Issue 2010

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PRACTICE

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SUSTAINABILITY

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Modern didactical approach using multimedia-based systems

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LUCAS-NÜLLE

Dear Readers,

The main topic of this issue of "LN Practice" is power engineering and our special training and experimenting systems developed for the area of renewable energies.

The international community is striving to limit the Earth's warming to a maximum of two degrees – as officially stated in the declaration of the Copenhagen summit on climate change at the end of 2009.

This objective can only be reached through the determined utilisation of renewable energies. In our part of the world, wind energy and solar power will undoubtedly be the most productive and oft-utilised alternative energies. The fuel cell will also be making its contribution in future, in stationary applications but especially as a mobile energy source.

For this extremely important spectrum of topics, top-quality training systems have been developed by our staff in product management and development working in conjunction with reputable partners from industry. We would like to introduce these learning systems to the reader in this issue.

The topic of power engineering will also be one of the highlights at the upcoming Didacta trade fair in Cologne running from March 16 to 20, 2010. Furthermore, we are looking forward to the Light + Building trade fair on April 27 in Frankfurt, where we will be presenting the topic of "Renewable Energies in Electrical Engineering Training and Education". We also welcome the opportunity to advise you on how knowledge in this area can be conveyed using multimedia-based training systems.

In this issue we will also be reporting on developments inside our company involving the question of how modern didactic approaches can be implemented using multimedia-based training systems. We will also be presenting our clients' successful training and education concepts as they succeed both at home and overseas and reporting on the set of skills required of the automotive mechanic and specialist of tomorrow. We also look at how installation technology training is structured in the Netherlands.

Furthermore, we provide insight into our understanding of sustainability and how it shapes our company philosophy and our day-to-day operations. In our opinion, planning and working in line with a keen sense of responsibility and sustainability has to be lived out in three different dimensions: the ecological, the social and the economic.

Wishing you an enjoyable read,

Rolf Lucas-Nülle

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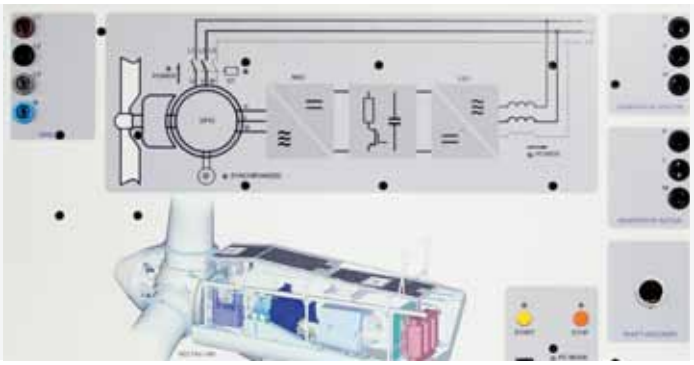


Sustainability

Professional further education and training for the future

From inside the company

International projects

Cooperation

Miscellaneous

UNESCO World Conference on Education for Sustainable Development

Declaration is now available in nine languages

The Bonn Declaration, adopted by the participants of the UNESCO World Conference on Education for Sustainable Development (Bonn, Germany), is now available in nine languages, namely in English, French, Spanish, German, Arabic, Russian, Chinese, Danish and Japanese. The Bonn Declaration reflects the discussions held during the conference and provides a strategic orientation for the second half of the UN Decade. It attests to the importance of education for sustainable development in the current world situation. It calls for making a compact with the global UN Decade of Education for Sustainable Development aimed at improving knowledge, skills and competencies as well as strengthening values and attitudes oriented towards a transition to a more just, fair and viable world.

Download: http://www.esd-world-conference-2009.org

Vocational training:

International perspective

The last decade has given rise to a strong public discourse in the most highly industrialised economies about the importance of a skilled workforce as a key response to the competitive dynamic fostered by economic globalisation. The challenge for different training regimes is twofold: attracting young people into the vocational training system while continuing to train workers already in employment. Yet, on the whole, most countries and their training systems have failed to reach these goals. How can we explain this contradiction? Why is vocational training seen to be an 'old' institution? Why does vocational training not seem to be easily adapted to the realities of the 21st century? This book seeks to respond to these important questions. It does so through an in-depth comparative analysis of the vocational training systems in ten different countries: Australia, Canada, Denmark, France, Germany, Korea, Mexico, Morocco, the United Kingdom and the USA.

By Gerhard Bosch and Jean Charest, 2009
Publishing house: Routledge, Chapman & Hall

INEPO 2010: 18th International Environmental Project Olympiad, May 19-22 in Istanbul

The aims of the INEPO actually run parallel to the operations carried out by the United Nations Group. The 21st element of the declaration broadcast at the 1992 Rio de Janeiro conference organised by the United Nations emphasises the importance of youth and international cooperation. As environmental problems are worldwide, we have no choice but to cooperate at a global level. The International Environmental Olympiad takes place in Turkey in the first week of June in World Environment Week. The practical benefits of these projects can be summarised thus:

■ Participating in finding alternative, eco-friendly energy sources. ■ Developing projects to eliminate polluting agents. ■ The preparation of groundwork for a recovery process. Above all, important steps are taken in the creation of friendship arrangements between countries. ■ This is a great step taken in order to prevent warfare in the long term. ■ Investments in weapons can then be directed to more humanitarian efforts.

The youngsters compete with each other to gain a place. But ultimately, everyone returns to their countries with a feeling positive. This is because there are other things which people gain from the competition, such as students from different countries and cultures meeting here, mingling and sharing their opinions.

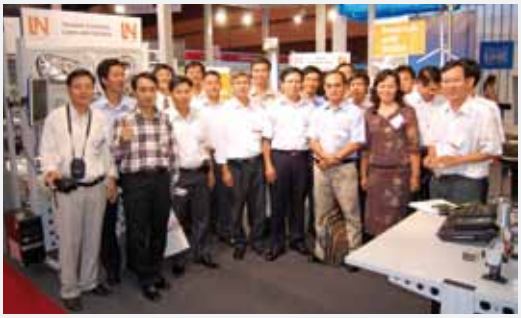
http://www.inepo.com/

International conference: technology-enhanced learning

The 1st International Conference on Technology-enhanced Learning, Reforming Education and Quality of Teaching 2010 is a bold effort aiming to foster the debate for the global need in turbulent times to invest in education and to go beyond mere verbalisms. It is intended to be the leading academic conference for technology-enhanced learning.

http://www.reform-education.org/

TRADE FAIR DATES



USA

- 20–23.06.2010
  ASEE
  Louisville, Kentucky
  http://www.asee.org/conferences/annual/2010/index.cfm

- 02–04.12.2010
  ACTE
  Las Vegas, Nevada
  http://www.acteonline.org/convention.aspx

FRANCE

- 10–12.05.2010
  M@DI/Intertice 2010
  CNIT Paris la Défense

ALGERIA

- 01–03.03.2010
  International Workshop on Physics: Renewable energies, INWOP'10
  Centre Universitaire d'El Oued
  El Oued

- 26–28.05.2010
  2nd Official International Days on Electrotechnology, Maintenance and Electromagnetic Compatibility
  ENSET
  Oran, El Oued

VIETNAM

- 01–03.12.2010
  Worlddidac Vietnam
  International Center for Exhibition
  Hanoi
  http://worlddidacvietnam.com/

ANGOLA

- 20–25.07.2010
  FILDA 2010,
  Luanda

RUSSIA

- 15–17.04.2010
  "Education Beyond Borders"
  Krasnaja Presnja exhibition centre
  Moscow

- 28.09–01.10.2010
  "The Educational Environment"
  VDNH Forum
  Moscow

KAZAKHSTAN

- 25–27.05.2010
  KiTel trade fair
  Almaty

TURKMENISTAN

- 08–10.09.2010
  "Science and Education: a Renaissance"
  Ashgabad

AZERBAIJAN

- 06–09.10.2010
  "Education and Career"
  in Baku

National and international comparison of the two main paths to gaining advanced technical qualifications

Masters of technology

Lifelong learning is more important than ever for skilled workers as their jobs become increasingly demanding. The two advanced qualifications as master craftsman or technician are given particular recognition. Which qualification is suitable for whom is not an easy question to answer. It depends what kind of career path the individual wants to pursue afterwards. International recognition of the qualification might also be a consideration as the training and advanced training of technical and managerial staff is organised differently from country to country.

No-one is born a master," says an old proverb. This should really be widened to include technicians too. Both training routes make exacting demands on trainees who are seeking to improve their career prospects. Nevertheless, there are important differences between the two types of training, which will affect the training process itself as well as subsequent career development. A master craftsman training course is less complicated and, for that reason, can seem more appealing to some people at first. Even journeymen that have just passed their test can now go straight to a school for master craftsmen. Potential technical professionals, however, must be able to show proof – usually employer confirmation – of one to one-and-a-half years of work experience after successful training, depending on the federal state in question, before they can apply to the relevant school. The majority of schools charge a fee towards costs, which in most cases comes to a few hundred euros per semester or session. The master craftsman training course is shorter than the technician training course, but is significantly more expensive, depending on the chamber of skilled crafts responsible for the school.

Master craftsmen: finished quicker and always in demand

Young people must factor in an expenditure of around 10,000 euros before they can take their master craftsman's examination after completing around 800 hours of training. The training period for technicians is more than twice as long. Consequently, trainee technicians study a wider range of subjects than trainee master craftsmen. These often include subjects that are not directly related to the trade in question, such as general mathematics, business management or technical English as well as personal development modules which are designed to equip the trainees for promotion to middle management positions. Where this additional, general knowledge is not required, for example in a skilled crafts enterprise, the master craftsman course provides a quicker route to the desired destination.

Otto Kentzler, President of the German Confederation of Skilled Crafts (ZDH), explains: "For managers in skilled crafts enterprises, the master craftsman certificate is the ideal qualification. It stands for a high level of technical and business expertise and prepares the holder for the many and varied demands of managing small and medium-sized enterprises. Master craftsmen are in demand – whether it be as independent contractors or in management positions. The high status they enjoy in the trade is also reflected in their salaries."

On the way up: technicians reach middle management positions

In medium-sized industrial enterprises and large concerns, however, technicians often have better prospects,

masterly technicians

including in relation to salary, because here they are often employed in combination with, and sometimes on the same level as, graduate engineers. "Technicians are always required when the work in question is of a practical rather than theoretical nature. At the same time, they often work alongside engineers who have a more theoretical orientation by virtue of their education," says Peter Schüly from Verein der Techniker e.V., one of the largest organisations for technical professionals in Germany. Many state-certified technicians really are specialists in their field as there are over 400 technician courses covering a very wide range of specialisations. Whereas at the beginning of the 20th century, training was only offered for mechanical engineers, today there are technical schools and courses covering almost every branch of industry.

