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Intelligent Learning and Teaching

EDITION 2012

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Wind Turbine Generator

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- Electrical Power Engineering
- Power Electronics, Electrical Machines, Drive Technology
- Fundamentals of Electrical Engineering and Electronics
- Communications Technology
- Control Technology, Process Automation
- Electropneumatics, Hydraulics
- Measurement Technology
- Refrigeration and Air Conditioning
- Microcomputers
- Automation Technology, Mechatronics
- Automotive Technology
- Lab Systems

Advanced Photovoltaics

CarTrain E-Mobility

Industrial Mechatronic System IMS®

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LUCAS-NÜLLE

DEAR READERS,

Smart solutions are not necessarily those that are implemented with great bombast and effort. Rather, they are products and services which at first glance do not seem particularly complicated. On closer inspection it becomes clear that the smart solution reduces the problem to the essential. It has an impressively clear design tailored to the function and offers users a real advantage. However, being smart also means being prepared to take risks and explore new avenues. An economy that continues to be growth-oriented in spite of the increasing scarcity of resources needs smart ideas more than ever today. You can read about them in this magazine.

Smart solutions help us achieve our objectives more quickly and, above all, more effectively – no matter whether we are talking about a car, a mobile phone or a dual study programme that gives young people a head start in their careers.

A dual study programme benefits companies as well as the students themselves. After all, the main priority today is to retain skilled employees. Changing demographics are having a particular impact on medium-sized engineering companies which can only master this challenge with smart ideas that are not inherently cost-intensive. High-quality in-house training also plays a part.

As a maker of training systems, we have our finger on the pulse when it comes to training. We examine new trends thoroughly and integrate them if they are relevant to vocational training. In the past year we have begun to develop a new field that has future potential: refrigeration and air conditioning – a widespread technology in industry. The demand for experts in this area of technology will increase worldwide in the coming years.

For us, smart thinking and action means planning with a view to sustainability and a focus on the future. Because, ultimately, we believe that those companies which have a forward-looking approach to business will be the most successful ones. This credo runs through everything we do, from product development to packaging.

In this issue you can read about the things that are affecting us in 2012 as well as the impact that we are having as a company.

We hope you enjoy reading this magazine.

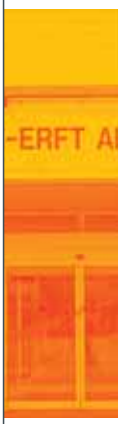
Yours,

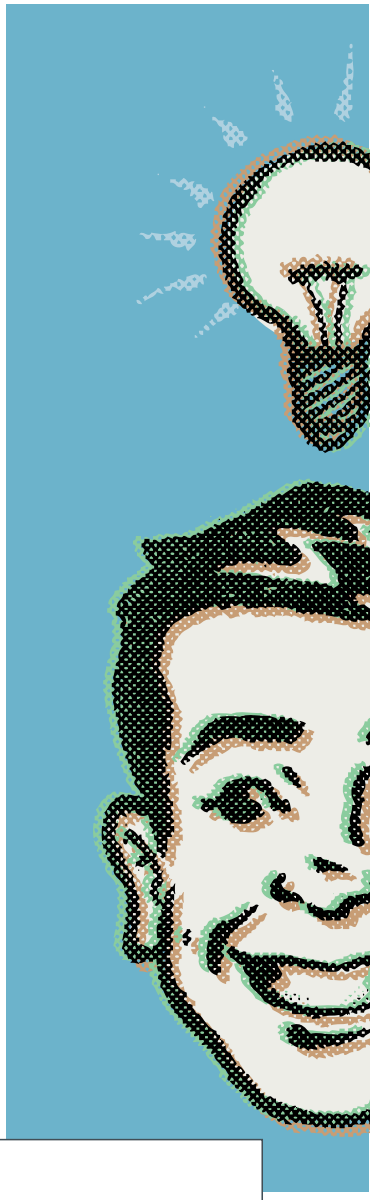
Rolf Lucas-Nülle

Standards

About the Company

Training and Occupation News





International Projects

Products

DIGITAL MEDIA IN SCHOOLS

The special analysis of the (N)Onliner-Atlas 2011, published by Initiative D21 e.V., on the subject of multimedia learning, once again proves the importance of the use of digital media in the classroom. The study also shows that there is still some catching up to do here, particularly in teacher training.

UNESCO WANTS TO STRENGTHEN ENGINEER TRAINING

The UNESCO General Conference in Paris has adopted a resolution in which it calls for engineer training to be geared more closely towards the model of sustainable development. In doing so, UNESCO wants to strengthen the involvement of engineers in solving global problems. The resolution had been submitted by Germany and signed by 17 states including France, South Korea, USA, Kenya and Honduras. The resolution calls for curricular reforms at universities, greater international cooperation, including between developing countries, and a strengthened role for engineers. The resolution also supports the “UNESCO Engineering Initiative”, which seeks to enter into partnerships with engineering associations worldwide. The initiative is part of the “UN Decade of Education for Sustainable Development” (2005-2014).

Further information:

http://www.unesco.de/ingenieurwissenschaften.html

THE INTERNATIONAL YEAR OF SUSTAINABLE ENERGY FOR ALL

The UN has designated the year 2012 as the International Year of Sustainable Energy for All. Its aim is to highlight the importance and opportunities surrounding sustainable energy resources.

Further information at
http://www.sustainableenergyforall.org

2012 INTERNATIONAL YEAR OF
SUSTAINABLE ENERGY
FOR ALL

Trade Fairs 2012

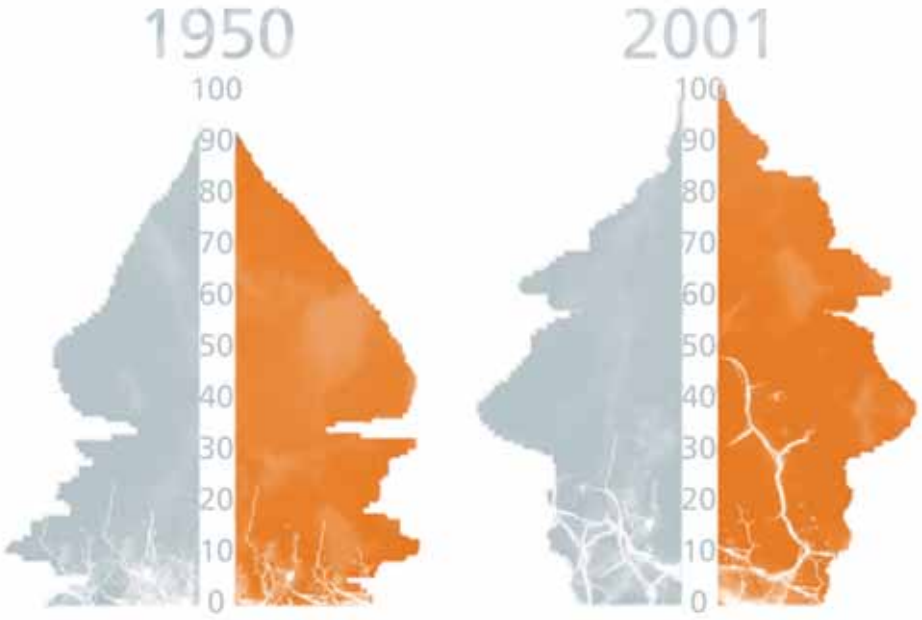
Lucas-Nülle will be represented at many trade fairs around the world in 2012. These events provide an opportunity to inform customers and partners about our training systems.

Trade Fair	Location	Date
Educational Technology and Learning Resource Expo	Nigeria	28.03. - 29.03.2012
German-African Energy	Germany	22.04. - 25.04.2012
EDUCA	Angola	Nov. 2012
ASEE Annual Conference and Exposition	Texas, USA	10.06. - 13.06.2012
ACTE Annual Convention and Career Tech Expo	Missouri, USA	17.11. - 19.11.2012
BETT London	Great Britain	11.01. - 14.01.2012
GESS Dubai	Saudi Arabia	28.02. - 01.03.2012
Worlddidac Astana	Kazakhstan	14.05. - 16.05.2012
eLearning Africa	Benin	23.05. - 25.05.2012
Educatec Paris	France	Nov. 2012
UCHSIB. SIBERIAN EDUCATION 2012	Russia	20.03. - 22.03.2012
EDUCATION. CAREER KAZAN 2012	Russia	11.04. - 13.04.2012
Global Education – Education Without Borders	Russia	16.04. - 18.04.2012
Science, Sport and Tourism in the Epoch of the Great Revival	Turkmenistan	05.11. - 07.11.2012

CHANGING DEMOGRAPHICS AS A CHALLENGE AND OPPORTUNITY FOR SMALL AND MEDIUM-SIZED ENTERPRISES

Almost all European countries have ageing populations with fewer and fewer young people – a trend that is set to continue in the future. For companies, this raises the prospect of a shortage of skilled labour. Only those who take preparatory steps now will have the necessary resources to draw on in the future. There are simple strategies for combating the shortage of skilled labour and the loss of know-how.

