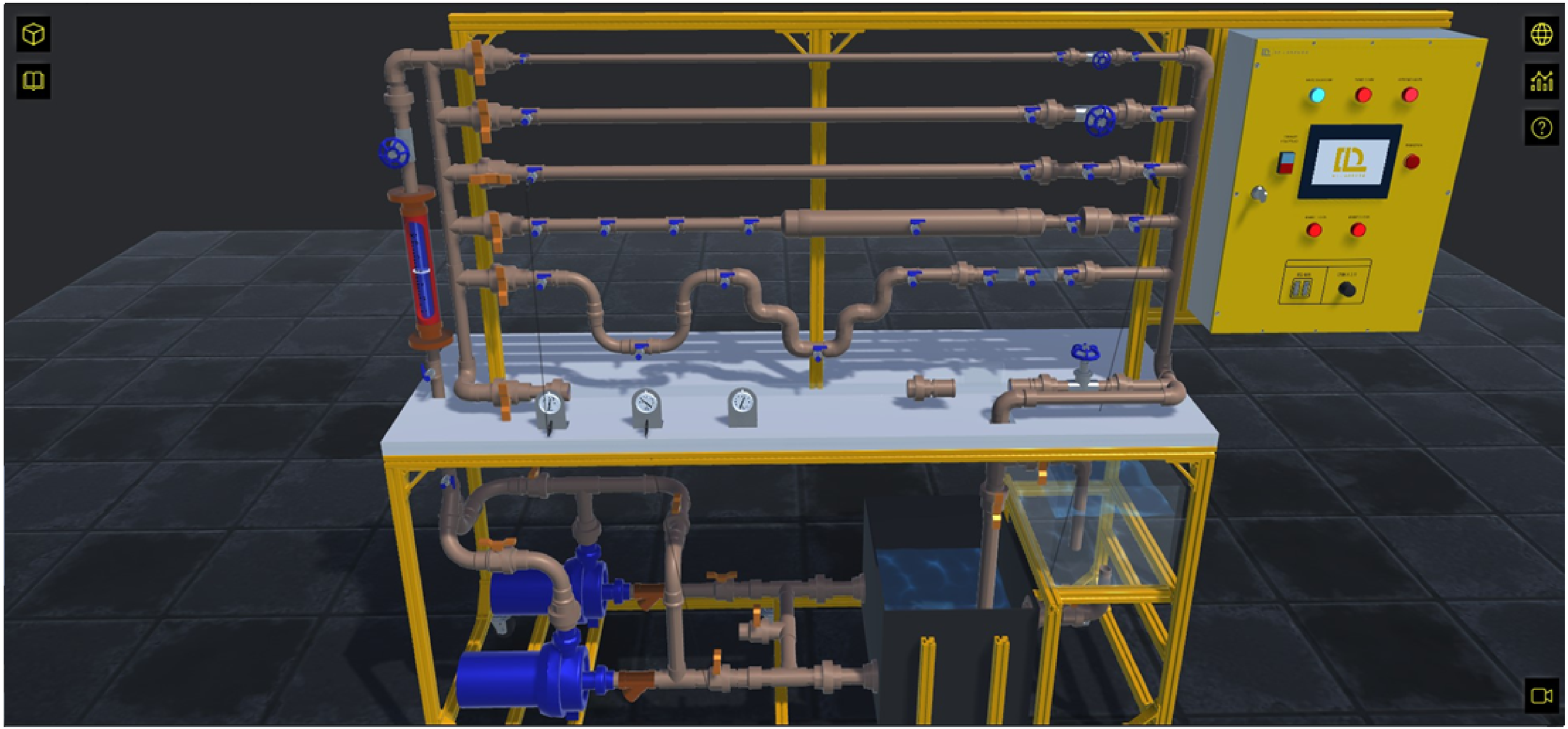


Student works on theelectrial connections



...and with all that correctly done, runs the experiment and answers questions about it

3D ENVIRONMENT TO PROVIDE A REAL PRACTICAL EXPERIENCE TO STUDENTS



WHY IS IT A SMARTSIM?

IT CONNECTS PROFESSOR, STUDENT AND SCHOOL

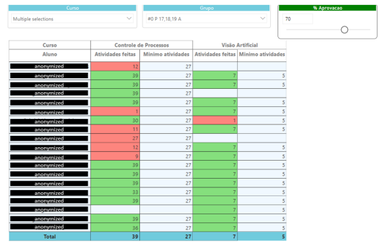
De Lorenzo´s cloud server receives students activities and provides reports and analytics to professors and institutions. Besides, a student can start working at school and continue at home or vice-versa.

That means that the professors can monitor the students and based on the report that De Lorenzo´s cloud provides, the professors can give the support that a specific student might be needing.