"Most of the schools work very closely with local industry, thereby ensuring that the education planners at these schools know exactly which skills are in demand. This close cooperation allows new requirements to be integrated into the curriculum very quickly. As a result, most of the trainees quickly find a job after completing their course", says Peter Schüly.

Both qualifications are valuable, not just in terms of job searches and career prospects, but also for further education and training. Both master craftsmen and technicians have for years been admitted into German higher education institutions even without the usual university entrance qualifications. However, the chosen area of study must be relevant to the student's educational background. An automotive technician, for example, would be perfectly entitled to enrol in a classic mechanical engineering course.

Internationally recognised: the Bachelor professional

In other countries, at the very least the technician qualification is already frequently regarded as equal to a college qualification, for it is these tertiary education institutions with an emphasis on technology that are training the future generation of skilled workers. Depending on educational background and the target qualification, this kind of course would normally last two to three years. At the end of the course, the students can either be awarded a diploma – not to be confused with the German 'Diplom' – or a Bachelor degree. In order to internationalise and enhance recognition of the German technician qualification, the European technical professionals association EurEta has been campaigning for the adoption of the "Bachelor professional" title, which German and other European technical schools can award their students as an additional title. In some countries, this qualification even enables students to embark on a course of study at Master's level. However, the final decision on the recognition and equivalence of a qualification obtained in Germany rests with the relevant educational institution in the country concerned.

The same applies the other way round. A technician qualification gained abroad does not necessarily qualify someone to study in Germany or any other European country. The universities check each case individually and examine the course curricula and the student's performance in detail. In most cases, direct entry to higher years is not possible. However, the conversion of student performance based on the European Credit Transfer System is designed to facilitate comparability in the medium term and thus open up new prospects for students. In industry, by contrast, an individual's skills are more important anyway than the official recognition of a title.

The chambers of skilled crafts have also been working towards recognition in practice, in order to make the master craftsman certificate competitive internationally. Otto Kentzler explains: "The German master craftsman's examination is well-known in many countries and the expertise of German master craftsmen is in demand worldwide. Within the EU, the master craftsman qualification is also included in the EU's directive on the recognition of professional qualifications. This means that German master craftsmen can generally find work in other European countries without any problems. Furthermore, we have signed special equivalence agreements with several countries, including France and Austria, which ensure reciprocal recognition of the master craftsman qualifications in these countries. However, there is no international recognition mechanism in place as the differences between many education systems are too great."

A recent study reveals the growing demands on vocational teachers and the resulting training requirement.

MEDIA SKILLS CHALLENGE

Vocational teachers of technical subjects are under constant pressure to keep up to date with the latest fast-moving developments and, over and above this, to undergo ongoing training in the field of teaching and organisational skills.

In 2009, the Institute of Technology and Education (ITB) at the University of Bremen, whose scientists have been researching vocational education for over 20 years, carried out a major study on the situation of vocational teachers of electrical engineering and information technology in Germany. One particular area of interest to researchers related to teachers' training requirement, their technical competence and the use of media-supported systems in the classroom. This study was sponsored by Lucas-Nülle. The participating schools had the chance to win a UniTrain-I blended learning system, which facilitates the teaching of technical subjects based on the very latest didactic concepts. The following interview with Dr. Felix Schmitz-Justen, who designed large parts of the study, highlights the challenges currently facing vocational teachers, particularly in terms of further training.

Mr. Schmitz-Justen, what are the biggest challenges currently facing vocational teachers in their day-to-day work?

In our survey, we asked the teachers to name all the activities that they are involved in as part of their job. They were then asked to assess the challenges – in terms of time, methodology and content – associated with the individual activities. What came out was that the biggest time-related problems for vocational teachers at the present time are associated with the implementation of the learning field concept. Equally, the teachers find that administrative and organisational tasks also make demands on their time. These include obtaining or repairing apprenticeship workshop equipment. While the latter do not involve any challenges relating to methodology or content, implementing the learning field concept is a major challenge in this respect.

What do vocational teachers think of the reorganisation into learning fields and what is the training requirement in this area?

The requirement for action-oriented teaching – i.e. the implementation of the learning field concept – has affected

all vocational teachers since the reorganisation of apprenticeships in 2001. In view of the content and methodolgy-related problems facing vocational teachers – particularly in terms of implementing the learning field concept – an appropriate qualification for vocational teachers is particularly desirable at this point. This qualification must be aimed at enabling or making it easier for vocational teachers to implement the learning field concept. Otherwise a situation will persist in which they cannot fully harness the potential of didactic learning field work, with trainees not benefiting from the sensible reforms as a result.

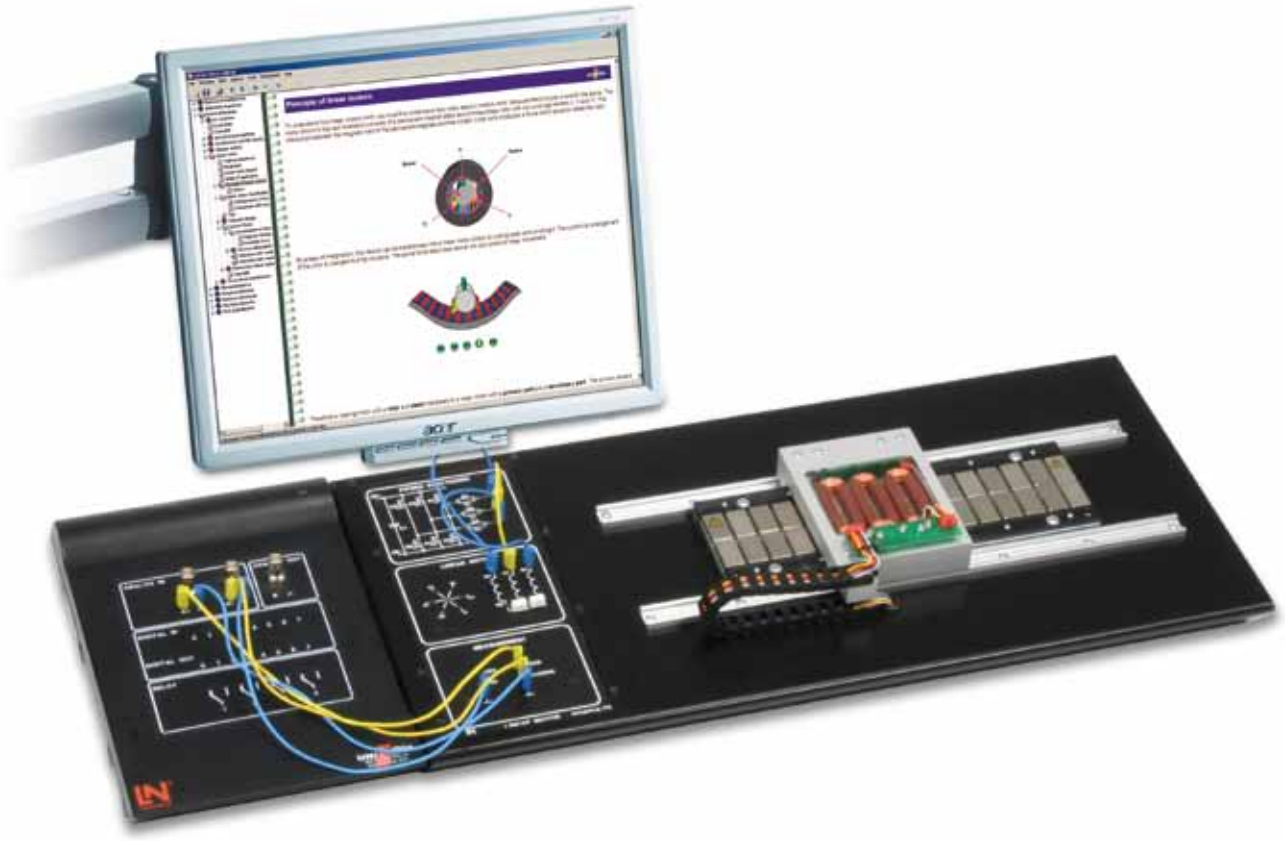
What are the consequences of this situation for teaching?

The high demands facing vocational teachers when it comes to implementing the learning field concept can be seen from the answers on specific teaching practice that were provided in our survey. These suggest that many vocational teachers still adhere to the former subject-based method of teaching. For example, many of those surveyed by us still rely on traditional teaching concepts. This is reflected in the high level of teacher-centred instruction. Teaching from the front of the classroom is still very widespread at most schools. This is hardly compatible with a concept such as that of learning fields. If the new concept is to be implemented, teachers need to cooperate more closely with one another. Although they report basically positive teamwork experiences, such teamwork rarely takes place on a day-to-day basis.

Conventional instruction from the front of the classroom is still very popular at most schools.

New didactic concepts can often be implemented more easily and efficiently by using different media. This requires teachers to have well-developed media skills. What strengths and weaknesses have you found in this respect?

Our survey also asked questions on the subject of media and Internet-based systems. If one asks vocational teachers about their IT skills compared with the IT skills of their trainees, there is obviously a big difference between classic programs and Web 2.0-based systems. While the



UniTrain-I

vocational teachers feel that they clearly have the edge on their trainees when it comes to using classic office software, they admit that their trainees are more skilled in the use of wikis, podcasts, blogs and online communication programs. It's a shame, however, that the teachers are generally not making use of existing IT skills in order to support the trainees' learning processes. The teachers hardly use media and Internet-based systems in class, even though there is nothing stopping them from doing so.

What is the reason for this reluctance? Are vocational teachers not yet sufficiently convinced by the proven benefit of media-based systems?

The objective is customised learning software.

On the contrary. Our study showed that, in spite of their reticence, the teachers consider all the components that can be covered by learning software to be important and beneficial to vocational teaching. In particular the representation of technical functions and expertise as well as the visualisation of work processes were singled out as especially important by the vast majority of teachers.

This latest survey backs up the conclusion of earlier ones that the low level of use is, instead, attributable to the fact that most of the products available on the market are not adaptable. The fact that individual changes or enhancements cannot be made to the text and media content leads to problems with acceptance.

How should learning software be structured to allow teachers to make optimum use of it in lessons?

As a consequence of the aforementioned experiences and findings, the idea of rapid e-learning is following a fundamentally different path from more "classic" e-learning approaches. Learning software must be designed so that the users – i.e. vocational teachers, instructors and trainees in the case of technical vocational training – can easily make changes to the content without special expertise in media technology. The aim is "individualised learning software" that is tailored to the specific conditions and requirements of each case.

The vocational teachers basically confirmed the great potential of digital media in the online survey. The priority must now be to harness this potential to a greater extent in technical vocational training and education.