When one looks at Europe's age pyramid, it is immediately apparent that it has shifted dangerously and now resembles a Christmas tree that is rather frayed at the bottom. According to particularly pessimistic assessments, the pyramid will have become virtually inverted by 2050. Fewer births mean fewer young people, which in turn means fewer young employees coming into the workforce. Although this is not a new insight, German small and medium-sized enterprises are particularly ill-prepared for the changing demographics – as shown by a recent DEKRA study.



It's all in the mix.

According to this study, only around 45 per cent of companies with up to 50 employees have prepared themselves for the changes.

"Many of them are no doubt shying away from the expense. Yet effective measures are also possible without a major financial outlay. The most important thing is to know your own personnel structure and make a projection for the next ten to 15 years. This will quickly reveal any weak points that need to be strengthened with appropriate methods," says Steffen Kröhnert, demography expert at the Berlin Institute.

The solution to the problem of changing demographics is not, therefore, to launch a massive and cost-intensive recruitment drive in an attempt to get a younger workforce overnight. Quite apart from the fact that there is a barely adequate supply of labour for this already, such a change in personnel would also involve the loss of valuable know-how.

Most companies have a greater-than-average proportion of baby boomers in their workforce. However, it will be another 20 to 25 years before this generation, born between 1960 and 1970, reaches retirement age – time enough for preparations. This is also the case at Lucas-Nülle.

Around 63 per cent of employees are aged between 31 and 54, while 15 per cent are aged 30 or under and 20 per cent are in the 55+ age group. As well as taking on skilled young workers, the management is intent on retaining older employees in the company for as long as possible.

Tips and information on changing demographics

The Demography Network

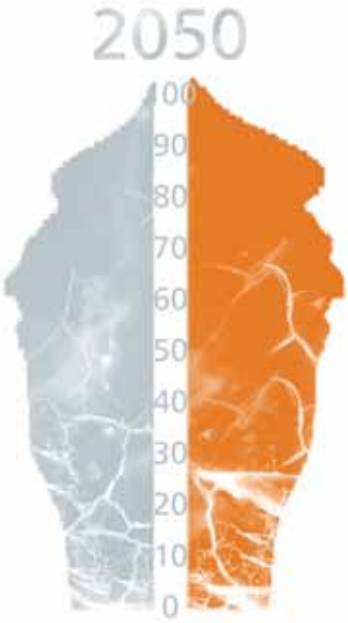
The network provides companies with information and strategies on dealing with changing demographics. As 2012 is the European Year for Active Ageing, more events and information are being offered on this subject.

http://demographie-netzwerk.de/

The Berlin Institute for Population and Development

The Berlin Institute carries out research into the impact of changing demographics from an economic, ecological and social point of view.

www.berlin-institut.org



"A good mix of ages would, of course, be ideal. But in an ageing society, this cannot be maintained in the long term anyway. Companies should therefore tackle the changing demographics from several angles and take a set of integrated measures. In addition to training your own young employees, it is important to enable older members of staff to continue working," advises Steffen Kröhnert.

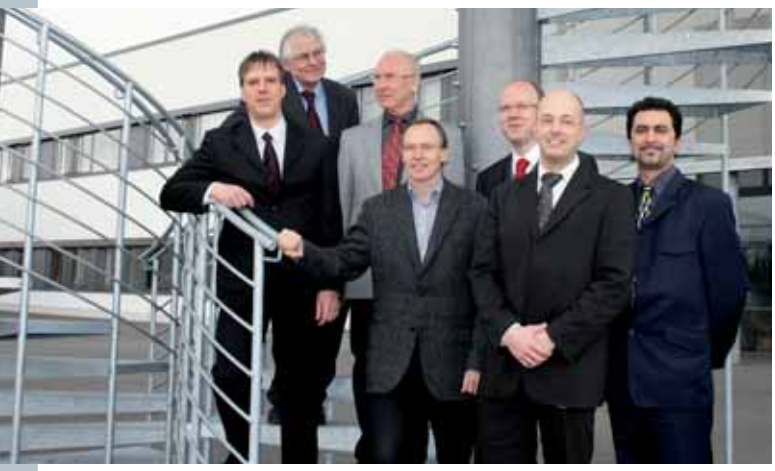
Workplace design that helps to maintain health, work restructuring that reduces the workload on older employees, and targeted training on the subject of work-life balance, health and occupational safety are relatively easy to implement.

It is also important to promote cooperation between younger and older employees, which works particularly well if the corporate culture supports fairness and mutual appreciation. In this way, the different skills of new job entrants and experienced staff can complement each other. At Lucas-Nülle, friendly cooperation is taken for granted. The older employees' knowledge gained through experience is valued just as much as the younger employees' curiosity and élan. It is not surprising, therefore, that most employees stay until the statutory retirement age – some even beyond.

"The advantage of this is that know-how can be actively passed on. For that is the real problem of changing demographics: important practical know-how that is not found in any manual or operating instructions is lost. It can only be passed on in day-to-day work situations – from one generation to the next," explains Steffen Kröhnert.

DUAL STUDY PROGRAMME – SIMPLY SMART

Trainees lack theoretical knowledge, students practical experience. Graduates of a dual study programme, however, know both aspects, having completed two courses within a very short period of time. Dual training is proving to be an advantage in the MINT subjects in particular, with graduates not only possessing a high level of technical competence. This has been shown by the experience of the Rhein-Erft Akademie in Cologne.



Delighted to have completed their studies, these graduates are looking forward to a varied career.

"It is really fun and I am learning so much. I think it's great that we can put our knowledge into practice straight away. It's pretty demanding, mind you," says Sarah, 22, writing about her experiences in a forum for students undertaking dual study programmes. She adds that so far she has no regrets about choosing this path to employment. Most of her fellow dual-study-programme students, of whom there is a total of 51,000 in Germany, would presumably endorse this statement. The demands may be great, but then so are the prospects. As well as working in a company, the students go to vocational college and attend lectures in the evenings or at weekends. It is an intensive programme, which leaves the students with hardly any free time during the four years of their studies. Nevertheless, the demand for these combined training courses is growing, both from industry and from ambitious school-leavers. The graduates really do have outstanding career prospects.

A win-win situation

"The companies thus get a new generation of staff to meet their own requirements. They carefully select the most able school-leavers through tough assessment procedures. After all, these are the people in whom the companies invest a lot of money, and as a rule they are not disappointed.

The Rhein-Erft Akademie at the Knapsack chemical park

Our dual-study-programme students are absolute top quality. So far, no-one has dropped out," reports Dr. Lutz Schmalstieg, head of course cooperation/coordination at the Rhein-Erft Akademie in Cologne. This education and training institution, together with the Jülich department of the FH Aachen University of Applied Sciences, offers a dual study programme in chemical engineering, which will produce its first graduates in the spring of 2012. Almost all of them have secured an employment contract. "A win-win situation for both parties, because engineers are very much in demand in the labour market," says Dr. Schmalstieg.

Future chemical technicians and process engineers are trained using training systems from Lucas-Nülle.

Social competence and technical know-how

According to a study carried out by the Federal Institute for Vocational Education and Training (BIBB), state universities, private higher education institutions and vocational colleges currently offer a total of around 930 dual study programmes in cooperation with 2,274 enterprises – and new ones are being added every day. Since the previous year, the number of courses has grown by 19 per cent. The number of students has risen by six per cent. There has also been progress with regard to subjects. The MINT subjects, in particular, lend themselves to effective integration of course content and company requirements. Thus, both the training providers and the students really do benefit from day one.

"A dual study programme facilitates the development of professionals who get to know the company from the bottom up during their training as chemical technicians while at the same time acquiring the know-how of process engineers. Able to communicate at all levels and with every employee in the company, these graduates can occupy important interface positions. This social component is just as valuable to the companies as the graduates' technical knowledge," observes Dr. Schmalstieg.

The first graduates of this dual study programme will receive their Bachelor degrees in spring 2012. The applications for next year's intake are already piling up on Dr. Schmalstieg's desk.

Comparison of courses, figures 2009/2012

Subject area	*Change compared to April 2010 in %*	*Number of dual study programmes*
Mathematics	100.0	2
Business and social studies	41.7	17
Engineering, general	38.1	58
Civil engineering	27.6	37
Industrial engineering	25.0	35
Economics	18.5	378
Mechanical/process engineering	18.3	142
Transport engineering/nautical science	18.2	13
Information technology	17.7	133
Social services	17.4	27
Electrical engineering	13.0	87
Total	19.7	929

GOAL ACHIEVEMENT IN TWELVE STEPS

Why do Lucas-Nülle products have such an impressive track record in large-scale projects worldwide? The answer is because of long-established project expertise. Sales engineers, project planners and product managers all pull together to successfully execute major international projects in twelve steps.

