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"I believe that the school must represent present life – life as real and vital to the child as that which he carries on in the home, in the neighborhood, or on the playground." *John Dewey*

The world is changing all around us. A skilled population is the key to a country's sustainable development and stability. We know that obtaining a quality education is the foundation to improving people's lives and sustainable development. To contribute to skill people over the next ten years and beyond, we must look ahead, understand the trends and forces that will shape our business in the future and move swiftly to prepare for what has to come. We must get ready for tomorrow today. We will make it possible for youth and young adults all over the world to gain skills they can use in the labour market or to create their own jobs. We will make it possible for every person to have lifelong learning opportunities to acquire the knowledge and skills they need to fulfil their aspirations and contribute to their societies.

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A Shift Towards Digitalization in Technical Vocational Education

By Karl Skaar

Digital skills are driving competitiveness in today's economy and countries. Digitally supported education and training can help to strengthen individual skills



Young students of robotics working on a project, Photo by Adobe Stock

For TVET, a revolution in the curriculum is required to prepare graduates for an immediate job, but also for continuing employment. Imagine having been trained on extractive technology such as cutting, boring, turning using the finest equipment only to find that employment depends on additive technology, Internet of Things, and 3D printers.

In the context of digitalisation and technological change across all areas of life, the use of digital media is growing in significance for the TVET system.



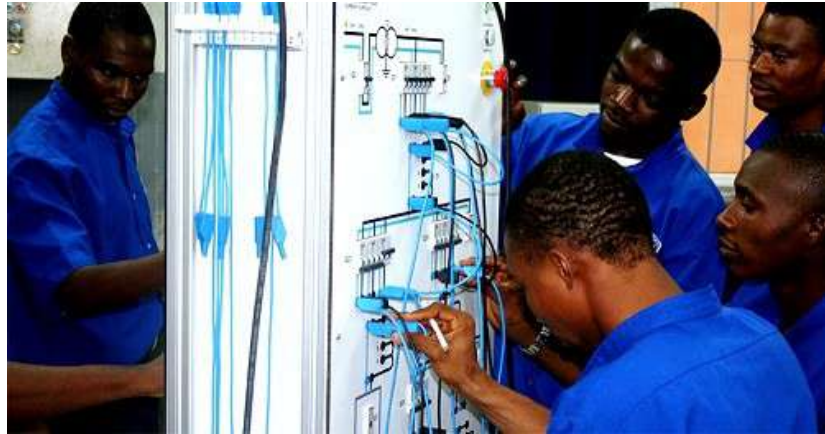
Karl Skaar, Editor

Is a highly successful professional, with a high degree of entrepreneurial flair. Among the many different roles, he is the chief editor of the Lucubrate Magazine.

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Digitally supported education and training can help to strengthen individual skills and competencies for the beneficial and responsible use of



digital technologies in all areas of life, make learning more flexible and enhance the quality and attractiveness of TVET.

A Shift in the Technical Vocational Education and Training

The shift toward digital education is building steam and it is already massive. Even students enrolled in lock-step public schools complement their school work with online information. Teachers suggest it. When given a choice by the TVET to take a course in class or online, many opt for online. Digital education is responding to the variability of their clients and making education more affordable, exciting and responsive to the needs and learning styles of students.

Digital education is often personalized to what the person needs at the moment in time. It can be learned wherever they are. Digital education offers new skills that are required by today's industry and job requirements.

Vocational education needs to prepare talent to work across a variety of roles, many of which are technical. In today's work environment, this requires a focus on the new digital economy. Governments and businesses around the world are making the necessary investments in these domains, fully understanding that talent and skills issues are and continue to be a top priority. The future of enterprise relies on the ability to move quickly with the changes that are upon us now and respond well.

In today's high-tech work environment, there are many challenges which simultaneously present opportunities to those who are open to seeing them as such.

Some of the core areas in the digital economy may be:

- Internet of Things
- Drone Technology
- Digital Marketing
- Customer Experience
- Data Analytics

Under, we will give a brief explanation of those core areas.



Internet of Things

The Internet of Things is a network of physical objects that are digitally connected to sense, monitor and interact within a company and between the company and its supply chain enabling agility, visibility, tracking and information sharing to facilitate timely planning, control and coordination of the supply chain processes [1].

In the Internet of Things (IoT), machines and devices are equipped with sensors and Internet connections that make it possible to collect data and store this data to cloud services. In Vocational education and training (TVET), the stored data can be used to improve decision-making

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processes. With the help of this data, a teacher can also get a more accurate picture of the current state of the education environment. IoT should be integrated into TVET because IoT will help to achieve significant educational objectives. IoT can promote students' preparation for working life, the safety of the education environment, self-directed learning, and active learning. It can also improve the efficient use of educational resources. In addition, IoT based solutions should be introduced so that students would have a vision of new types of IoT skill requirements before they enter the labour market.



Drone Technology

The history of the drone continues into the 1980s and beyond. It was developed for military purposes. Today we find that the drone is used for many purposes. The fast pace of drone technological innovation is tremendous.

A drone, in technological terms, is a crewless aircraft. Drones are more formally known as uncrewed aerial vehicles or unmanned aircraft systems. Essentially, a drone is a flying robot that

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can be remotely controlled or fly autonomously through software-controlled flight plans in their embedded systems, working in conjunction with onboard sensors and GPS [2].

Drones are controlled by remote ground control systems, referred to as a ground cockpit.

Drones are becoming the eyes and ears of scientists by surveying the ground for archaeological sites, signs of illegal hunting and crop damage, and even zip-ping inside hurricanes to study the wild storms. You can even rent a personal drone to soar above the horizon and snap a photo or video. Our news and features will cover developments in drone technologies, innovative uses for drones, and how drone use will impact society.