Thank you for talking to us. ■

Tip

UniTrain-I

the multimedia training system for the vocational training of technicians and engineers

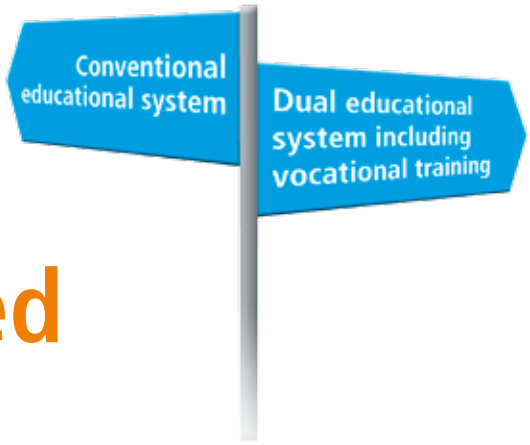
For over 10 years, trainees and apprentices have been learning with the UniTrain-I multimedia-based training system from Lucas-Nülle. The system elicits an enthusiasm for all things technical and promotes learning by integrating a hands-on approach to the mastering of theory and practice based on real experiments that are embedded in a multimedia learning program. The individual trainee can complete the program independently at his or her own speed. Consequently, the instructor has more time during the instruction phase to provide individual assistance and to also steer the educational process. The modularly designed system is convincing thanks to its proven didactic concept, high user friendliness and a solid price-performance ratio. To put it simply, UniTrain-I offers the wide experimentation range of a large laboratory in an extremely compact package. ■

A visit to Regionaal Opleidingen Centrum (ROC) Eindhoven

Dual system training in the Netherlands:

hearts, hands & heads combined

– for better understanding!



Take your choice – the classroom or on-the-job training? Just as in Germany, young people in the Netherlands have both alternatives open to them. Both training approaches emphasise instruction in the four critical fields of competence. Ries Luijsterburg, Technical Director of ROC Eindhoven and Representative of InduTeq, the foundation for advanced training, reports on the Dutch System and on new quality requirements.

The technical courses offered by (ROC) Eindhoven take place in a building formerly owned by Philips and currently under monument protection. Cooperative ties still exist to the electronics manufacturer which is to this day still located in ROC's immediate vicinity. Accordingly, ROC provides advanced vocational training to employees from Philips and many ROC trainees go to Philips to complete the practical training component of their dual vocational training programme. Upon graduation, the approximately 1,500 students currently in training at ROC start their careers with rosy prospects thanks in particular to ROC's reputation for focussing on the acquisition of practical hands-on skills which are also a focus in the classroom curricula. This is an absolute necessity because only half of the students have signed up for dual training, the other half pursue a technical profession in a purely conventional classroom-based course. The choice of programme is completely at the discretion of the trainee. Most professions and vocations are offered in both the dual system as well as the conventional school approach. The number of students taken in each year is determined by their training levels. Depending on the students' previous experience and qualifications, there is a choice between a one and four-year training programme, which can also be continually supplemented.

Students and trainees who opt for the dual system programme normally work four days at a company and spend one day at a vocational college. The theoretical component of the training is supplemented by self-learning phases, which the student or trainee can complete on a flexible basis adapted to fit his or her work schedule in the school labs.

"In the laboratories our trainees conduct the experiments to a large extent on their own, although there is an instruc-

	Course of study	Qualification	Duration
1	*Training to be an assistant*	*Simple job qualification*	*6 months to 1 year*
2	*Vocational training*	*Job performance qualification*	*2–3 years*
3	*Technical vocational training*	*Independent work performance*	*2–4 years*
4	*Special education + expert training*	*Independent work performance with specialisation*	*3–4 years (1-2 years of specialised training)*

Ries Luijsterburg

Apprentices at ROC

Lutz Schulz training ROC specialist teachers

tor on location to assist them, if problems or questions arise", explains Ries Luijsterburg, Technical Director at ROC Eindhoven and the person responsible for purchasing equipment for the laboratories and classroom facilities.

Lucas-Nülle supplies many of the experiment stations for the areas of automation technology, electrical engineering, installation technology and mechatronics.

"We have had a lot of positive experience with these systems. Above all, the didactic approach that promotes independent learning and holistic instruction goes a long way toward meeting our demands. Regarding the UniTrain-I system featured in the program, this system is used in small projects to help boost the skills and competence of the students who work on their own virtually without any help at all", says Ries Luijsterburg in explaining the decision to purchase Lucas-Nülle systems.

Conventional schooling or dual system: When you have the choice...

Purely conventional schooling	Dual system
Trainees over 18 have to pay school fees.	*Trainees receive a salary which is linked to the Dutch minimum wage scale.*
Trainees have all-day instruction in the school and complete so-called "stages", practical training phases lasting several weeks inside a company.	*Trainees work four days of the week in a company or factory and study one day in a vocational school. In addition to this, they participate in self-learning phases in the school labs.*
Each of the four levels is offered.	*Depending on what level is being sought, it may be difficult to find a dual system training place in a company.*
The conventional school training leads to a recognised vocational training degree at one of the four levels.	*The dual training program also leads to a recognised vocational school training qualification at one of the four levels which the student can build on.*

Four areas of competence

Practical skill is one of the four core competences symbolised by "feeling and handling, thinking and understanding", and is being promoted by binding stipulations for all technical training programmes. It goes into effect as a new qualification level as of mid-2010. The fact that personal attributes – normally seen as personality-specific and frequently referred to as soft skills – are ranked as highly as so-called hard skills is a result of the incredible change taking place in the work environment.

Industry demands soft skills

"We have recently conducted a representative survey of companies performing training in our region, i.e. the catchment area around ROC Eindhoven, and have concluded that the clear and unambiguous message is that personal attributes like teamwork, creativity and reliability are seen as just as necessary for success in training and any subsequent career as well-grounded technical know-how", reports Ries Luijsterburg.

In order to instil these four competences, the teaching approach at ROC has undergone enormous change over the years. Today, conventional instruction from the front of the classroom accounts for around 30 percent of the time needed by vocational school instructors to convey the required basic theoretical information and to compile and

compare results at the end of a series. But even in these theoretical phases, the four competences are still in focus. Naturally, one feature is to have the students present the know-how they have acquired in group presentations – in English or in another foreign language. Students and trainees also work in small groups on projects. This means that they have to rely on each other to be successful in independently tracing individual work steps and exploring technical contexts without constantly calling on the instructor for assistance. This sounds demanding, but it means an enormous leap in motivation for the students.

Advanced training for vocational teachers: putting practical training at the focal point

Naturally, all of this means teaching personnel also need to develop to keep up. Their role is evolving from the dominating figure at the head of the classroom, guiding students through the material, explaining and dictating the tempo, towards someone who is more of a facilitator and mentor who provides assistance and fresh motivation. This also means that the instructor has to relinquish more control and have confidence in his or her students. To come to grips with this revolution, further and advanced teacher training in the Netherlands takes up a considerable amount of the work year: 160 hours of further training is mandatory for the vocational teacher. At first glance, this seems to be a huge investment in terms of time, but it's worth it. The teachers are also given considerable freedom in determining their own personal further training programme and receive support from their employers as well. "The self-learning segment also involves reading current technical literature or dealing with new technologies", explains Ries Luijsterburg, "while the employer is responsible for organising the remaining portion of the training programme. Each school may have a different training focus depending on the school's curricula." This may include, for example, seminars on technical and didactic topics and information seminars but may also include tours of industrial facilities. The practical, hands-on component of the programme plays a huge role in further teacher training. This helps to ensure that the instructors do not lose touch with current developments in industry, even after long years of teaching in the classroom. In conjunction with industry, the InduTeq foundation, where Ries Luijsterburg represents his school, regularly offers advanced further training in technical and didactic developments for vocational instructors. The most important aspect of these seminars is that they are directly related to actual practice. Right now the biggest issue is the so-called four competence areas and how they are reflected in the classroom. To familiarise teaching staff with the potential within the field of installation technology courses to convey the four competences, InduTeq hosted an information day at ROC Eindhoven, where the InsTrain System from Lucas-Nülle GmbH was introduced.

"Ideally, training and educational facilities in the region should all work in concert when it comes to implementing training and education reforms. In the area of electronic installation and wiring technology, the InsTrain system is ideal because it contains not only all the necessary components but also the right didactic platform needed for the new qualifications framework", explains Ries Luijsterburg. A shared foundation for instruction is a guarantee that the students are all on the same or similarly high levels. "And ultimately that is our aim: to empower young people to obtain a vocational qualification and to graduate into a successful working life", says Ries Luijsterburg.

Cooperation beyond borders

For so-called European trainees and apprentices (Euzubis), who get training in different countries, there is a website of the same name offering interesting information. Here trainees and apprentices can find out under what conditions training in Germany is officially recognised: http://www.euzubi.eu/

Vocational and advanced training in the Netherlands

For young people who would like to complete their training in the Netherlands, the information brochure provided by the Arbeitsagentur Kleve (Employment Agency Kleve) offers a good overview: http://www.eab-info.com/Infobroschuere.pdf

Further teacher training in the Netherlands

InduTeq:

The webpage for the InduTeq foundation, which organises the practical side of further education and training for teachers in technical subjects in the Netherlands: http://www.induteq.nl/

In conjunction with InduTeq, Lucas-Nülle GmbH offers information seminars and master classes covering certain technical topics.

We play to win the long game.

Sustainability is more than just climate protection and environmental awareness. In an interview on the subject, the head of Business Development Christoph Müssener and his second in command Joerg Ludwig talk about sustainable business development and long-term thinking at Lucas-Nülle.

To what extent is sustainability a topic at Lucas-Nülle:

Christoph Müssener: We work in a sector highly affected by sustainability. Investments in training and education have a decades-long impact and are one of the best ways to confront a crisis in a sustained fashion. Vocational training is an important component in building up industries and supplying them with qualified personnel, especially for developing countries or countries without any energy or raw material reserves. But for some time now we have been involved in the topic of sustainability even on the technical side. Accordingly, renewable energies have been a focal point of our development activities.

How do you define sustainable business development at the company?

Christoph Müssener: For us, it is all about long-term and responsible business growth. This can be seen in concrete terms in product development where we not only try to anticipate future markets and tomorrow's trends but also initiate investments early on. This means investing when we know the fruits of that investment can only be harvested in in future years or even if it might take a whole decade before there is a pay-off. We play to win the long-term game.

How much is this long-term thinking worth to you in concrete terms?

Joerg Ludwig: In terms of manpower and the turnover percentage invested in new system development – we feel we can compete with the high-tech corporate players. Currently, more than ten percent of our annual turnover is ploughed directly back into our development department. Such high stakes only tend to pay off in the mid- to long term. The pay off of such a patient strategy is that, as a rule, once the technology has reached a marketable state for the sector, we can immediately deliver these specific, needs-related products.

On the one hand, long-term planning is needed, but at the same time, this entails huge risks especially on account of the high investment sums involved. How do you succeed in controlling this?