"We aim to deliver complete solutions that guarantee our customers better training conditions in the long term," explains Heinz Keppler, Sales Director for the Middle East and Eastern Europe. In effect, this means that he and his team begin their work long before the training systems are installed for the customer – with the first of a total of twelve steps that every international project goes through at Lucas-Nülle.

Lucas-Nülle makes contact with its customers at international trade fairs and conferences, or through consulting firms, enabling institutions to find the right Lucas-Nülle products for their requirements.

The second step involves concrete planning, which is undertaken jointly by the customer and Lucas-Nülle. "At this point, it is important to identify the precise requirements and to consider what the customer's training objectives are and what else they need in order to achieve them," explains Heinz Keppler.

Along with the hardware, such as training systems, lab technology, furniture and buildings, this also includes timetables and curricula. For good teaching also depends on good time management.

A system does not create itself

"In the fourth phase of a project, we develop modern training plans and optimize timetables so that students and teachers can make optimum use of their labs with our training systems," reports Heinz Keppler. This work requires a great deal of experience, intensive discussions and precise knowledge of educational processes. However, that is not all. "We also look at local industry and ask what skills young people really need in order to make a successful start to their careers."

The lab on the virtual drawing board

Finally, the customer receives a lab design that encompasses training systems as well as peripheral equipment, furniture and mains power supply.

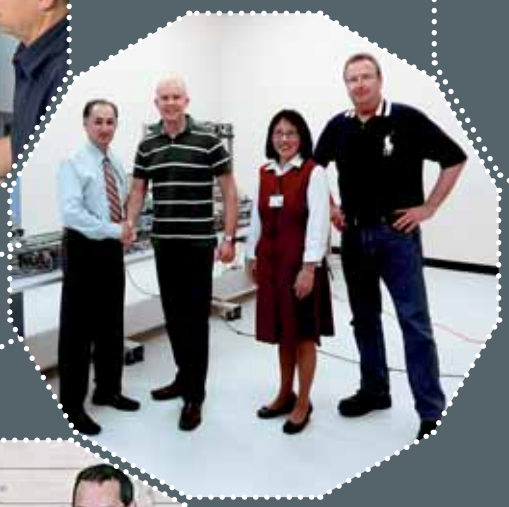
Once the customer has an idea of the kind of equipment the lab should include, they issue an invitation to tender for the contract. "After that, Lucas-Nülle submits a detailed tender and, in many cases, is awarded the contract. This concludes step seven for us and we then proceed to production," explains Keppler.

Flexible worldwide

"We are in the comfortable position of being able to immediately carry out preliminary production work in order to guarantee fast delivery times, particularly for our multimedia training systems, which are in such demand," confirms Keppler. This also involves precise logistical planning, as Lucas-Nülle produces all the training systems in Germany. To ensure that they reach the customer quickly, regardless of whether they are based in the Netherlands or Saudi Arabia, the right documents need to be in the right place at the right time, and the packaging also has to meet the customer's specifications – sturdy and, at the same time, secure. "This, too, is a question of experience," notes Keppler. "We have been sending consignments to all corners of the globe for decades. So we know exactly what kind of problems can occur and are able to avoid them in the first place."

1 Contact
2 Identification of needs
3 Planning
4 Situational local analysis
5 Development
6 Design
7 Contract award
8 Production
9 Logistical planning
10 Installation
11 Start of work
12 Training seminars






Learning to teach

Finally, once the training systems have been safely delivered to the educational establishment, the Lucas-Nülle experts can begin with the installation. “We do this in compliance with national and international safety standards”, says Heinz Keppler.

Once the systems are up and running and the first test experiments have been successfully completed, that is when the real work with the new equipment begins. Experienced trainers from Lucas-Nülle train all the teachers at an institution to enable them to incorporate the systems into their lesson plans and use them in their lessons. In courses lasting several weeks, they not only teach how to operate the systems expertly, but also convey the fundamental didactic principles as well as technical background knowledge.

If any problems do occur, our After-Sales Service will provide rapid on-site support. “Since we employ local service partners worldwide, our people can be at the educational institution within a very short space of time and provide direct help. In this way, we ensure that customers never have to wait long for spare parts and are able to use their systems constantly,” explains Keppler.

NAIT

ALWAYS READY FOR NEW DEVELOPMENTS

The Northern Alberta Institute of Technology, Canada's largest vocational training provider, sets great store by teaching the students topical subjects and state-of-the-art technologies. That is why, at the end of 2010, the NAIT established "Renewable Energy" as a new area of study. The institute has fitted out two complete laboratories with Lucas-Nülle systems specifically for this purpose. After a trimester, Timothy Matthews, the man in charge of the laboratories, gives his initial assessment.

"These days, when I'm in our laboratories to prepare experiments, I never cease to be amazed at the positive impact Lucas-Nülle has had on our 'Renewable Energy' area of study," reports Timothy Matthews.

To achieve this result, Gerald Schex, Sales Director for Canada, Ralph Linnertz, Product Manager for Renewable Energy, and Oliver Scheel, Lucas-Nülle's local partner in Canada, conducted detailed planning and discussions of the lab specifications with Matthews.

"And the standards were high," recalls Gerald Schex. "The lab and its systems had to meet the highest safety standards in the shape of the Canadian CSA standard. We were able to meet this standard because we had already put a great deal of effort into ensuring the safety of our products. All our development work is done in accordance with IEC 61010-1, which is regularly checked by independent auditors. The NAIT opted for one laboratory with a panel system and one laboratory with UniTrain-I equipment."

After several months of planning, the systems ar-

rived at the NAIT and Timothy Matthews got everything ready for putting the systems into operation.

"We were truly amazed when we got to the NAIT. We had never experienced anything like this before: Timothy had already unpacked everything and prepared it perfectly, so that we were able to connect the systems in next to no time," reports Ralph Linnertz.

Matthews was present when we put the systems into operation, and he quickly got a hang of the different functions.

"We had so much to learn for our new area of study. We also had to come to grips with the systems first of all and understand how they work. I am really glad that Lucas-Nülle was with us the whole time, which meant that we had extremely helpful support throughout the process. Whether it was choosing the right systems for our curriculum, getting to grips with the functions or commissioning the laboratories at the end, the Lucas-Nülle staff were flexible and helpful throughout. It is thanks to this commitment that our programme has been a great success from the start," says Matthews.

Not only the students were enthusiastic about the first practical applications of the systems. "Whenever I show political decision-makers, education experts, employers or parents around our laboratories, the systems from Lucas-Nülle attract the greatest attention. The visitors immediately start to ask questions, want to try out the system themselves, and praise the high technological standard as well as the elegant design," reports Timothy Matthews with some pride. "We are looking forward to continuing our collaboration with Lucas-Nülle."

Shortly after the laboratories were installed, we received the follow-up order to supply additional modules for the labs.

THE POLYTECHNIC BANDA ACEH OFFERS TOP-CLASS TRAINING AND EDUCATIONAL PROGRAMMES

Banda Aceh – a place that is associated above all with the 2004 tsunami. This environmental disaster hit the coasts of Aceh Province particularly hard, almost destroying the entire infrastructure, even in some inland areas. In order to give the region a future, the government made it a priority to rebuild educational institutions. One of these is the "Polytechnic Banda Aceh", which today offers world-class training and education.

The tsunami claimed thousands of lives, including those of many teachers and students. In order to safeguard the region's future, the reconstruction efforts by the government and the international community have therefore been aimed at educational institutions in particular.

Besides restoring and rebuilding schools that were badly damaged or, in some cases, completely destroyed, it was also decided to establish a new polytechnic whose main focus is on applied technologies. The kind of subjects that are taught there are essential to the province's economic development. The construction of the "Poly Aceh Campus" was made possible through cooperation between Chevron, USAID, the national, regional and local governments as well as the Rehabilitation and Reconstruction Agency (BRR). The new building project was completed by August 2008.

Studies with a practical focus

The polytechnic offers three-year diploma courses that are equivalent to the German technician grade. The choice of subjects available to students ranges from information technology to electronics and mechatronics through to business accounting. Working closely with Lucas-Nülle to provide the equipment for the technical courses,

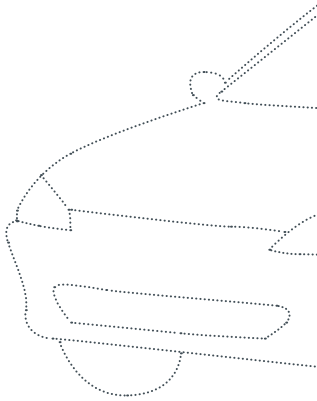
the polytechnic bought nine UniTrain-I systems with courses in electrical engineering, electronics and microprocessors. After several months' experience with the UniTrain-I systems, the lecturers were extremely positive about them. The 'blended learning' concept enabled them to convey the learning content more efficiently than with conventional systems. The college bought a further 55 systems from Lucas-Nülle in order to facilitate practice-oriented training for advanced students in later semesters as well. This included a fully equipped machine lab in 2010 as well as a comprehensive IMS® system that has been in use in automation technology since 2011.