COMPATIBLE WITH THE DL SMART-DASHBOARD (SOLD SEPARATELY)

PROFESSORS CAN FOLLOW STUDENTS PROGRESS

The professor can do and access everything the student can. Besides, he/she can also access the dashboard's portal.
It includes interesting reports and analytics that help the professor to monitor the group in real time, as well as to identify students who are doing very well, as well as those who need help, who are not working at all and who seem to be "cheating".



Tasks report

This is an important tool since it provides evidence of the activities a student worked on. That means the school has evidence of the practical activities the distance learner has done with detailed information about it.

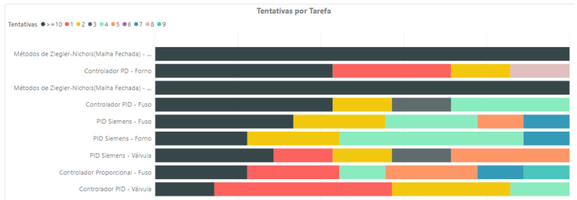
Curso	Tarefa	Timestamp	IsDon
Scripts	1.1 - Abrindo uma tela modal	3/9/2020 6:33:37 PM	False
Desenvolvimento de sistemas supervisórios	2.6 - Implementar Gráficos	11/22/2019 7:14:00 PM	False
Desenvolvimento de sistemas supervisórios	2.5 - Montar interface principal	11/18/2019 5:04:15 PM	True
Desenvolvimento de sistemas supervisórios	2.4 - Construindo os objetos da aplicação	11/18/2019 4:28:54 PM	True
Desenvolvimento de sistemas supervisórios	2.3 - Explorando Recursos	11/15/2019 5:35:44 PM	True
Desenvolvimento de sistemas supervisórios	2.2 - Conhecendo o Elipse E3	11/15/2019 5:10:00 PM	True
Desenvolvimento de sistemas supervisórios	2.1 - Comunicação OPC	11/14/2019 12:57:42 PM	True
Desenvolvimento de sistemas supervisórios	1.8 - Comandos pelo supervisório	11/14/2019 11:25:14 AM	True

PROFESSOR CAN SEE WHICH STUDENTS ARE ON SCHEDULE

With this interface, the professor may choose which groups he/she wants to monitor, to verify who is on schedule, who is pending and so on. It is possible to define the expected progress percentage in relation to the tasks available in the course.

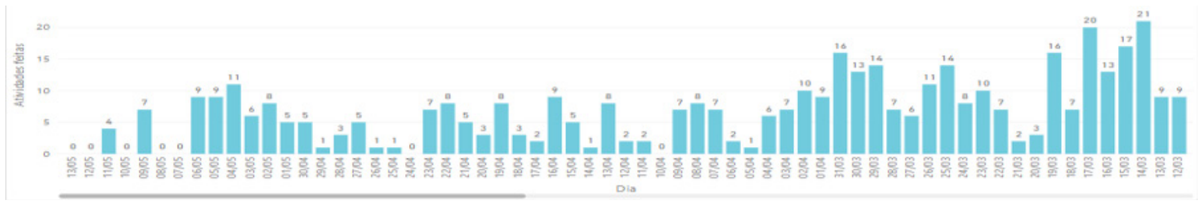
TRIALS PER TASK

This chart helps the teacher to understand which task may be the most difficult and which one may be the easiest in order to adjust the deadlines.



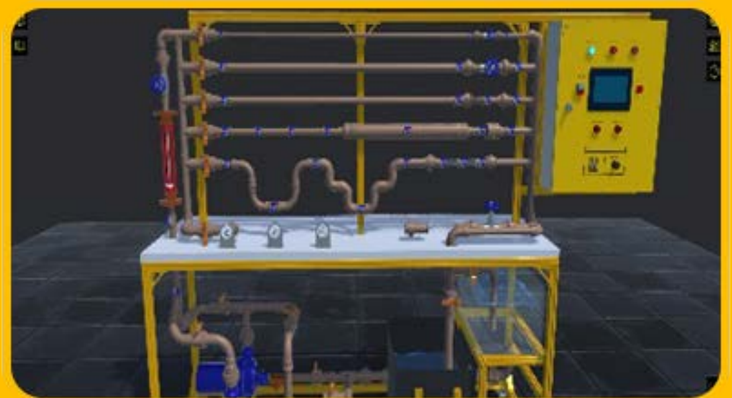
RHYTHM

This other dashboard shows the number of activities the students did daily and weekly. The professor may decide to verify it regarding a whole group/class or a specific student.