Joerg Ludwig: Of course, we don't have a crystal ball and so we aren't infallible when it comes to predicting technical developments. When huge investments are involved as is practically always the case when developing a new product, making the wrong assessment can indeed have very negative consequences. If we didn't limit our risk exposure, we would actually be acting contrary to our principle of sustainability. In order to keep the risk of a faulty investment as low as possible, we keep a very close eye on trends. As product managers we are obliged to stay in constant dialogue with research institutes and the industry and to keep abreast of the corresponding technical literature. Also the sales managers, who are keenly aware of their local markets and client requirements, keep their eyes open and test certain trends for their feasibility.

Christoph Müssener: If we consider the risks to be too high for our company alone, we look for strategic partners that also believe in the future viability of a particular technology. It is through these kinds of cooperations that we are able not only to minimise the financial risk but also to guarantee that our systems consistently meet high technical standards. After all, we like to team up with market leaders from the industry as well as renowned research institutes.

You stake a lot on innovative systems which, however, have long gestation periods. How are you able to keep the requisite know-how in the company for prolonged periods?

Christoph Müssener: Our approach to keeping valuable know-how in our company and at the same time making it available to all staff in its necessary form is to rely on a data-based product management and offering system. This not only allows for the necessary transparency but also facilitates the work of all participants across departments throughout the entire company.

Joerg Ludwig: As market leader it is easy for our company to recruit talented junior staff and, by and large, we have been able to retain them and their expertise for the long

Christoph Müssener (left) and Jörg Ludwig (right)

term. One reason for this success lies in how we recruit them: when considering potential staff, we do not restrict our assessment criteria to grades and formal diplomas. Just as critical for us are the candidate's personal attributes and whether he or she fits into our corporate culture. The success of this strategy is evident in the high percentage of employees who have been in the company's employment for ten years or longer. That figure is currently at over 60 %.

Which developments are currently in your focus?

Christoph Müssener: Clearly, without a doubt, they are automotive drive technology and renewable energies. Naturally, a trend only gains momentum depending on the degree to which industry eventually adopts it or not. Economic shifts to regional markets, political decisions and recently even climate conditions can play a role as to how hot a topic really becomes. The new area of automotive drive technology is an excellent example. For some time now, we have been observing the trend toward hybrid, fuel cell and pure electric drive technology. But it still has yet to be decided which of these technologies will prevail in the marketplace. Until now we have offered training systems for fuel cell technology as well as hybrid drive technology. However, we would also able to offer at a moments notice a highly-developed training system for purely electric motors should these establish themselves on the market.

Joerg Ludwig: Also the topic of renewable energies had been on the radar for an extremely long time because we are real believers in sustainable technologies. For ten years now we have been offering a training system on photovoltaic technology. So you could say that we anticipated the current boom in renewables. The beautiful thing about this is that we already have fully developed training systems in solar energy, hydrogen and wind power at our disposal. Our wind power training systems in particular are highly innovative and technically quite comprehensive. And the topic itself is by no means exhausted because the technology itself keeps presenting new problems and solutions which need explaining and understanding.

What challenges are you currently contemplating?

Christoph Müssener: Right now the most intense issue confronting us is the question: How do we distribute and store the electric current obtained? There is a tremendous amount of work to do in this area and we are already offering systems designed to deal with the topic of intelligent power mains – the so-called "smart grid". These

courses are designed for instruction both on the vocational training level as well as the university level. Currently about 50 % of our development budget flows into renewable energies – so we are playing to win the long game.

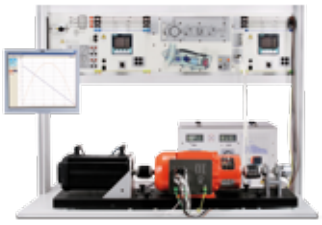
Training systems for rene

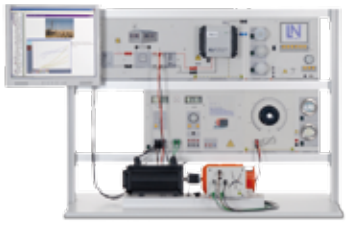
Wind power

"Small wind power plants" training panel system

This training system teaches the trainee the basics needed to understand the operation of small wind power plants. Autonomous learning is made possible by the "Interactive Lab Assistant", a multimedia training environment that contains all the important instruments, instructions and documentation. The trainees quickly become acquainted with the physical fundamentals and learn how generated power is stored and ultimately how to build an off-grid system with which they can generate an alternating current of 230 volts. They also gain insight into hybrid systems which can generate current out of wind power and photovoltaic energy.

"With the small wind power plant training panel system, we are providing vocational instructors with a powerful system for the off-grid operation of a wind power plant, all with multiple hands-on applications", says Ralf Linnertz, Product Manager for the area of Renewable Energies.





"Wind power plants with double-fed asynchronous generators" training panel system

This state-of-the-art training system enables the student to become acquainted with different types of modern wind power stations. The necessary physical context is explored with the aid of many graphic animations. In the hands-on section, the students examine a double-fed asynchronous wind generator just like the ones used today in modern large-scale wind power stations. The trainee operates it in the lab under realistic conditions including varying wind forces and loads. Additionally, it is possible to study the system's response to power grid failures because the system is "fault-ride-through" capable.

"This innovative system brings trainees and students up to date with the state-of-the-art of this fascinating technology. Thanks to the "Interactive Lab Assistant", a multimedia experiment environment is available which encompasses all of the important instruments, instructions and documentation", says Christoph Müssener, Head of Business Development.

Solar energy

UniTrain-I "Photovoltaics"

As a standalone system, the UniTrain-I board for photovoltaics training combines all the components needed for training the fundamentals of this renewable energy technology. The trainees learn how solar cells are manufactured and how they operate, as well as how solar batteries are designed. They learn how to record the characteristics of solar modules, how solar cells are connected up and how to explain the influence of temperature, irradiation intensity and angle of incidence on a solar module. Methodical fault simulations challenge the trainee to put into practice the knowledge and skills learned in the course.

"The UniTrain-I System for photovoltaics is the right solution for anyone who wants to acquire the basic knowledge of this field", explains Ralf Linnertz, Product Manager for the area of Renewable Energies.

wable energy technology

Fuel cells

"Advanced Photovoltaics" training panel system

The photovoltaic system designed for advanced studies familiarises trainees and students with the practical and theoretical fundamentals of photovoltaic technology. The system was conceived to demonstrate how photovoltaic systems operate in a highly realistic fashion, including how they are put into operation and maintained. The solar cycle simulation provides the student with an extremely realistic environment for experimenting. The use of solar emulators permits industrial components such as charge regulators and inverters to be operated right in the lab. The "Interactive Lab Assistant" embodies all of the important instruments and documentation in a multimedia experiment environment and also promotes independent learning.

"Using the Advanced Photovoltaics System, instructors can provide practical instruction over the entire spectrum of this technology. The solar cycle which can be set to correspond to any location offers special incentives to the students", says Ralf Linnertz, Product Manager for the area of renewable energies.

UniTrain-I "Fuel Cell Technology"

This course on fuel cells from the UniTrain-I series consists of many practical experiments on the basis of which the current state of this pioneering technology is demonstrated. Trainees thus learn how fuel cells are designed, how they operate and how they are commissioned. After completing this course they are in a position to explain the electrochemical processes of electrolysis, configure fuel cells and understand the operating principles of an electrolyser. Students and trainees carry out experiments that cover Faraday's laws and on how to determine the energy efficiency of fuel cells.

"At first glance, the physical and chemical foundations of fuel cell technology are fairly complicated. But with our system, the trainee is not only able to grasp these concepts but to internalise them in a sustained way", says Christoph Müssener, Head of Business Development.

"Advanced Fuel Cells" training panel system

This system provides a safe environment for experimenting with hydrogen and fuel cells. It is comprised of a 50-VA fuel cell stack, a metal hybrid storage unit and an electronic load. The corresponding interactive multimedia environment has all of the measuring instruments, experiment instructions and documentation integrated into it. To allow for independent self-learning, the multimedia learning environment contains the "Interactive Lab Assistant" as well as all the measurement instruments and instructions.

"For the advanced learner who wants to get a more in-depth look at fuel cells, the advanced system is ideal because it contains all of the components needed for near-industrial work conditions", says Jörg Ludwig, Product Manager for the area of Energy Technology.

Striking out on a future course **based on sustainable resource utilisation**

"Training that focuses on sustainable development teaches our children, young people and adults alike how to think and act in an environmentally sustainable way. It puts people in a position to make decisions for the future and at the same time assess how their own behaviour will affect future generations and life in other parts of the globe."

UNESCO definition for sustainable training and education

From the perspective of many experts, the climate change conference in Copenhagen at the end of 2009 was a disappointment. There is still a lot that needs doing to protect the environment in a sustainable way. For that reason it is somewhat timely that the UN Decade of Education for Sustainable Development (ESD) is moving into its second half at almost the same time as the less than concrete summit results come in. After all, it is only through education that a sufficient number of people can understand how climate change comes about and how it can be stopped. According to UNESCO guidelines, the competence needed for this consists primarily of forward thinking, interdisciplinary knowledge and autonomous actions.

Knowledge of how renewable energies can be utilised efficiently is one of the most important factors for sustainability and environmental protection. By renewable we mean infinitely usable, at least theoretically. Here, limits are being imposed not by sheer mass of resources but ultimately by the limited number of specialists availing of the required technology. To be able to fully exploit the potential of the sun, wind and water, the energy industry needs first and foremost well-trained and educated technicians and specialists who are familiar with state-of-the-art technologies and who think in interdisciplinary terms and can act autonomously in line with the UN Decade of Education for Sustainable Development.

Training systems for sustainable education

Lucas-Nülle recognised this educational mission very early on and for that reason is able to offer a wide range of products for training and education in the area of renewable energies. In cooperation with partners from industry and research facilities, the product managers from LN are constantly developing additional systems with which they can convey new technologies in a practice-oriented way. "Here our main concern is sustainability in two dimensions. When we plan new systems we ask ourselves not only what is to be taught but also how we can promote self-reliant autonomous work which ensures sustainable learning success and also develops the trainee of today for a working life that increasingly promotes self-reliance and creative approaches to solutions", explains Christoph Müssener, Head of Business Development at Lucas-Nülle.

Solar energy and wind power have two unbeatable advantages: first of all, they are virtually inexhaustible, and secondly in many countries of the earth they are totally dependable. In sun-rich regions, solar energy allows people to enjoy utterly new independence from partly dilapidated power grids thus not only contributing to environmental protection but also improving their quality of life.

"Based on discussions with educational experts as well as training and educational institutes worldwide, we have learned how important education is in the area of renewable energies", explains Leslie Twine, Sales Manager for LN's Asian Region. It is not just countries in the southern hemisphere that can gain valuable energy from solar radiation. The importance of renewable energies is increasing worldwide both in developing countries as well as industrial countries. Fraunhofer Institute for Solar Energy Systems (ISE) in Freiburg estimates that by 2050 around 30 percent of the global electricity consumption will be covered by solar energy. A comparably huge potential is also predicted for wind power according to the Federal Ministry for the Environment. The prognosis is that wind power's share in the global energy mix could reach as much as 25 to 30 percent by 2020. Good news not just for the environment but also for the energy industry, which by then may expect high rates of production growth. Naturally, technicians and specialists are needed for this kind of increase. Some people may feel that the large wind turbines appearing on the flat horizon or protruding imposingly out of the sea are a degradation of the landscape. But anyone who has looked inside the interior of these giant power turbines will grasp the fascination of this power engineering. To be able to teach this is one objective of sustainable education which can be achieved in numerous projects by the end of the UN Decade of Education for Sustainable Development.