Young people for regional industry

The teaching methodology has proved its worth. Virtually all the students at the polytechnic have excellent job prospects when they graduate, with nearly all of them finding employment in the region's industry. This means that the main aim behind establishing the college – to strengthen the economy in the province and thereby make an important contribution to reconstruction – has been achieved.

Word has got out about the polytechnic's good reputation: in September 2008, the first intake saw 240 students take up their studies. Today, this number has almost quadrupled.

AM I SMART ?



Our test lets you measure your smart factor. You will see that it is not that difficult to be smart. The solution with the "right" answers can be found on page 19. Good luck and we hope you enjoy it.

1 Smart? What does it actually mean?

a) Smart means cunning, clever, sharp, quick.
b) Smart stands for specific, measurable, attainable, relevant and timely.
c) Smart is a car made by Mercedes and Swatch. The name is a combination of both company names.
d) Smart is the acronym for super, modern, amazing, rewarding, terrific.

2 Which of these inventors came up with a truly smart product?

a) Thomas Alva Edison
b) Rolf Lucas-Nülle
c) Thomas Sullivan
d) Jürgen Dethloff and Helmut Gröttrup

3 How many words* can you form out of the word 'smart'? You have 30 seconds!

*You do not have to use all the letters.

4 In everyday life, are you smart because

a) you never leave the house without your smartphone.
b) Smarties are part of your staple diet.
c) you always try to kill two birds with one stone.
d) even though your car is not a Smart, you still park at right angles from time to time.

5 Smart solutions are characterized by special qualities. They are:

a) simple and therefore ingenious.
b) complicated and therefore ingenious.
c) timeless and therefore forward-looking.
d) unique and therefore expensive.

Solution

1 Smart basically means cunning, clever, sharp, quick. However, SMART is in fact also an abbreviation from project management which stands for specific, measurable, attainable, relevant and timely. And yes, it is also true that there is a car called Smart, although it only defined the smallest car size possible up to that point in time, not the meaning of smart itself. Option d) was thought up by us.

2 Jürgen Dethloff and Helmut Gröttrup invented smart cards (including credit cards), a smart product in the true sense of the word. Rolf Lucas-Nülle invented UniTrain-I, also quite smart. Thomas Alva Edison gave us light – not just in the lab – with the first light bulb. Thomas Sullivan is regarded as the inventor of the tea bag – simple but ingenious.

3 In 30 seconds we came up with art, star, rat, tram, Mars, tsar, arm, mat, mast and tar – a total of ten. If you managed to get more, well done! We would like to hear how you got on.

4 Smart people recognize opportunities. That is why they often manage to solve two problems with one solution. A smartphone is practical, and if you can't think of the solution yourself, you can always phone a friend. Smarties may have chocolate on the inside, but they do not qualify as smart food, sorry. And honestly, we don't know what kind of car you drive, but anything bigger than a pedal car should not be parked in contravention of the general road traffic regulations.

5 Smart solutions are simple and therefore ingenious. Sometimes they are also timeless or unique. But never let anyone talk you into believing that a complicated solution is ingenious, let alone smart.

Your score:

1 to 7 points:

Don't worry. You don't have to be smart to survive. It's not your fault that your Spanish is better than your English, that you don't own a credit card and that, although you have mastered spelling, forming new words is not really your thing. However, we do have to deduct points for parking your car at right angles. We recommend that you switch to public transport: a smart solution, as you'll get fewer parking tickets while at the same time helping to protect the environment.

8 to 13 points:

Not bad. Maybe you can improve by playing rummy cup more often and working on a few UniTrain-I courses.

14 to 19 points:

You are pretty clever! Your smart factor is 7 ¾ . Keep it up. Too smart is a bit scary anyway.

20 points or more:

Up to 20 points means you're smart, in fact very smart. Congratulations! You are successful at whatever you do in this world because you react smartly in any situation. Do you have more than 20 points? Well, that doesn't mean you're super-smart, just scary.

	1	2	3	4	5
a	4	2	Please count up the number of words you found. 0 – 1: one point 2 – 4: two points 5 – 7: three points 8 – 10: four points 11 or more: How did you do that? Check the total again. Words like Mrs. Art do not count. Well? Still got 11 or more? All right then, give yourself 5 points.	3	4
b	3	3		2	1
c	2	1		4	3
d	1	4		1	2

CHANGE AT THE TOP:

NEW MANAGING DIRECTOR AT LUCAS-NÜLLE

For over 13 years, Volker Hagmann was at Rolf Lucas-Nülle's side, managing the operational side of the business with great success. At the beginning of 2012, Marc Woerner took over from him as Managing Director. The handover went smoothly because the two men had previously worked in tandem and were therefore able to adapt to each other's style of working.

The 1st of January 2012 marked the end of an era at Lucas-Nülle. Volker Hagmann relinquished his duties as Managing Director. The 67-year-old had consolidated the company's international market leadership, always identifying and taking advantage of opportunities with his infallible sense of timing. The staff know him as a great networker, as someone who understood how to build and maintain strong relationships with customers and partners, retain good employees and appoint them to key positions. Also as a person who recognized and fostered talent. It was clear, then, that his successor would also have to bring special skills to the job.

> "It is a stroke of luck for both parties that we have been able to recruit Marc Woerner"

The management were quick to agree that they had found their man in Marc Woerner. A graduate with engineering and business qualifications, Woerner joined Lucas-Nülle in 2011, exactly six months before the actual handover. During those six months, he managed the company jointly with Volker Hagmann and worked intensively to get to know its employees and operations. "Working in tandem like that offers those involved the opportunity to learn from each other and ensure a smooth transition," confirms new MD Woerner, looking back. He says that learning is precisely what drives him anyway. And a look at his previous positions documents that thirst for knowledge which has characterized his career path to date. The successful completion of his engineering degree was not enough for him. "Technology has always fascinated me, no doubt about it, but I very quickly became drawn to the business side as well," says Stuttgart-born Woerner. Representative of his single-minded approach was his completion of a distance-learning diploma in business management at the Fernuniversität Hagen alongside his day job. He believes that lifelong learning is a major challenge for future growth.

These two qualifications laid the foundations for his subsequent career, which has always seen him working at the interface between technical innovations and business challenges. While he was still studying mechanical engineering at the Technical University in Munich, he joined a small plant engi-

neering company, where he got to know the technical sales department from the bottom up. Woerner then had the good fortune to get a place on an international management programme at ABB, allowing him to acquire the other necessary skills from scratch. He held a number of positions there, taking him through each of the global plant engineering company's departments, from transformers to sales management through to marketing management in the Utility Automation Division. "Important years, during which I learned a great deal," says Woerner.

Nevertheless, he ultimately made a deliberate decision to move into the SME sector by joining Kriwan, the worldwide leader in electronics and sensor technology for refrigeration and air conditioning systems. By the end of his time there, he held the position of Executive Vice President. He says he values the friendly company culture, close cooperation and down-to-earth business strategy that characterize SMEs. This also applies to Lucas-Nülle in particular. The decision to take the position of Managing Director was therefore easy for him.

"It is a stroke of luck for both parties that we have been able to recruit Marc Woerner", says Rolf Lucas-Nülle, owner and Managing Director. "He brings the necessary management experience for an internationally successful medium-sized enterprise and also has excellent sales skills that are particularly handy for products in need of elucidation."

It is precisely these areas that Marc Woerner will strengthen and expand as the new Managing Director. "I would like to preserve and continue the excellent work that has been done here. Lucas-Nülle is doing fantastically well in every respect. I see my role as being to further develop our strengths and to make our structures even more efficient and effective in order to facilitate further growth," says the new Managing Director of Lucas-Nülle. One of his main priorities will be to achieve integrated corporate communications that harmoniously combine internal and external communications.

The company will continue to be able to draw on Volker Hagmann's expertise in the future though. As Senior Vice President, member of the Advisory Committee and representative in a large number of industry associations, he will, from now on, support the management as well as the sales departments of both the German parent company and Lucas-Nülle Middle East GmbH.

Room for More Training and Education

ANOTHER LARGE PART OF REBUILDING COMPLETED

Lucas-Nülle continues to expand and modernize the company headquarters in Kerpen. The focus last year was on expansion of the seminar rooms. An area was created on the ground floor which now offers excellent opportunities for teaching and learning.

Lucas-Nülle's seminars on current technological subjects and how to provide instruction on them are popular and therefore usually booked out quickly. "For us, this indicates high demand on the part of vocational teachers, trainers and lecturers," says Wolfgang Pett, authorized representative at Lucas-Nülle. However, the rooms previously available lacked the capacity necessary to conduct the total number of annual seminars.

In view of this, Wolfgang Pett re-planned the entire section of the ground floor around the reception into a seminar area, which now provides enough space for training and presentation of the systems. Whereas previously, many disciplines were housed together in one room, now every product category has its own, generously dimensioned enclosure.