SUMMARY OF FEATURES

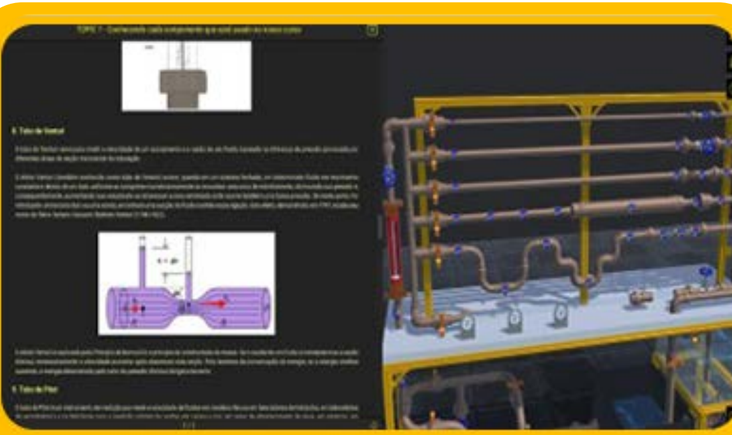
IT'S A 3D SIMULATOR



IT HAS BUILT-IN PROJECT

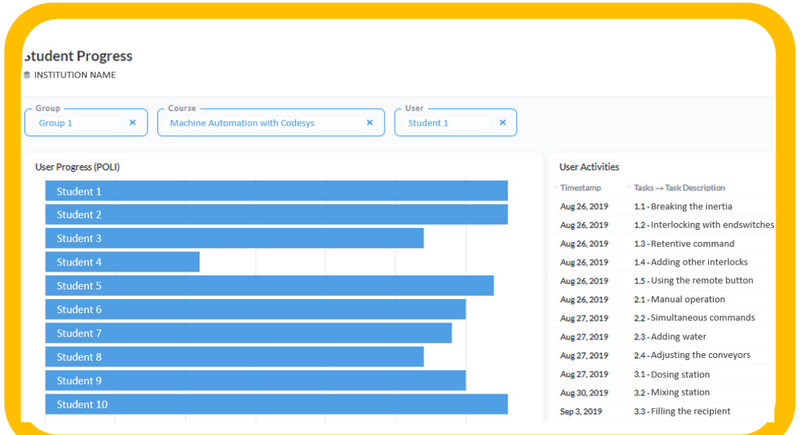
THE PROJECTS INCLUDE GUIDANCE

+ CONTENTS AND SUPPORT MATERIALS, SO THEY CAN LEARN BY THEMSELVES



IT AUTOMATICALLY CHECKS STUDENT ACTIVITIES TO LET THEY MOVE ON, LIKE IN GAME

PROFESSORS CAN MONITOR STUDENTS AND VERIFY WHICH POINT THEY NEED HELP



COMPLETE CONTENTS

HOW DOES IT HELP THE PROFESSOR?

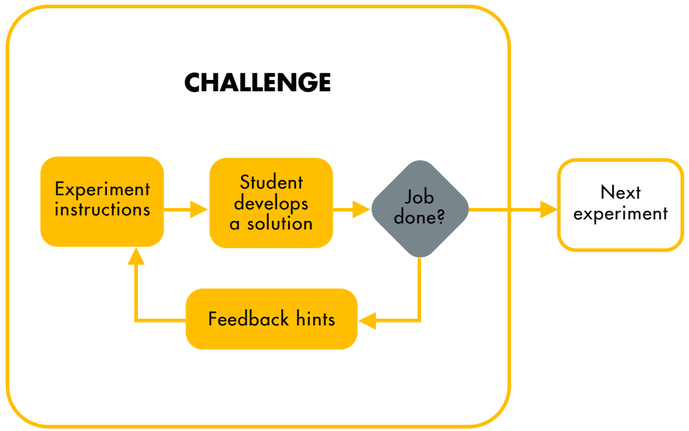
With this software, the teacher spends less time explaining topics, verifying students' activities and helping students to identify mistakes that do not allow the successful completion of the experiment.

That means that the professor has more time to manage the class, help students who need more attention and make improvements. The two following points grant such benefits:

1) The software automatically verifies the experiments carried out by the students and it gives relevant feedbacks:

Like in a game that has different phases with challenges and missions, the DL CIVIL INSTALLATIONS software includes practical experiments that need to be successfully completed to let the student access the next one.

The teacher does not need to verify continuously if the student carried out the experiment. Moreover, many questions that students would make about "what could be wrong" are automatically "answered" by the software when the student does not perform the experiment successfully. The image below summarizes this process.



2) The software tracks the students' progress and it allows exporting reports:

At any time, the professor may verify how many and, specifically, which experiments the student have completed. That report can be used to track students' activities and it can be considered as an evaluation tool.

This report can be generated and displayed directly in the system or it can be exported to a spreadsheet (see image below).