Schools, colleges, service providers and other businesses may enter their own ideas as a "decade project". Planned projects or ones in progress which promote as many potential targets as possible of the national action campaign for the decade have the opportunity to be awarded a prize.

Tip

Information regarding the "Decade for Sustainable Education" and the application modalities pertaining to the decade project can be found here: http://www.bne-portal.de

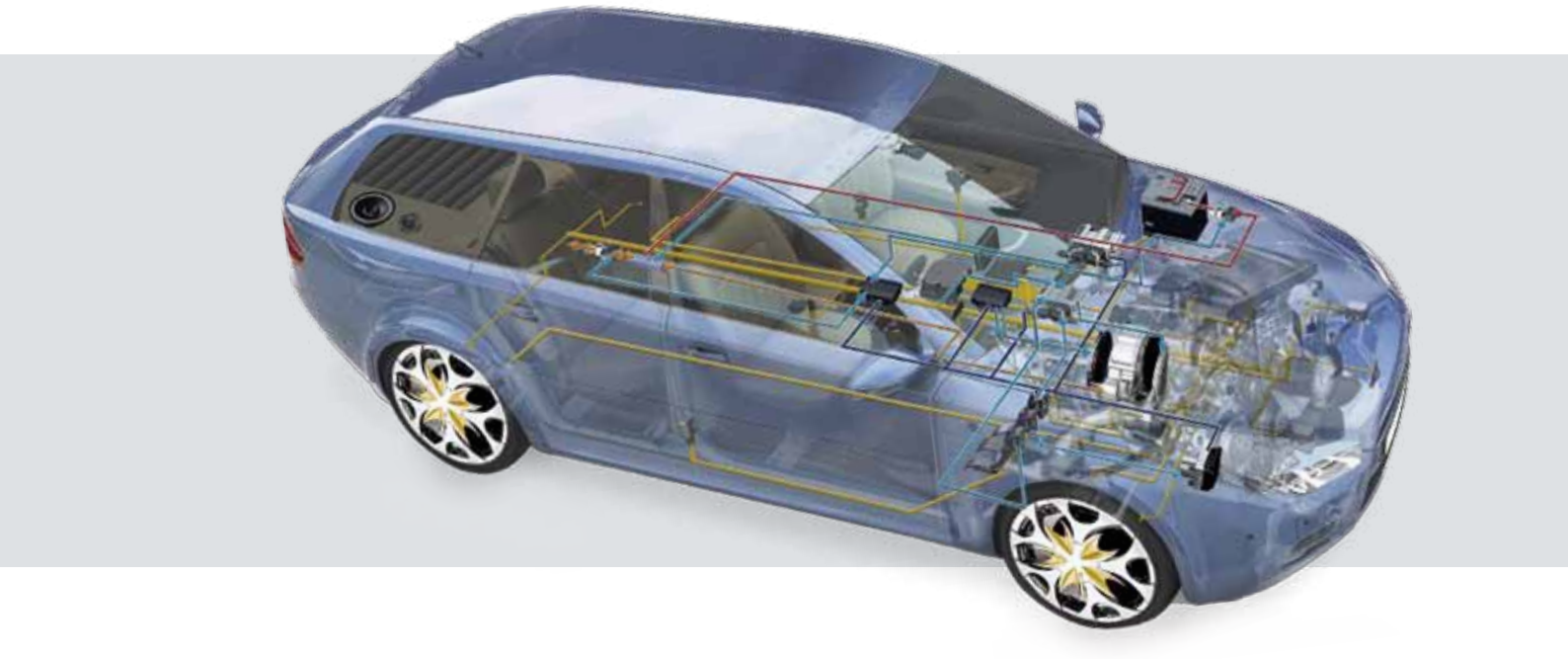
Good long-term career prospects for skilled automotive workers

Leading vocational and advanced training institutes are focusing on the teaching of new technologies such as hybrid technology in an effort to prepare the young people of today for the automotive industry of tomorrow. Social skills are equally as important for a successful long-term career.

Qualified employees with these skills and attributes will soon be in demand by manufacturers as well as car repair garages. The economic crisis and the investments in green technology designed to stimulate the economy are accelerating an already irreversible trend.

"It goes without saying, therefore, that the new technologies of the hybrid drive are covered in the classroom. One of the ways in which the students can prepare for this is by taking more in-depth courses. We have had very good experiences with the automotive training systems from Lucas-Nülle because they combine theory and practice, which has a strong motivational effect on the students," says Dr. Eberhard Schwarz from the Nikolaus August Otto vocational college in Cologne-Deutz, explaining the training concept adopted by the institution.

TAK, the Technical Academy of the German Automotive Trade, has also been offering advanced training courses in hybrid technology for some time, e.g. in Munich and Kassel. "We are convinced that this technology has a big future. Automotive businesses will soon be struggling to cope without appropriately qualified employees who possess the relevant skills in this area," explain the trainers from the automotive trade association in Kassel.



Green drives on the upswing

The race for alternatives to the conventional combustion engine is in full swing. Cars will steadily become cleaner and more energy-efficient. The next few decades are likely to see a wide range of technologies coexisting with one another – including alternative fuels such as second generation biofuel or gas-to-liquid diesel – and further innovations like "homogeneous charge compression ignition," according to a recent study on the future of mobility carried out by Z-Punkt GmbH, a futurology research company. It predicts that classic hybrid engines will be followed by fuel cell hybrids and battery-powered electric cars.

As far as the garages are concerned, a key common feature of these drives is that, in some cases, their employees have to work with high-voltage systems. The usual 14 volts is often not enough for electric cars, so systems with up to 650 volts are not unusual. The necessary repairs may therefore only be carried out by trained automotive technicians. They must be able to prove that they have completed additional training which qualifies them as trained electrical technicians for HV systems in motor vehicles. "There is a dual benefit to businesses which provide such training to their employees because skilled technicians that have been trained in this way are allowed to instruct and supervise other employees in working with high-voltage systems in motor vehicles," explain the trainers from the ZDK. The relevant courses are offered by the Technical Academy of the German Motor Trade (TAK). Gerhard Soßdorf from the ZDK Kassel explains that "demand for this additional qualification will grow steadily over the coming years. So long as the necessary hybrid technology skills are either not integrated, or inadequately integrated, into the three-year dual vocational training course for automotive mechatronics technicians, the industry will be reliant on people with additional training."

The renowned academy uses the UniTrain-I course "Hybrid drives in motor vehicles" from Lucas-Nülle for the two-day training course that leads to the additional qualification of 'skilled electrical technician in the automotive trade'. "As one of the few providers, Lucas-Nülle GmbH took up this topic at an early stage and translated it into a high-quality training system based on state-of-the-art technology. Added to this there is the system's flexibility. At the moment, hybrid technology is only covered by our advanced training courses, but in the future this will be extended to apprenticeship training courses. We also want to use the UniTrain-I system in initial dual vocational training," says Gerhard Soßdorf, explaining the decision to opt for Lucas-Nülle.

"At the moment, important hybrid technology-related information and skills are primarily being taught and offered in advanced training courses," says Siegfried Schulz, Product Manager for Automotive at Lucas-Nülle, and a former instructor at the BBV-Prenzlau vocational training association and also member of the examining board at the Uckermark motor trade association. "The systems integrate practice and theory so closely and guide students through this complex topic in such small steps that they can also be used for teaching in vocational schools, for specialised practical training and for examinations."

Urgently needed: advanced training for vocational teachers

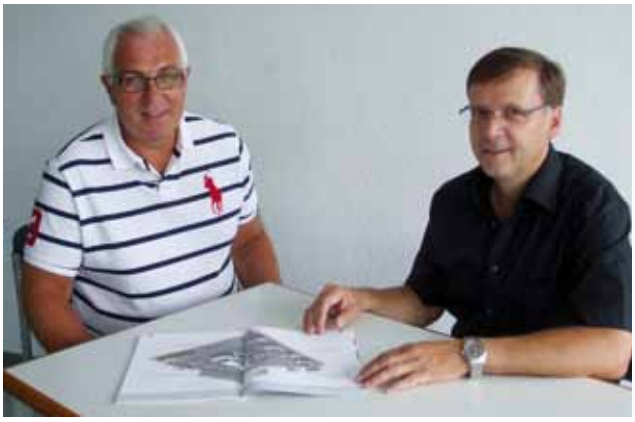
The opportunity to get advanced training in this field after completing one's apprenticeship is open to every journeyman. Increasingly, the vocational schools are also gearing themselves up to familiarise their students with the hybrid drive. "However, there is still not enough relevant training available for vocational teachers, who have only rarely come across this technology in their own training," explains Prof. Georg Spöttl, Director of the Institute of Technology and Education at the University of Bremen. Although the Federal Government's innovation programme is also providing vocational colleges with new training equipment, there is often a lack of technical expertise in using this equipment. Just 40 publicly funded places in advanced training seminars are available for around 2,000 vocational teachers. "Far too few to bring everyone up to date. Consequently, a lot rests on the manufacturers and suppliers if the teachers are to be competent in using this equipment," adds Spöttl.

Challenge for tomorrow's skilled employees: hybrid fault diagnosis

Siegfried Schulz confirms that the demand for suitable training courses is increasing at the same time as that for hybrid training systems: "Demand for our training systems and the associated instructor training courses has been growing for about half a year, and we have been offering these more frequently ever since. The instructors are particularly keen that the system should facilitate the teaching of diagnostic skills. In practice, it is very important that young people be good at troubleshooting. More often than not, the instructors themselves have a lot of catching-up to do, so we make sure that this is covered in our training courses."

This assessment is also confirmed by a study on the future direction of automotive training carried out by Professor Stefan Bratzel, Head of the Automotive Center at the Fachhochschule der Wirtschaft higher education institute on behalf of the National Association of the German Automotive Industry. Around 1,200 business managers took part in this study and emphasised the growing importance of diagnostic skills in the future.

"As the requirements are becoming more complex, skilled automotive technicians are more likely to find suitable problem-solving strategies in a creative, experienced team. It will be the role of the younger employees to apply these strategies to the new technologies as well," explains Spöttl.