"Like the presentation systems, the training rooms were earlier located in the foyer. We have extended

this area and structured it more effectively. It now has state-of-the-art furnishings which offer us new possibilities for providing presentations to clients," reports Wolfgang Pett.

Similarly to the technological fields they exhibit, the seminar rooms have been named after well-known physicists, inventors and researchers. The room containing training systems for automation and power engineering has been named after Nicola Tesla, who became especially famous in the fields of electric power engineering and transmission. In this room, course participants and customers can test systems on photovoltaics and wind power under realistic conditions. Also set up here is the complete IMS® facility (IMS® = Industrial Mechatronics System) for demonstrating the interplay between its various modules.

The Nicholas-August-Otto room, named after the inventor of the gasoline powered combustion engine, provides plenty of space for automotive systems. The focus here is on an automobile which has been converted for educational purposes, and around which many other systems such as CarTrain and UniTrain-I have been grouped. The Werner-von-Siemens room is equipped with modern training systems for practical exercises in the field of installation technology. The Konrad-Zuse room is set up to instruct teachers and trainers in the field of communication technology.

"These new facilities offer ideal conditions for more intensive training," affirms Wolfgang Pett.

How an Enterprise Can on a Sustainable Basis

Sustainability is a mega-trend of the 21st century. For Lucas-Nülle, thinking and acting with a view to the future is not new – it has been a basic business principle for over 30 years. How has this medium-sized company been able to achieve sustainable success for three decades?

Lucas-Nülle has been headquartered in Kerpen-Sindorf for 30 years, and grown rapidly within these three decades. That this has always been possible at the same location is exclusively attributable to a business strategy geared toward sustainability that has been in place since the end of the 1970s. "Though this concept may have had a different name at that time, the aim has always been to keep the company on a solid path of sustainable success", says Christoph Müssener, head of business development. Accordingly, Lucas-Nülle defines success not just in terms of maximized profits, but equally by employee satisfaction and, increasingly, environmentally compatible manufacture and operations. "We feel this principle is indispensable for us to continue performing as well in future as we are right now," adds Müssener.

Thinking of the future also means investing today in tomorrow's innovations. Approximately twelve per cent of annual sales are therefore invested in Lucas-Nülle's ever-growing development department. Even many technology companies are not able to match this percentage. This is achievable only in a company with a solid financial base. The high equity ratio of about 34 per cent not only serves as a hedge for Lucas-Nülle but is the prerequisite for large international projects. Small and medium-sized enterprises in Germany have an average equity ratio of around 20 per cent, often not enough to survive long dry spells.

A simple equation: satisfaction on both sides

With a financial management approach oriented toward future developments, Lucas-Nülle creates degrees of freedom in everyday business. "We can simultaneously realize a number of product concepts, while still being able to test everything and allowing new systems to mature," explains Christoph Müssener. Long-term success, even against prevailing industrial trends, is the achievement of creative, motivated employees. Rolf Lucas-Nülle has absolutely no doubt about this. Performance-based bonuses are therefore being issued to all employees this year too. "That is quite unusual, and shows colleagues that their services are appreciated," affirms Müssener.

The calculation is based on a simple equation: when staff do well, so does the company, and vice versa.

Finding and binding employees

In addition to fair and amicable mutual dealings as well as flexible working hours, it is a matter of course for superiors to take special life situations into consideration.

So, in complete contrast to a trend presently experienced by small and medium-sized tech companies, there is no shortage of skilled staff at Lucas-Nülle as yet. "We establish contact with young people, are keen to offer them

Be Innovative

openings and prospects for advancement, and provide them with training," Christoph Müssener says by way of explaining the consistently high number of qualified applicants. Staff here benefit from favourable working conditions and an interesting, exciting environment.

Lifelong learning and staff health are not empty words for Lucas-Nülle, which annually invests more than the norm in further education and training for staff, with a dedicated health training day. Personnel statistics show that this commitment is rewarded by the staff. Lengths of service at the company are unusually long, currently averaging 11.3 years. About 40 per cent of the approximately 100 employees have already been with the company for 20 years or more.

One solution – two benefits

A company which assumes responsibility and undertakes to educate the next generation should also be concerned about the future of the environment. Consequently, Lucas-Nülle complemented its concept of sustainability with the ecological aspect already some time ago. A solar facility for converting sunshine into electricity was installed in May 2011 that practically covers the entire flat roof of the company's headquarters. By December 2011, this facility had already reduced the company's CO^2 emission by 35 tons. Besides its main task of supplying the building, the facility also serves to demonstrate training systems for renewable energies under realistic conditions. Customers can observe the interface between the training system and facility in the new seminar rooms (report provided on pages 22 and 23).

Sustainability often implies deriving two benefits from one innovation. This applies particularly in the field of ecology. "We therefore screened all levels of the company to establish whether and how its processes harm the environment, and what could be changed", declares Christoph Müssener. Employees have also contributed decisively to the success here. Being best familiar with their respective work routines, staff have submitted many energy-saving ideas. In addition to the climate-friendly solar facility, the office building has received a new, more economical heating system. Moreover, all buildings have been thermally insulated. "Because an intelligent use of energy is frequently the aim here, waste heat from the server room is now used to supply a nearby production room," says Christoph Müssener to illustrate an example of smart energy-saving opportunities.

Sustainability as an entrepreneurial mandate

In addition to the building, logistics are a major consumer of resources and energy. As a global company generating about 80 per cent of its turnover from exports, Lucas-Nülle constantly dispatches products abroad. As one consequence, its training systems need to be elaborately packaged before going on their long journey. It has meanwhile become possible to obtain such packaging to a large extent from recycled paper.

"Sustainability is a mandate we want to improve on every day, not only to become a more social enterprise, but also a more successful one," says Christoph Müssener who himself has been with Lucas-Nülle for over 13 years.

Co-existence of stability with innovative drive is not an issue for Lucas-Nülle. Long-term thinking and associated dependability are fertile ground for performance and creativity.

The Kassel vocational training centre has one goal: to impart practical skills. For this purpose, the centre's instructors continually adapt their teaching and learning methods. When two of its new electrical engineering buildings required furnishings, the centre opted for multimedia training systems which support and encourage independent learning. This report is about a visit to Hesse's largest educational centre.

"In professions whose innovation cycles are becoming increasingly shorter, qualified personnel need the practical skills necessary for continual learning. We help trainees develop these skills."

Every year, the educational centre trains about 8,000 participants in inter-company apprentice courses, sponsored training and retraining as well as further education programmes ranging from in-house seminars to master training. This makes the Kassel educational centre the most important partner of the trades in the region. Special training programmes and master courses attract participants from all over the nation.

"Our new electrical engineering laboratories should be able to serve the greatest possible number of such diverse programmes," reports Juergen Gintschel, a departmental head at the Kassel educational centre.

The composition of the course participants is becoming increasingly diverse too. "The gap between very capable and weak students is growing. We therefore face the particularly difficult challenge of accounting for very different levels of learning, in order to bring all participants to approximately the same level of knowledge as a course progresses. Traditional classroom teaching is destined to fail here," says Heiko Schade, who trains electrical engineers for energy and building management systems, explaining the situation in the department. For this reason, the vocational training centre adopted new teaching methods from an early stage onward.

"Our lessons are no longer primarily designed to impart knowledge which then quickly becomes obsolete. In professions whose innovation cycles

PROFESSIONAL PRACTICE IN FOCUS

are becoming increasingly shorter, qualified personnel need the practical skills necessary for continual learning. We help trainees develop these skills," says Schade, elucidating his remit.

To accomplish this effectively as part of instruction, the training centre has used training systems from Lucas-Nülle for many years. "We simply discovered that these systems are practical and embody a sound didactic concept. For our new lab, we decided to use the multimedia InsTrain systems which also permit independent learning", states Heiko Schade. The Classroom Manager, an administrative software from Lucas-Nülle, can be used to freely edit multimedia courses and adapt them to the learning progress of each class.

This makes it possible to promote different learning curves within a group. "We can, for example, use a course for basic training or for technicians and master classes. I can modify the contents without the need for any programming skills," notes Heiko Schade happily. Students can then develop the necessary skills on their own, guided through the curriculum by the animations, measurements and experiments forming part of the multimedia learning environment. "Though I provide assistance as the trainer, the students nonetheless learn independently. This gives me completely new options of offering lessons which are more varied and hence more successful," reports Schade.

Trainees also see advantages in the new form of instruction.

"Because the system is extremely practical, I was able to recognize and implement a lot of things when it came to real-life operations," says Oliver Quolke, who will complete his retraining as an electrical engineer for energy and building management in June. His colleague Joseph Mbaku, who plans to continue his education after re-training as a technician, adds: "It is also very nice to be able to handle realistic tasks as part of a team. This ensures an association to the real world at all times, besides permitting me to recall details and work procedures very clearly." The two young men are very happy with their instruction at the Kassel vocational training centre. This success is also confirmed by employers. "Feedback from companies indicates that our approach is correct, allowing trainees to deploy their skills as qualified staff in professional life," states Juergen Gintschel.