Timestamp	Student	Topic	Experiment
2021-11-30 10:37	Da Vinci	Basic Industrial Installations	1.1 - Single - pole control auxiliaries
2021-11-30 12:15	Da Vinci	Basic Industrial Installations	1.2 - Contactor
2021-12-01 14:47:00	Da Vinci	Basic Industrial Installations	1.3 - Logic operators (and)

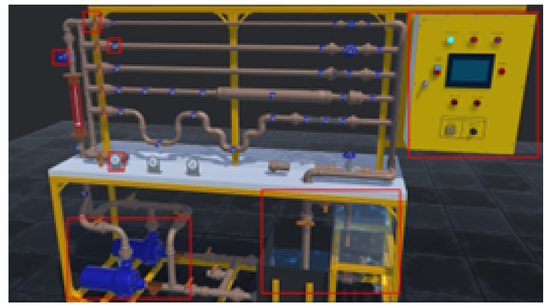
DIDACTIC EXPERIENCE AND APPLICATION

The software guarantees a complete experience in the field of hydraulics installations. Students can approach this topic starting from the basic concepts, such as measurement units, types of pumps, instrumentation, pumps in series and in paralell, up to advanced experiments such as Francis turbines efficiency calculus

Through this system, it is possible to assemble a relevant number of hydraulics applications to carry out the following didatic experiences:

- **Basic hydraulics concepts**
- **Mechanical losses on pipes**
- **Francis turbines**

SET OF COMPONENTS



The system is based on a set of components that allow the assembly of installations. The set consists of the following componentes:

1. Pumps
2. Valves
3. Rotameters
4. Frequency inverter
5. Tanks
6. Pressure gauges
7. Turbine
8. Dynamometer

LEARNING TOPICS

This software covers **3** topics and proposes **15** experiments for the students. The experiments are listed below, grouped by learning topics.

COMPLETE CONTENTS

COMPONENTS PRESENTATION AND THEORETICAL CONTENTS

With this kit, it is possible to perform the following experiments:

- Breaking the inertia

Smart simulator environment with 1 experiment regarding basic concepts, such as measurement units, types of pumps, instrumentation, pumps in series and in paralell. Each one is divided in three steps: Wiring connections, setup and simulation. After the simulation, the student will have to answer an assessment form related to the experiment in order to unblock the next one

MECHANICAL LOSSES ON PIPES

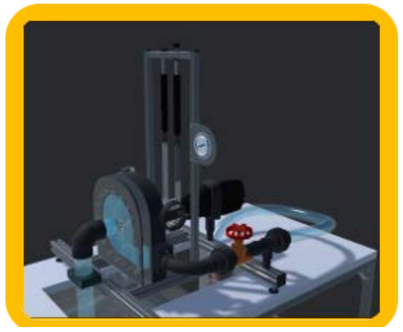
With this kit, it is possible to perform the following experiments:

- Pumps in series – line 1
- Pumps in series – line 2
- Pumps in series – line 3
- Pumps in series – line 4
- Pumps in series – line 5
- Pumps in parallel – line 1
- Pumps in parallel – line 2
- Pumps in parallel – line 3
- Pumps in parallel – line 4
- Pumps in parallel – line 5

Smart simulator environment with 10 experiments regarding mechanical losses on pipes. Each one is divided in three steps: Wiring connections, setup and simulation. After the simulation, the student will have to answer an assessment form related to the experiment in order to unblock the next one

COMPLETE CONTENTS

FRANCIS TURBINES



With this kit, it is possible to perform the following experiments:

- efficiency calculation 1
- efficiency calculation 2
- efficiency calculation 3
- efficiency calculation 4

Smart simulator environment with 4 experiments on calculating the efficiency of a Francis turbine with different degrees of opening of the guide vanes and applied loads. Each one is divided in three steps: Wiring connections, setup and simulation. After the simulation, the student will have to answer an assessment form related to the experiment in order to unblock the next one

SYSTEM REQUIREMENTS

MINIMUM REQUIREMENTS

OPERATIONAL SYSTEM
64-BIT WINDOWS 10

DIRECTX VERSION
DIRECTX 11

PROCESSOR
INTEL I3-12100F (4 CORES, 3.3 GHZ , 4.3 GHZ TURBO)
OR
AMD RYZEN 3 4100 (4 CORES, 3.8 GHZ , 4.0 GHZ TURBO)

MEMORY
8GB

GRAPHIC CARD

STORAGE
HDD (1GB)

RECOMMENDED REQUIREMENTS

OPERATIONAL SYSTEM
64-BIT WINDOWS **11** PRO

DIRECTX VERSION
DIRECTX 12

PROCESSOR
INTEL i7 9700 OR AMD RYZEN 7 3700X

MEMORY
16 GB

GHRAPHIC CARD
NVIDIA GTX 1050 TI 4GB OR RX 550 4GB

STORAGE
HDD (1GB)