Gerhard Soßdorf and Siegfried Schulz

Trainees who feel they have been inadequately prepared for the labour market of tomorrow by their company and vocational college have every opportunity to obtain the necessary qualifications through targeted advanced training courses. The chambers of skilled trades, the manufacturers' training institutes and private providers offer a broad spectrum of short and long-term courses ranging from customer communication through to certification as a skilled electrical technician in the automotive trade. "Recently qualified journeymen in particular can easily follow the material as their technical knowledge is still fresh. Additional qualifications are always a good investment in one's future career," says Spöttl. ■

Advanced training options for skilled automotive workers:

www.tak.de – TAK, the Technical Academy of the German Motor Trade, has just recently started offering courses on high-voltage systems in hybrid and electric cars.

Advanced training options for vocational teachers and instructors:

Lucas-Nülle GmbH offers compact, practice-oriented advanced training at various locations:

- *08.06.–09.06.10 Bitterfeld*
- *08.09.–09.09.10 Chemnitz*
- *24.11.–25.11.10. Kerpen*

You can register and find other course dates at www.lucas-nuelle.de

Success through intercultural expertise

Lucas-Nülle globetrotter par excellence

From its headquarters in Kerpen in Germany, Lucas-Nülle supplies training and educational institutions with modern training equipment and systems the world over. Founded in 1979, the company has managed to do what only a minority of German mid-sized companies achieve: not only is it active on special niche markets overseas, but it has also gradually established itself as the number one supplier of modern training systems on five continents. This is now reflected in a world-wide distribution network and overseas turnover amounting to 80% of overall revenues. This success testifies to the perseverance and personal commitment, and ultimately the intercultural expertise, of its staff. In an interview, several members of the sales team including Thomas Goetz, Heinz Keppler, Manfred Masson, Gerald Schex and Leslie Twine as well as Christoph Müssener, Head of Business Development, talk about doing business overseas.

Lucas-Nülle has also been operating internationally almost since the day it was founded 30 years ago. To what extent has the focus on international markets shaped the company culture?

Leslie Twine: It is inevitable even though business overseas initially grew at a modest pace. It all started with a big project in the Middle East which was tendered to us. After successfully completing this first step we began to orient ourselves more internationally, learning new lessons with each new project. This is reflected in our travel habits and also in our corporate culture.

Where do we see concrete examples of this intercultural expertise?

Christoph Müssener: This leaves its mark right down to product level. For example, we develop our courses so that we are not only able to offer them in standard languages such as English, French and Spanish, but can supply them in practically any desired language whatsoever. If, for example, students in Kazakhstan only speak their local dialect fluently, we translate our courses and the corresponding manuals into this local tongue. This flexibility and adaptability are two aspects of our intercultural competence.

Are they also two aspects which describe the general company culture at Lucas-Nülle?

Christoph Müssener: Not just that. It is also the frequent contact with other cultures which has given rise to a company culture based on mutual respect which integrates diversity and fresh perspectives. Of course, as I said, this openness for the world is a prerequisite for succeeding internationally. Our staff of over 90 employees come from eleven different countries. An immigration background or special know-how about a certain region is not just a benefit for working in sales. We offer a regular program of in-house language courses. Trips overseas are not just the exclusive domain of the sales team, but are also there for project managers who put systems into operation on site at the customer location or perform Train-the-Trainer seminars.

How do you maintain and pass on the intercultural knowledge the company has accumulated over the years?

Thomas Goetz: The sales team is constantly talking about its experiences. This is how we always keep up with the latest developments in other regions. This is know-how that is exchanged on an informal basis and then conveyed to other echelons. Since we frequently host delegations from international partners, this is also important. There is no point working hard to assimilate when we are overseas and then upsetting visitors here during the greeting ceremony in Germany.

You have mentioned the multi-language aspect of the products. What role does language skill play on location?

Gerald Schex: We are normally able to greet our guests in their native languages, but more important than that is a solid grounding in English, French or Spanish so that you can communicate routinely on location. In prolonged negotiations, a person can end up embarrassing themselves trying to communicate in the native language. In such cases it is better to defer to our local dealer, our most important partner overseas.

How do you prepare for delegations?

Heinz Keppler: In these cases the respective sales manager takes the lead because as a rule he knows best about local customs. Recently we installed a permanent prayer room for our Muslim guests which has a prayer rug available and includes a sign pointing toward Mecca. This has proven to be a great comfort for our visitors who used to have to return to their hotels if they wanted to practise their religion.

Manfred Masson: One small ritual that we always take care of is to ensure that the appropriate national flag is flying. Depending on the country, we also hoist regional flags. We currently have 50 flags in our warehouse and the number is growing every year.

Sounds as if there's virtually nothing that could possibly go wrong. Have there been any major blunders in the past?

Heinz Keppler: Things like that happen now and again for sure. After all, when we're abroad we're just guests but the main thing is how you react in situations like that. The top priority is respect for the other culture and respect for your own. It's not a good idea to try to copy every aspect of the host country's culture. It is also important to be cordial but to show clearly where the limits and the distinctions lie.

Gerald Schex: This is not just in relation to business but also everyday things such as eating and drinking customs. Of course it's interesting to try out the typical dishes of the host country but if there's something you really don't want to eat then there's no point forcing yourself.

Thomas Goetz: On the other hand, having copious meals before doing business or before holding a meeting is just the way they do things in certain countries and it would be rude to try to speed things up, even if Germans tend to be a bit more expeditious in this regard.

Leslie Twine: In the region I am responsible for – Asia – there are very many rituals and strict rules governing communication which you don't necessarily grasp straight away as an outsider. If you make a faux pas in this region it could even mean a deal falling through and you might not even be aware of what exactly has just happened. Who knows, we might have closed even more deals (laughs). But seriously, I think we have been very successful for a very long time in Asia because we show genuine interest and maintain long-term relationships to our local partners. This means that they are prepared to be magnanimous from time to time about the odd bit of behaviour they might not necessarily be delighted about.

How exactly do you maintain relationships with international partners who are several thousand kilometres away?

Heinz Keppler: We look very closely at potential dealers because they are the ones who put us in contact with business partners in the regions – or not, as the case may be. Apart from their technical expertise, it is very important that these partners show themselves to be reliable. A great deal of patience is required.

Leslie Twine: And we often travel to these places ourselves. Nowadays I spend more than one third of the year in Asia. Our customers are keenly aware that I am not just some guest on a flying visit to close a deal but they see me as someone who has a first-hand knowledge of the training landscape and, consequently, of their requirements, meaning that I can advise them correspondingly.

Gerald Schex: The same goes for all of us. Without regular stints in the customer's region and building up personal contacts, our relationships would remain superficial.

Manfred Masson: This direct contact also enables us to demonstrate our expertise because, at the end of the day, customers aren't just buying our products but the entire service package from logistics to installation to training and after-sales support. This applies just as much to Germany as it does to our international customers.

Frequent travel forms part and parcel of the sales manager's job. How do you prepare yourselves for trips to regions and business partners which are new to you?

Heinz Keppler: You have to be an open-minded person to start off with. I used to enjoy travelling through mostly remote areas on my motorcycle and getting to know them that way. I still get some of that spirit of adventure on my travels today. A trip to Iraq always involves unknown factors and can't be planned through from start to finish. I sometimes had to get there by travelling over land from Jordan – that meant 1,000 kilometres in a taxi. You can't prepare for that kind of thing but you can be ready for most eventualities. Having said that, I usually read up on any cultural peculiarities, speak with colleagues who have been there or talk to friends who know the region.





From left to right: Manfred Masson and team, Heinz Keppler and team, Christoph Müssener, Head of Business Development, Gerald Schex and team, Leslie Twine and team

And that helps?

Heinz Keppler: Not always. On one occasion I really wanted to fit in with the local customs – I had found out that men in this particular country wore beards. So I didn't shave for several days before my trip but when I finally got there I soon realised that all the men were clean shaven. Having beards was more something men did in another part of the country. What this goes to show is that you really only get a feeling for the nuances of a culture once you have been there for a while because certain characteristics just can't be learned about on a theoretical basis and cultures are always in flux.

Christoph Müssener: Which explains why each of our sales managers is responsible for one region only and has almost exclusively been operating there for a period of several years. So, nasty surprises which might really jeopardize our business don't happen.

This strong presence in the respective region is also demonstrated by involvement in trade fairs. What kind of a role do these industry gatherings play?

Manfred Masson: We sell products which require further clarification and it goes without saying that we have to present them at the fairs, and I mean entire systems as opposed to catalogues. Our customers want to test a product before making a purchase.

Christoph Müssener: Because of this – and in contrast to many other mid-sized firms – we attend very many trade fairs in virtually every part of the world and usually with a large booth as we want to demonstrate our systems in as much detail as possible. In almost all regions there are one or two trade fairs where we present a comprehensive range of products, e.g. the annual Worlddidac fair in Asia. In return we also get ideas for our products during discussions with international industry specialists.

...which you then implement in the respective region?

Christoph Müssener: First and foremost, we develop products in tandem with the requirements of the German market, mostly because we have well-conceived curricula and high standards of education in this country which we can use as our benchmarks. On the other hand, specific regional conditions can sometimes – and at a very early stage – give rise to new product ideas which are then implemented in Germany a good bit later on.

Today, you already generate around 80 percent of your turnover abroad. Are there products which were developed for a particular market only?

Leslie Twine: In the globalised world, the content of technical training courses tends to be the same no matter where you go, meaning that virtually every product can be useful for costumers both on the domestic and foreign markets. But of course there are regional focuses, e.g. in the area of renewable energies. A university in Singapore was looking for a training system for solar power which would meet teaching requirements for this subject. Taking these customer requirements as a basis, we took the product we had already developed back to the test bench and – in conjunction with the customer – we adapted it in such a way that the customer became satisfied that it fulfilled his product specifications. In the final analysis, the customer was provided with a product which was aligned to their teaching requirements. And now of course our customers in other regions can benefit from this work as well.

Thomas Goetz: In Norway – a country of vast expanses which is extremely thinly populated in many areas – educational institutions specialising in distance learning are much more developed than in many other countries. This opens up entirely new areas of application for our blended learning concepts which can then be transferred to other regions.

Where are you off to next?

Manfred Masson: My next trip will take me first to the Maghreb and then Gabon and Ivory Coast.

Heinz Keppler: I'm off to the Gess fair in Dubai.

Leslie Twine: I'll soon be travelling to Vietnam and then to Malaysia and Australia. In Vietnam I'll be taking delivery of our very big consignment for the KfW Development Bank project.

Thomas Goetz: My next trip will be taking me back to the Balkans where huge development potentials and market opportunities will be opening up in the short term.

Gerald Schex: From now until April 2010 I will be travelling to Spain, Egypt, Kenya and the US.

Lucas-Nülle systems for technical colleges in Burundi

Burundi's civil war raged for over ten years from 1993 to 2005, almost completely crippling the country's education system. Technical schools and colleges, in particular, were looted and destroyed. Since the end of hostilities, the Belgian government has been investing in the reconstruction of its former colony through aid organisations. Schools and universities are being given top priority.

Lucas-Nülle equipped three vocational schools with training systems in Burundi. The teachers and students help out with the unloading (upper series of photos).