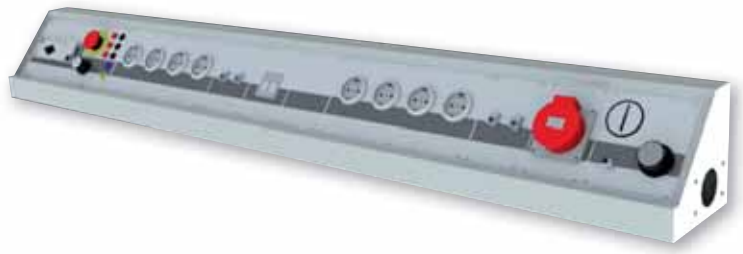
Oliver Quolke and Joseph Mbaku conducting the exercises assigned to them on the InsTrain system

New Products

3HU ERGO 45° POWER CHANNEL – FOR TABLETOPS AND COCKPITS

Keep it simple

– this is the motto under which the new, 3-height-unit Ergo 45° power channel was developed. Compared with a standard power channel, the new one is more compact, and perfect for imparting just the basics or for serving purely as a fuse-protected supply unit. Special emphasis was laid on user-friendliness during development of the new channel. The front panel's 45° inclination is ideal for comfortable, better-organized and ergonomic operation. The channel can be used as a power supply source not only on tabletops, but also in cockpits in combination with innovative lighting technology.

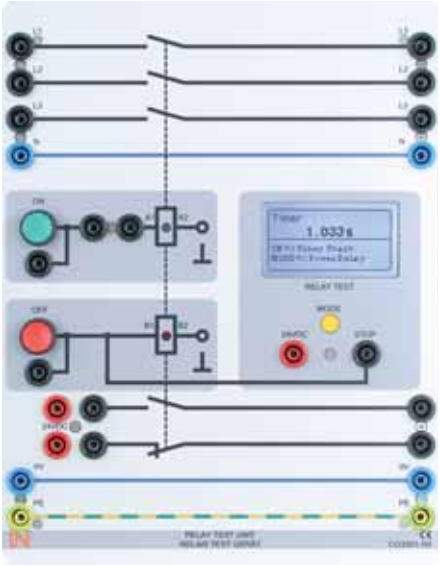


KEYLESS ENTRY FOR AUTOMOBILES

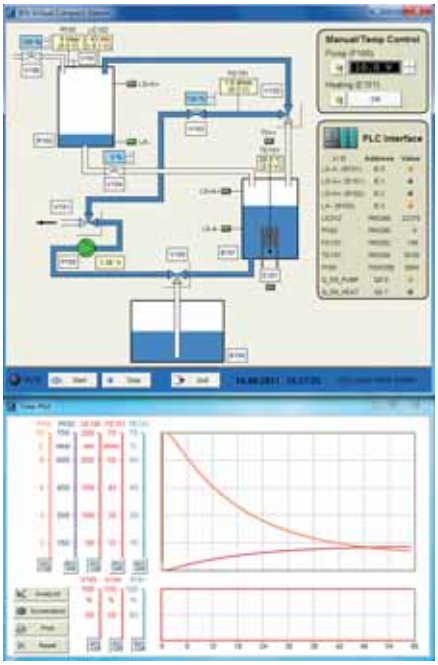
A new keyless entry course introduces trainees to a highly topical comfort system. This practical UniTrain-I course guides students through realistic experiments which familiarize them with door-locking systems, radio remote control and keyless automobile access. Students also learn about the operation of a central locking system with a CAN bus. At the end of the course, trainees have a good understanding of the systems involved and are ready to apply this skill in everyday working life.

TEST DEVICE FOR PROTECTIVE RELAYS IN POWER ENGINEERING

The new relay tester is ideally suited to three-phase testing of the functions of current, voltage, time-delay, and power relays. The device measures the time taken by a relay to trip after the trigger condition has been generated. This allows trainees and trainers to experimentally investigate power engineering relays, besides understanding and interpreting their behaviour. Simple operation via start and stop buttons allows particularly convenient usage for educational purposes. The inputs and outputs are furnished with 4mm safety sockets to prevent electric shock. The tester is also intrinsically safe and protected accordingly against overload.



IPA-VIRTUAL COMPLEMENTS PROCESS ENGINEERING



IPA-Virtual is a software which simulates the complete IPA1 training system within a virtual learning environment, and presents the system in graphic animations on the screen. Like the real model, the virtual IPA station can also be programmed with STEP 7, and operated via the “SPS PLCSIM” software. Available for recording step response or testing the determined controller parameters is a standalone version of IPA-Virtual, in which the model can be operated without any additional control software. The system covers all learning areas, from commissioning of the compact station right up to optimization of control parameters. In this manner, IPA-Virtual allows preparation for work on real models. Programs created by trainees for the simulation system can subsequently be transferred smoothly to the real compact station.

LN-LABDESIGNER ROOM-PLANNING SOFTWARE FOR ELECTRICAL LABORATORIES

LN-LabDesigner, a new online room-planning software intended for use at Lucas-Nülle from the spring of 2012 onward, opens up new dimensions in planning and configuring laboratories. Easy to use, this tool permits interested parties and planners to innovatively plan laboratories and visualize them in 3D. The software supports various output formats to transfer 2D or 3D projects to standard graphic programs. Particularly noteworthy is the 3D visualization providing different views and flights through the planned laboratory. The program, including an extensive furniture library, can be downloaded free of charge from Lucas-Nülle’s website.

STUDENT-TEACHER MEASURING STATIONS WITH ETHERNET CONNECTION

The challenge: to distribute any required measurement or bus signal to students easily, and without any interference or feedback. The solution: smart student-teacher measuring stations from Lucas-Nülle.

Lucas-Nülle has developed a novel system that trainees can use to receive the same signals which are input by the trainer into a central, teacher's measuring station.

Highly flexible, networked and safe student-teacher measuring stations are desired by many trainers, especially in the field of automotive training. The analog systems which have been commercially available for some time now have significant drawbacks: they generate feedback and interference, and their installation requires a considerable amount of wiring.

Lucas-Nülle has therefore designed a novel system that trainees use to receive the same signals which are input by the trainer or instructor into a central, teacher's measuring station. Signals from a training system such as Lucas-Nülle's CarTrain or even from a real car are digitized at the teacher's measuring station, and distributed through an ordinary network cable to the students' measuring stations. There, the signals are converted back into analog form, thereby becoming available in the same mode as on the original system.

Capable of distributing any required electronic signal to students, this innovative system can also be used in conjunction with Lucas-Nülle's other training systems outside the automotive scope. Signals travel from the teacher's workstation to the students' workstations via an Ethernet connection, so that transmission is fast and precise. As a result, students no longer have to remain passive during presentations on a real vehicle or the CarTrain, and can instead actively participate and perform independent measurements. Clearly structured overlay masks for displaying the respective measurement object at each student's measuring station ensure a continuous reference to the demonstration system. One special feature is that incorrect operation by a student does not disrupt either the original system or the other students' systems, nor do these systems suffer any damage as a result.

No loss of data in the networked classroom

"Our solution makes it possible to equip entire classrooms with workstations, while avoiding data loss," says Martijn Vincken, product manager for Lucas-Nülle's automotive department. Regardless of how many apprentices are currently working in the network, they all receive extremely accurate signals. Six different measuring channels are available for this purpose, allowing a far greater

diversity of signals to be measured during a lesson, compared to conventional systems. Another important aspect is safety. “Ever since the introduction of electric mobility into technical vocational education, students have been exposed to high-voltage systems. This places new demands on safety precautions in the training lab,” explains Martijn Vincken.

Safe measurement of high-voltage systems

Using Lucas-Nülle’s new student-teacher measuring stations, high-voltage signals sent from the instructor’s workstation are converted automatically for students, and output at their workstations in the form of harmless, low voltages. However, the graphically displayed signal curves are completely identical to the original, high-voltage characteristic. As a result, students can observe a high-voltage signal’s typical features without endangering themselves.

The teacher’s measuring station is equipped with a gateway allowing different CAN signals to be fed. Every student’s measuring station is furnished with a CAN-bus transceiver so that the student can independently measure and analyze CAN-bus signals. Consequently, this topic which is of relevance to testing can be taught particularly efficiently using the new teacher-student measuring stations. The last interface is terminated in each case by the system using a resistor, hence permitting automatic bus determination. A further and very significant advantage for teachers is specific indication of faults or interruptions, permitting direct identification of the faulty workstation. The teacher or instructor can immediately register the interruption and react accordingly. This reduces classroom disturbances and enables more successful learning.

ALWAYS ONE STEP AHEAD OF DANGER

With a new training system from Lucas-Nülle's proven InsTrain series, instructors teach the subject of burglary and fire protection as a key component of modern installation technology. During the development process, Lucas-Nülle once again relied on its renowned partners who are also committed to high quality and practical relevance in training and further education.