In 2009, Lucas-Nülle was awarded a contract by a Belgian aid organisation to install new laboratories at three colleges so that training in state-of-the-art training facilities would once again be possible.

At the beginning of last year, Lucas-Nülle secured one of the major contracts put out to tender by BTC (Belgische Technische Coöperatie) and was thus given the opportunity to play a part in rebuilding the country's education infrastructure. The fact that Lucas-Nülle always puts its training systems into operation on site and offers extensive training for the teaching staff was a key factor in winning the contract.

Installation and training on site

"It is not enough simply to deliver the training systems and leave the colleges to get on with it. Intensive teacher training is necessary so that the institutions can use their new equipment competently and the students actually benefit from it," explains Lionel Hemme, Project Manager at Lucas-Nülle, who was on site to oversee the handover of the training systems.

From January 9 to 24, he and a number of employees from sales partner Phywe (Liège) visited the three large Burundian cities of Kiganda, Kiramba and Bubanza, where the country's technical colleges are located.

Hope for a new generation of skilled workers

In addition to UniTrain-I hardware and software, Lucas-Nülle also equipped the educational institutions with practice-oriented experiment systems on the subjects of electrical machines as well as PLC and control technology. The modern systems enable the trainees to familiarise themselves with the technical aspects in a practical way, so that they can later apply this knowledge straight away in their place of work. Burundian industry is hoping that the skilled workers who are being trained in this way will provide the growth boost that the country urgently needs. Until now, they have lacked the resources for practice-oriented training.

Teachers, parents and students want to achieve real change and can see great opportunities for the hitherto poorly educated young people to become engaged with the latest technical developments thanks to these modern training systems. This energy was also put into actual practice – when the containers were being unloaded after transportation over some very rough roads, the students and teachers helped enthusiastically.

"The instructors were just as curious about the new equipment as the students. In the seminars which were subsequently held in the capital, all the participants were very motivated to understand how the systems work," reports Lionel Hemme.

Even after installation of the equipment and the introductory seminars, Lucas-Nülle provides on-site assistance with any questions or problems.

Lionel Hemme (left in photo) is training the instructors on location.

Good experience with Lucas-Nülle

By now the teachers and students in Burundi have gained some experience with the new training systems. Alain Dubois, one of the Belgian instructors and coordinators working with the local colleges, reports: "One of the most interesting LN devices is the application simulator from the sphere of automation technology."

He also highlights the short set-up times and user-friendliness of the systems: "The kits that are supplied are very easy to use and cover the requirements of each group of trainees. The experiment with the intercom was successfully completed by the students in just ten minutes. And if there are ever any questions regarding one of the systems, the Lucas-Nülle staff provide straightforward and immediate on-site support."

The enthusiasm for the systems and the will to master the new technology as quickly as possible are also reflected in the fact that the instructors and new teachers have so far been practicing on their own every weekend in order to further improve their mastery of the new systems. "Now everyone feels that they have become really good technicians thanks to the intensive training, which is encouraging in terms of the work I am doing here and confirms my decision to opt for Lucas-Nülle systems," says Dubois.

USA

New York City, State University New York Maritime College (SUNY): Students who enrol here will find that they are never far from water. The maritime location of the campus right next to Forth Schuyler offers impressive panoramic views over the East River towards Long Island and the coast of Connecticut.

The college's imposing training ship, the "Empire State VI", on which the students travel across the seas in summer, is anchored within sight of the seminar rooms. Thus, before visitors even set foot in the college, which is called SUNY for short, it is clear to them that the students at this institution do not get bogged down in pure theory, but rather that the focus, from the start, is on the practical application of what has been learned. This renowned university, which has an interdisciplinary, technical-nautical focus, attracts the best high school graduates from all over the USA and abroad, offering them a wide range of four-year Bachelor and Master courses in preparation for a maritime career. Whether they study marine biology, shipbuilding, nautical science or shipping company management – at SUNY they are on course for rapid career progression. Places at the college, which boasts state-of-the-art equipment, are therefore in great demand.

Since 2006, Lucas-Nülle GmbH has been involved in equipping the electrotechnical laboratories. The faculty's laboratories were to be modernised as part of a three-year project. One of the reasons why Lucas-Nülle won this contract, which was funded and awarded by the State of New York, was the high practical relevance of its systems. Lucas-Nülle can provide the entire spectrum of electrical technology found on a ship in the form of experimentation and training systems. This includes the multimedia UniTrain-I self-learning courses, machine test benches for generators and engines and panel systems for power electronics and drives.

"The high technological standard of our products was just as important as the software interface of our systems," reports Christoph Müssener. Together with Gerald Schex, US Sales Manager at Lucas-Nülle, he travelled to New York to commission the power electronics and drive technology systems on site and train the new laboratory director in the use of these systems over two days of intensive training. The laboratory director was particularly impressed with the robust, fault-tolerant technology, the extensive experimental literature and the multimedia courses.

Technical problems solved on site

"The fact that the college operates to a very high technical standard and does not just pay lip service to the 'hands-on philosophy' was amply demonstrated as soon as we arrived. All the systems had already been unpacked and prepared so that the commissioning could begin straight away," Gerald Schex recalls.

We were quickly able to ensure that our systems and the laboratory's existing connections were compatible, and soon got down to the actual training," reports Christoph Müssener. Finally, the two engineers also suggested modernising the laboratory installation in order to further

The training ship SUNY

Christoph Müssener (far left) and Gerald Schex (second from the right) with project partners on site

enhance student safety, because this must always be the top priority when working with hazardous voltages.

The students have been using the laboratories enthusiastically since the end of 2009.

Australia

"Computer-assisted training systems are a solid mainstay in the Australian educational system. The demands are correspondingly high. For that reason we were all the happier to find out that we, together with out local partner 'Training Systems Australia', were able to prevail in a quite extensive tender", reports Sales Director, Leslie Twine.

Skyline of Brisbane, capital of Queensland in Australia

Distance learning institutions have a long tradition in Australia. The so-called "bush kids", children living at remote locations in the outback far from urban centres were frequently educated by their parents and assisted by the state-run distance learning organisation. Contact to their teachers was kept up by the kids via radio and by sending their homework by post. Over the years these circumstances and time-delayed instructions were gradually replaced by computer-assisted learning and teaching material. For that reason, Australia has long been a pioneer in the area of multimedia-based instruction – a position which the country would like to hold on to and at the same time steadily improve the quality of instruction. Of course, distance learning is also being put to use in the area of vocational school instruction. Computer-based teaching units play a particularly important role here. As the leading manufacturer of training systems with blended-learning components Lucas-Nülle easily stands out in being able to fulfil high quality standards and in part very special requirements which have been laid out also in the EKAS guidelines (Essential Knowledge and Associated Skills), among others. Accordingly, it was Lucas-Nülle that the leading TAFE Institute, SkillsTech Australia, with its three centres serving more than 20,000 students, decided to commission. Within the scope of an international tender for electrical installation technology, it was the UniTrain-I- and InsTrain-training systems that won the day thanks to their fully-developed multimedia course concept and the high degree of adaptability to existing framework conditions. One of the requirements made of training systems was that they have to be compatible with the popular "Janison LMS" learning system. "By making just a few flexible adjustments our software was modified and thus integrated into a multimedia-based training platform", explains Lutz Schulz, Product Manager for the area of electrical installation technology.

Since Lucas-Nülle designs the entire course software so that it is SCORM-compatible, it is possible to adapt the systems to this and other learning platforms.

Automotive training at the Cologne Chamber of Skilled Crafts

Butzweilerhof Training Centre of the Cologne Chamber of Skilled Crafts

Inter-company training is playing an increasingly important role in automotive apprenticeships. This is because there is no single company that can fully cover the complex nature of today's automotive technology. The Butzweilerhof training centre run by the Cologne Chamber of Skilled Crafts therefore places particular emphasis on state-of-the-art equipment and practical courses. This has been a successful approach, and one that is proving popular with the trainees.

Martin Drews, Oliver Heuz, Marco Mersch, Kevin Schuhmacher, Christoph Dick and Christoph Werth

Martin Drews, Oliver Heuz, Jan Strunk, Marco Mersch, Kevin Schuhmacher, Christoph Dick and Christoph Werth are six of the 200 trainee automotive mechatronics and service technicians who annually take part in the inter-company training courses at the Cologne Chamber of Skilled Crafts' Butzweiler training centre. They are currently in the third year of their apprenticeship and are preparing for their upcoming final examination. Their trainer, Klaus Erkelenz, uses the UniTrain-I system to explain how a CAN-bus works in a motor vehicle. The 24 trainees in his class work in pairs, carrying out experiments on the system while following the additional explanations that are projected onto the wall. So even the theoretical part of the course has a practical element – that is what characterises lessons at the Butzweilerhof training centre.

Automotive training has become increasingly demanding in recent years due to new technical developments in the sector. The Cologne Chamber of Skilled Crafts has therefore modified its ten-week inter-company apprenticeship training and its advanced training courses accordingly. The use of UniTrain-I courses is an important element of this.

"Inter-company training is primarily aimed at filling in gaps and conveying specialist knowledge which cannot be fully conveyed in the companies. The aim of the training is to provide all the trainees with the same level of knowledge so that they can take the final examination with confidence and equally good prospects of success," explains Klaus Erkelenz. He and his nine colleagues are specialists in their respective fields. This, too, is part of the training concept, as each of them can focus on staying up to date in their particular area and on incorporating the latest developments into their lessons.

"You do feel that the instructors who work here are really competent, and that we can learn a lot from them as they give their time and attention to the trainees' individual strengths and weaknesses," says Martin Drews.

In the courses on important topics such as mechanics, electrics, pneumatics, chassis and bus systems, the trainees initially familiarise themselves with the basics before going on to look at their application in greater depth. From the outset, the link with real applications is particularly important.

"From our point of view, it is undesirable to start off with intensive theoretical study followed by practical application at a later stage," says Klaus Erkelenz, explaining the didactic approach to automotive training followed by him and his nine colleagues at the Butzweilerhof training centre. "We switch between theoretical and prac-

tical phases in an integrated way that involves small steps, thereby ensuring that none of the trainees is left behind," he says.

The focus of inter-company training is on getting to know various diagnostic strategies. In this discipline, hands-on practice enables the trainees to achieve the fastest improvements. The use of the CAN-bus UniTrain-I system is embedded in this concept.

"I start the block by working on UniTrain-I with the class. First I teach them the basics and explain certain aspects which I would not be able to convey so clearly on a real vehicle with much greater technical complexity. But it works really well with this system. We only start working on the vehicles in our workshop once this stage has been completed," reports Klaus Erkelenz.