The InsTrain system is a classic for training in installation technology, each of the system's modules possessing salient, innovative features. The new InsTrain provides fascinating presentations on the topic of alarm signalling, and keeps trainees abreast of the state of the art. The primary objective nowadays is to protect a building and its occupants as unobtrusively and comprehensively as possible against risks, in order to fulfil safety requirements as well as insurance provisions.

"This module of ours relies on the latest alarm signalling technology available on the market. Trainees thus become quickly acquainted with prevailing standards and new applications. When choosing partners, we attached particular importance to manufacturers of equipment for private use, this area playing the biggest role in training. In ABB, we have found the ideal manufacturer," says Lutz Schulz, product manager for installation technology at Lucas-Nülle.

The InsTrain system incorporates ABB's L 240 (class A), a widely used, combined, household alarm system for burglary as well as fire, gas and water damage. "This assures not only our system's quality, but also a high practical relevance. Students who learn their trade with our training system are easily able to apply their practical knowledge in day-to-day professional life," asserts Schulz.

Not only students benefit from the high practical orientation. The new system also offers many advantages to instructors and vocational teachers. With extremely short setup times, a multimedia learning environment and interesting experiments, the system forms an ideal basis for stimulating lessons.

"Because a training system's success depends essentially on acceptance by instructors as well as students, we always keep both these parties in mind. This philosophy is also supported by our partners," says Schulz with regard to the development of InsTrain system.

LUCAS-NÜLLE'S TRAINING SYSTEMS: AUTOMATICALLY GOOD

One of the most challenging and fastest moving areas of engineering, automation technology is taught best with a practical orientation using state-of-the-art technology. Accordingly, Lucas-Nülle here presents a new system for CNC and machining technology. Combinable with the IMS® program, this new training system is of significance to automated production. As part of realistic production processes, trainees thereby acquire technical automation know-how which they can apply straight away on entering the professional world.

In terms of educational content, Lucas-Nülle's Industrial Mechatronics System® (IMS®) covers automation technology in its entirety. Trainees and students work here on a system whose individual modules build on each other in a logical manner. The new CIM (Computer Integrated Manufacturing) training system enables trainees to familiarize themselves with the fundamentals of machining. As another key constituent of automation technology, this system can be seamlessly integrated into IMS®. During project work, trainees are able to independently produce workpieces for the IMS® using compact lathes and milling machines. A robot can be used to link both the IMS® and CIM systems to form a complex automated facility. In this way, the training system is able to demonstrate an extensive process otherwise only observable in actual practice, and provide students with insights into the mechanical operations. Intended for modern, practical instruction, this complete environment makes it possible to experiment with realistic facilities already in the classroom.

Robotic link between CIM and IMS®

"Seamless linkage between both systems makes their technical processes easier to understand. Students engaged in projects receive hands-on experience in their respective professional fields," asserts Marijan Naglic, product manager for automation technology at Lucas-Nülle. The CNC machines can be linked to the IMS® system, but only if needed. Even as stand-alone units, the training lathes and milling machines are suitable for practising manual or computer-controlled production of workpieces. The robot which serves as a link between the CIM and IMS® automates the process fully if required. For this purpose, the design was adapted to special training safety requirements.

The robot's working range or reach must be protected by light curtains or other systems which meet applicable safety regulations. As soon as the light curtain's infrared rays are interrupted, the robot is switched off. If the front flap of the drilling/milling machine is opened, too, the robot is disabled to prevent injuries and material damage.

Educational software for theory and practice

"It is these safeguards which make practical experiments with the lathe and milling machine possible. Students can thus work independently and understand the processes involved," states Marijan Naglic.

An appropriate ILA course introduces students to the basics of machining technology. In theoretical lessons and practical exercises, trainees acquire all the knowledge and skills needed for independent design, programming and simulation, and, ultimately, fabrication of workpieces.

Department: EloTrain plug-in system

A MULTIMEDIA ENVIRONMENT FOR ELOTRAIN

Can a classic like the system of plug-in modules be improved even further? Yes it can, by furnishing it with a compact, practical, multimedia learning environment to impart the basics of electrical engineering.

The new 2mm connector system for UniTrain-I, in combination with its didactic concept, serves as a modern environment for training in the fundamentals of electrical engineering. “We spent a full year developing this new system and the associated software. During this process we not only refined technology and quality, but also made the design a great deal more compact,” says Stefan Linden, product manager for EloTrain.

Thanks to a use of significantly smaller components, the new system requires about 50-per-cent less workspace. This enables students to assemble more complex circuitry in a much tidier manner while taking up less space. “The new patch panel allows entire circuits to be configured in very close agreement with the related circuit diagrams, something which was possible only in fragments previously,” explains Linden.

The new patch panel can do much more though. Connecting it via USB cable to the UniTrain-I interface turns the plug-in system into a multimedia learning environment which integrates power supplies, function generators, and many different measuring instruments.

“These virtual instruments are just as accurate as external hardware, but naturally much more compact and less expensive,” states Linden, emphasizing the advantages of this solution.

UniTrain-I courses allow trainees to work through entire curriculums themselves, independently conducting measurements and checking circuits. Besides relieving the instructor, who now has more time to help students individually, this casts students into a more independent and responsible role already during basic training, thereby increasing their motivation.

“In particular, we have succeeded in developing a training and educational program which combines theory and animated graphics in a lucid manner. After a long period of development, this plug-in system for UniTrain-I has turned out to be a true innovation for classrooms,” says Linden.

A NEW PRODUCT RANGE ENSURES A GOOD CLIMATE

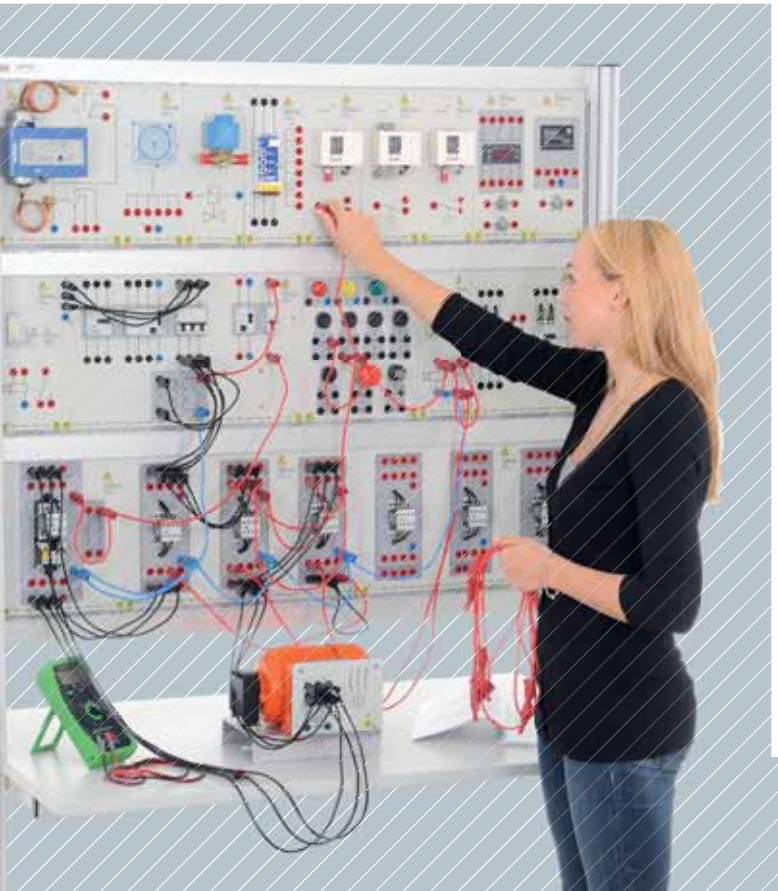
Refrigeration plant technology by Lucas-Nülle

In Germany, refrigeration plant engineering was not recognized by legislature as an independent, fully-fledged trade until 1978. Soon afterward, however, this trade established itself as an innovative and economically vital sector of enormous significance. It is so important that Lucas-Nülle, in cooperation with renowned partners, has created a separate product range for this technological area: refrigeration and air-conditioning technology.

"Many job vacancies in the field of refrigeration technology cannot be filled. In Germany, 2,000 companies with a total of about 20,000 employees operate in this segment of the industry. Besides an acute shortage of skilled workers, these companies face the problem of a lack of young talent." This is according to a statement by the Federal College of Refrigeration and Air-Conditioning Technology in Frankfurt, one of the few schools of its kind in Germany.

At the Maintal Federal College, whose training programme is intended specifically to reverse this trend, aspiring mechatronics specialists for refrigeration and air-conditioning technology as well as plumbing, heating and air-conditioning facilities prepare for an exciting career at both theoretical and practical levels. New training systems from Lucas-Nülle are already in use for this purpose.

"Refrigeration and air-conditioning technology is a new product range for us. In addition to the refrigeration cycle, a major aspect of refrigeration technology is electrotechnical open- and closed-loop control. It therefore fits very nicely into our product portfolio," explains Lutz Schulz, product manager for refrigeration plant technology. "Having dealt intensively with this technological area, we are now able to offer sophisticated training systems here."



Instructors and students at Maintal already work with the systems, and agree on their high ease of use and practical relevance. While students have special praise for the hands-on demonstrations, instructors value the teachware accompanying the systems, and their flexible possibilities of application.

With the system titled "Control Technology at Refrigeration Plants", the Maintal Federal College introduces students to the basics of open-loop control. Conversion of non-electrical variables into processable electrical signals, and control of machines and drives are important issues in a profession not originally associated with electrical engineering.

The refrigeration cycle remains an important training topic. The Maintal Federal College conveys this subject with the help of a related system of panels under a variety of conditions: trainees learn how pressure and temperature are interdependent, how cold is produced, and which components make up a refrigeration facility. Also forming part of the curriculum are environmental protection measures, leakage tests and safety features. Whether it is about compressors, valves or other components, trainees become familiarized with the refrigeration cycle and learn how to identify and repair possible malfunctions.

"These two systems, together with courses on machine and drive technology offered by Lucas-Nülle, already cover fundamental areas of training for mechatronics specialists in the field of refrigeration technology. However, we continue to develop even more modules for this product range," reports Schulz.

THE NEW CLASSROOM MANAGER WITH TEST CREATOR

Designing educational material, tests and experiments, assigning tasks individually while nonetheless retaining an overview of the general learning progress made by the class – all this is effortlessly achieved with the Classroom Manager. The new version of this software now available on the market includes a Test Creator, a powerful tool for designing tests. This finally makes it possible to integrate practical measurement exercises into tests.

The Classroom Manager makes it easy to create individual, interactive questions for Labsoft. A Test Creator now included in the software supplies new functions for the largely automated design of tests. From a collection of exercises, instructors can put together tests tailored specially for their classes in just a few clicks.

The content of questions can be freely designed with the help of a Questioner. After creating questions independently, the teacher can save them to a database which serves as a source for the Test Creator during compilation of tests. Ready-made databases containing exercises on the subjects of digital technology, electrical engineering and installation technology are already available for teachers who have no time to formulate questions themselves. Other subjects are in preparation.

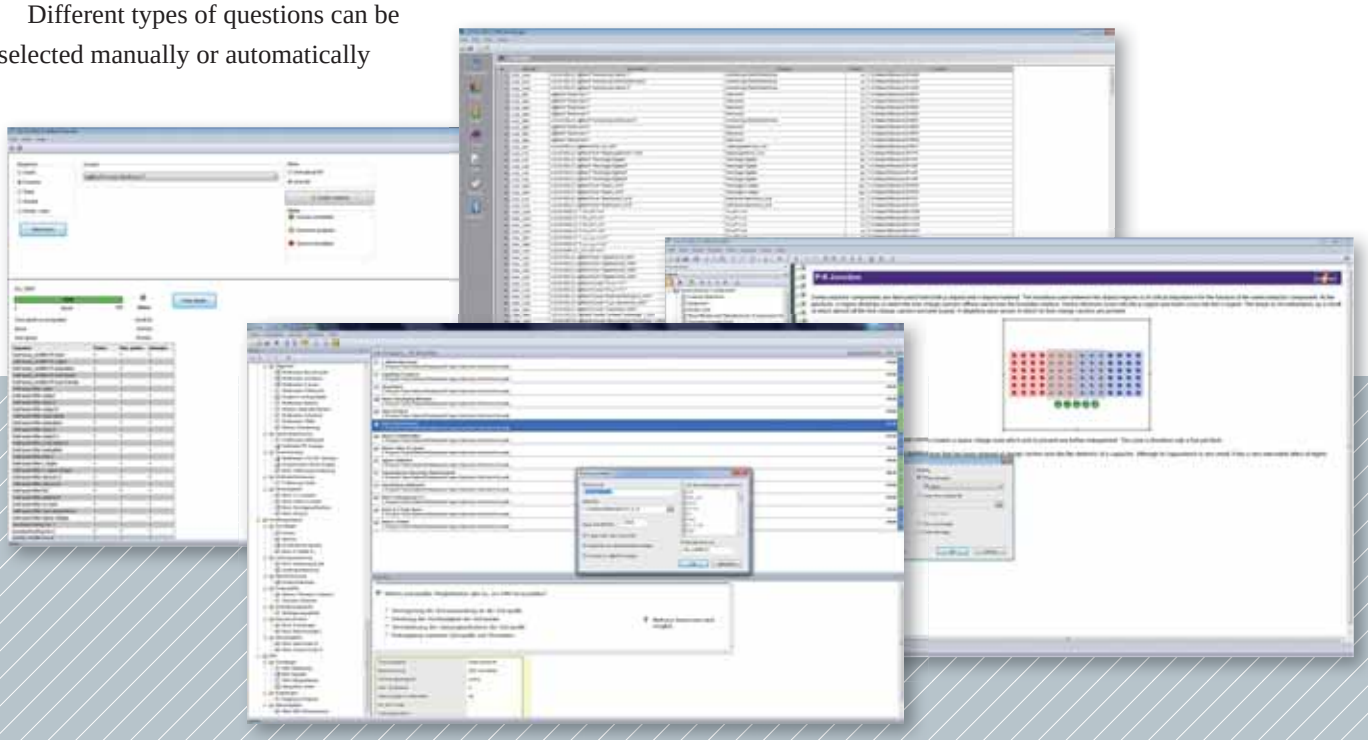
"We are confident that ease of operation and a large pool of questions will facilitate work for all teachers, especially because the new tool is very flexible and intuitive," says Joerg Sprengepiel, product manager for UniTrain-I at Lucas-Nülle.

Different types of questions can be selected manually or automatically according to subject. Furthermore, a file's exercises can be filtered not only thematically, but also by degree of difficulty, type of question, theoretical aspect, or measurement task. "For example, tests can be created for any learning level without the teacher having to first examine every question's degree of difficulty," explains Sprengepiel.

A special desire of many teachers was to be able to integrate practical exercises into tests. "Because imparting practical skills is a key constituent of every course, it was clear that this aspect should be tested too. Accordingly, about 25 per cent of the questions can only be answered following practical work," says Sprengepiel.

Virtual measuring instruments permit students to solve practical measurement exercises in a straightforward manner. Teachers can edit student groups and assign individual sequences so that not all students receive their questions in the same order. Evaluation is performed electronically with a single click.

Now available, the update includes the Test Creator as well as a new, fresher layout for all sub-programs.



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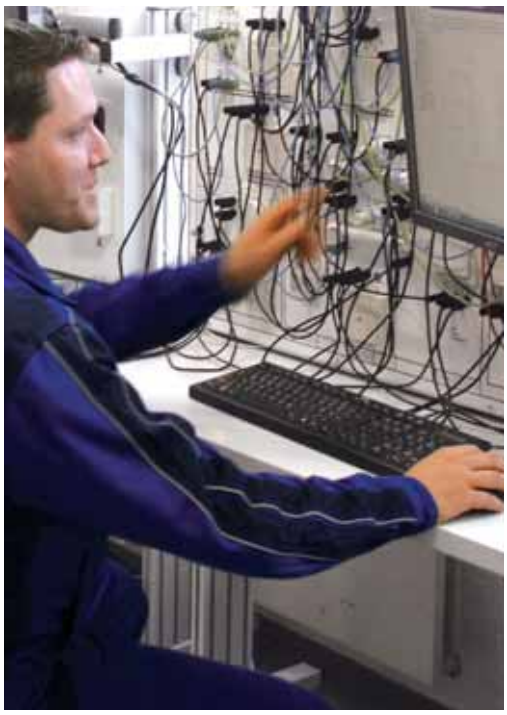


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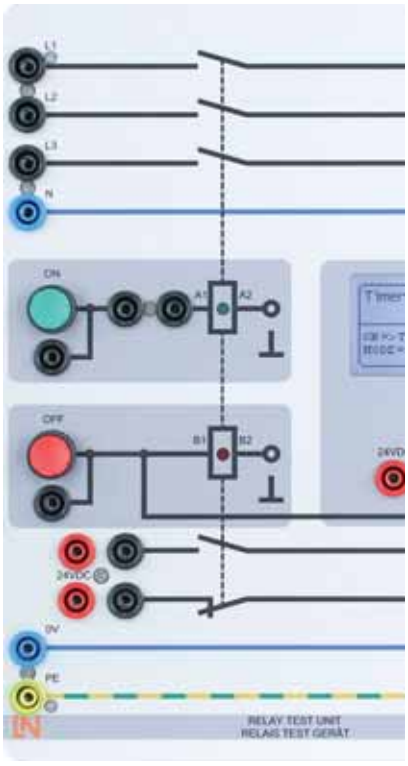
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