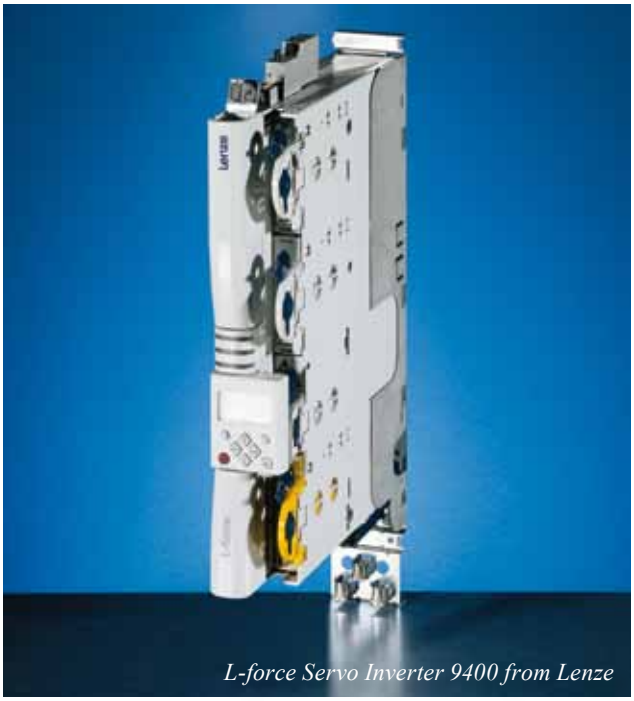
Both in the apprentice and master craftsman training courses, small learning groups are another important key to success. The members of these groups support each other and can fill in the gaps in their knowledge largely independently. "The UniTrain-I system has been very useful here, too, as I can adapt it to suit different levels. Not only is it possible, therefore, to support stronger and weaker students within one class; special modules also allow me to explore certain areas in greater detail with students on master craftsman courses. I like to use the system in master craftsman courses to demonstrate the CAN-bus as well as special measurements with the multimeter or oscilloscope," reports Klaus Erkelenz.

The trainees, too, value how the system can be used to present the CAN-bus topic in a way that is easy to understand. "I enjoy working on this system with my colleagues. It really helps you to understand things," confirms Martin Drews, a third-year apprentice at BMW. Jan Strunk restores classic Rolls Royce and Jaguar cars at the company in Cologne where he is being trained: "It is always a great feeling when a car leaves our factory fully roadworthy and restored to its former glory, but of course the technology found in classic cars is only comparable with that of modern cars in terms of the basics. That is why I found the CAN-bus course, which we worked on in the UniTrain-I system, particularly interesting and instructive. There are many aspects that I only properly understood thanks to this course," he says. Since he wants to shorten his apprenticeship in order to study automotive engineering in Stuttgart in the coming semester, he was particularly keen to learn the material he would need for the exam as quickly and effectively as possible. "To cover the material in two years instead of the usual three and a half is quite a challenge. But I have received good training here and am fairly confident that I will manage it just like the others here," he says.

Jan Strunk renovates valuable classic cars in his training and education centre.

Klaus Erkelenz, Automotive Engineering Trainer, builds his lesson around the UniTrain-I.

Straight into the new year with a strong tail wind



L-force Servo Inverter 9400 from Lenze

Lucas-Nülle and Lenze

Training systems for renewable energies are in great demand at the moment because this subject area is becoming an increasingly important part of training programmes due to worldwide efforts to cut CO_2 emissions. The necessary technical knowledge needs to be firmly embedded in these programmes as quickly as possible to ensure that the use of renewable energies is not hampered by a lack of skilled staff.

Since it is impossible to work with actual rotating wind turbines and real wind in training laboratories, Lucas-Nülle has developed a training system that allows the interaction of wind, blade geometry and gearing to be simulated with mathematical precision and linked with the connected generators. Such a setup enables students at vocational colleges and technical universities to run a vast array of extremely interesting tests and thereby get to know the fascinating world of wind power technology using a hands-on approach. The centrepiece of this powerful system is a servo inverter from Lenze, which can now also emulate wind.

The servo inverter from Lenze has already proved itself as an important component of the servo machine test bench for many years. The latest version also meets the challenging requirements of the wind turbine emulator. This function can also be added to older equipment in the form of an update.

The versatility of the Lenze servo inverter not only pays dividends in the classroom, it also proves that high-quality products do not need to fear the crisis. This is demonstrated by last year's sales figures for Lucas-Nülle equipment based on Lenze technology. 2009 once again saw a marked increase in sales, thanks in particular to the servo machine test bench, which is now recognised worldwide as the leading training system for the testing of machines and drives.

Lenze and Lucas-Nülle are continuing their collaboration along the same lines in 2010, with a particular focus on the growing renewable energy market.

Cooperation: Siemens

Mobile presentation of safety technology

Ralf Linnertz in front of a safety technology training panel system

Siemens AG and Lucas-Nülle have been working together in the field of safety technology for a number of years. As a leading manufacturer of safety-related components, Siemens offers a wide range of solutions for industry.

This is why Lucas-Nülle prefers to use Siemens technology in its training systems for common safety technology applications. From conventional safety door monitoring devices with positioning switches through to more complex AS-i-Safe and PROFIsafe modules, Lucas-Nülle offers suitable systems that are easy to expand and convenient to use thanks to their modular structure.

"This guarantees short set-up times and great versatility of use in the classroom," explains Ralf Linnertz, Product Manager for Safety Technology at Lucas-Nülle.

"These features, in particular, are not only of practical benefit in the confined space of vocational school classrooms, but also significantly enhance presentations to industrial customers. I have often faced this problem in my day-to-day work when I wanted to present our safety technology to customers," explains Michael Zumann, Safety Technology and Switchgear Equipment Promoter from Siemens.

By working closely with us in the field of safety technology, Michael Zumann was introduced to the benefits of the modular structure of our training systems and became convinced that this was the right solution.

As a result, Ralf Linnertz and Michael Zumann decided to expand this successful collaboration. Lucas-Nülle developed appropriate training panels for the safety-related components, which can be easily inserted into the mobile Lucas-Nülle presentation stands and operated from there. For in-house exhibits at the Siemens offices in Cologne, the components can now be easily moved from the training room – where the systems are normally kept – to the ground floor and back again, allowing customers and employees to carry out extensive tests on them. "The fact

Michael Zumann and Ralf Linnertz

Michael Zumann presenting safety technology systems in the Siemens training and schooling facilities

that we can now show the components as they are actually used makes the presentation much more vivid and graphic," reports Michael Zumann. "The modular Lucas-Nülle structure is very practical – and not just for our in-house purposes. Customers often have very specific requirements with regard to their safety technology, for which only certain solutions can be considered in any case. With the Lucas-Nülle system, I only need to take the relevant modules instead of packing the entire system, as was the case in the past. This makes my job so much easier." ■

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Betting on the right system

Training in installation and wiring technology would be inconceivable without InsTrain systems.

Lucas-Nülle developed the first system in the InsTrain series back in 2006. The self-proclaimed goal for the system and all of its associated parts and instruments was to develop a system that instructors could use to merge project-oriented assignments and blended-learning elements inside the classroom. For this purpose, we needed to design a compact system which would also comply with special safety standards. This was certainly no easy task, so Lucas-Nülle went out in search of partners from the education sector as well as industry to meet these requirements. Ultimately, our close cooperation with industrial practice proved to be a success and has been maintained over and over again in later systems of this series. In the meantime, we have four different InsTrain systems on the market which together cover the most important areas of installation and wiring technology. Nine prestigious companies were involved in developing the systems, contributing know-how and industrial components. Such close proximity to real applications is something vocational instructors and trainees alike profit from – as can be demonstrated by the experience gained at the Otto-Brenner Vocational School in Hanover. This is a modern training facility that is currently working with the building management trainers "Building Mains Service Feed" and "Lamp and Appliance Circuits".

Zdravko Djuric, the person responsible for installation technology training and education, explains how teaching has been completely changed by InsTrain:

"The InsTrain system has had a totally positive effect on our students since we began using the system in instruction. This field contains subjects that are usually quite difficult for our students and trainees to grasp – such as VDE measurements, electrical installations and mains power supply systems. Now, teaching these subjects is not just done on a purely theoretical level but is also complemented by a practical training side using this system. Several of the training areas can be completely redesigned which is very motivating for the students." Currently, the vocational school is using the building system trainers "Building Mains Service Feed" and "Lamp and Appliance Circuits" from the InsTrain system series to cover critical training areas for the teachers. Thanks to InsTrain, the

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staff find it much easier to make the subjects and the instruction more varied and practice-oriented, with the support provided by the multifaceted fault simulation possibilities playing a key role. “Our experience shows that, thanks to the didactic conception and the flexible structure inherent in the InsTrain systems, the teaching staff are able to modify the learning environment over and over again, making it more interesting and more challenging. This in turn boosts the student’s commitment which is so vital for an understanding of the material.”

InsTrain training systems from Lucas-Nülle

IMPRINT

Publisher
Lucas-Nülle Lehr- und Meßgeräte GmbH
Managing Director:
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(Responsible in terms of press law)
Volker Hagmann

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Fotolia.de,
iStockphoto,
Siemens AG,
Lenze AG,
Handwerkskammer Köln,
Private

LN PRACTICE
Experimenting | Learning | Understanding

Printing
Druckservice Harry Schmidt
Dillenburger Strasse 97n
Im Technikhof Kalk
51105 Cologne

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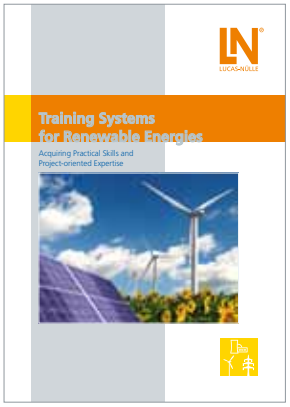

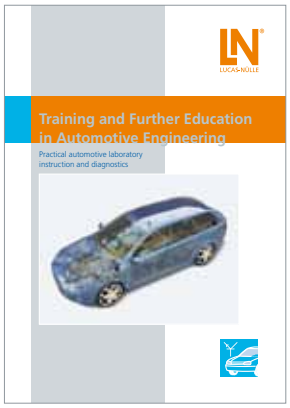

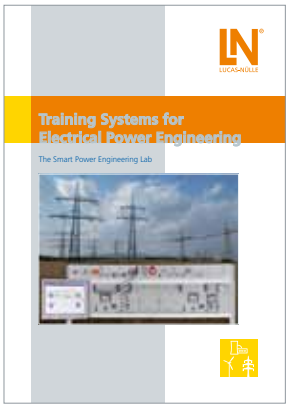

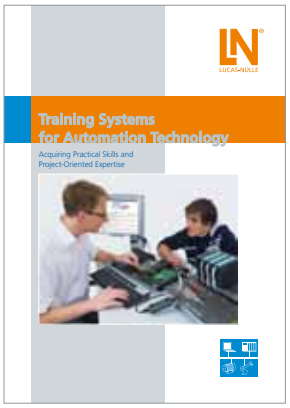

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