Digital Marketing
Photo: <https://thriveglobal.com/>

Digital Marketing

Marketing has always been about connecting with your audience at the right place and right time. Today, this means it is mainly on the internet, which is why digital marketing has become so critical to business success.

Digital marketing encompasses all marketing efforts that use an electronic device

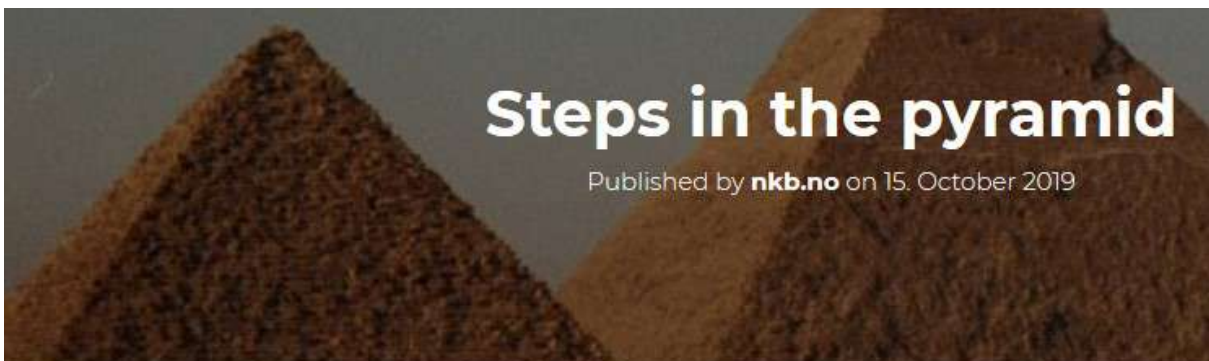
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or the internet. Businesses leverage digital channels such as search engines, social media, email, and other websites to connect with current and prospective customers [3].

Digital marketing is any marketing done online through various channels, platforms and tactics. Whether it is your business website, use of email marketing, online brochures, pop-up advertisements or other advertising options, these are all under the umbrella of digital marketing.

While traditional marketing might exist in print ads, phone communication, or physical marketing, digital marketing can occur electronically and online. This means that there are several endless possibilities for brands, including email, video, social media, or website-based marketing opportunities.

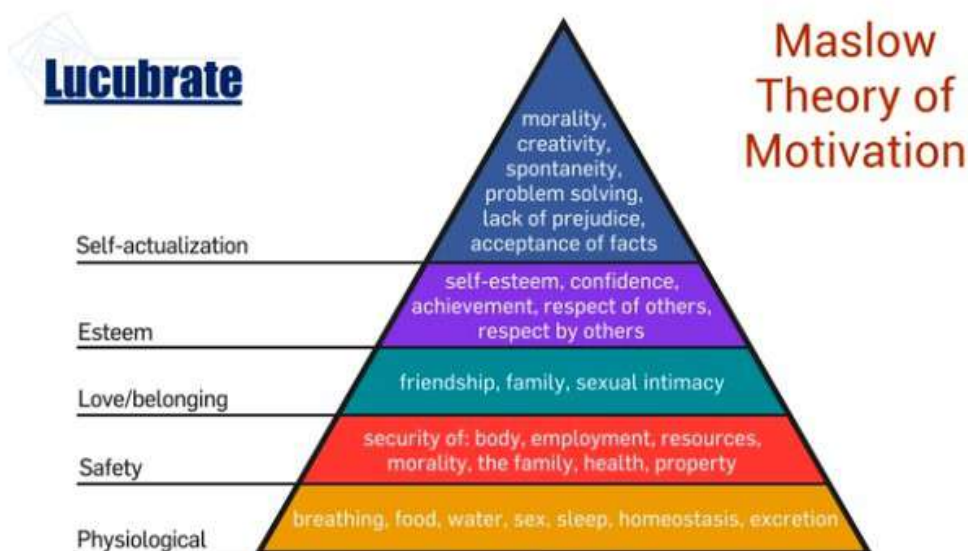


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Customer Experience in product and service concept, miniature people workers with blue team uniform building cube wooden block with acronym CX on the table with blackboard, user review or feedback.
Photo: Adobe Stock



Customer Experience

We hear the term 'customer experience' quite often, but what does it mean?

Customer experience can include many different elements, but most importantly, it comes down to the perception a customer has of your brand. While you may believe you produce great products, if a customer has a bad experience of this product or the sales process, this will affect the customer experience.

Customer experience is the result of every interaction a customer has with your business, from navigating the website to talking to customer service and receiving the product/service they bought from you. Everything you do impacts your customers' perception and their decision to keep coming back or not—so the excellent customer experience is your key to success [4].

Many things contribute to the overall customer experience – it is not just about the product or service. It could be the messaging you use. It could be the process by which you sell your products. It could be after-sales support. Even the inner workings of your company, your leadership team and how they

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interact with the rest of the organisation and how the product is developed, all come together to create and impact the overall customer experience.

Customers today are even more connected than ever before. They have a plethora of information at their fingertips, which means they are often demanding, unpredictable and want things their way and quickly. They work to solve their problems themselves. They also hold the power of social media, which means their voice has an impact. This ultimately changes everything for brands today. What used to be a linear customer journey is now mostly fragmented.

Understanding how to make sense of these changes and how to respond is what organisations need to do to create the kind of customer experiences that delight and thrill and keep them coming back for more.



Data Analytics

We are now living in the Information Age, a shift away from the Industrial Revolution that was brought about due to industrialisation to our current economy which is based on information technology. In order to rely on data, we have got to know it is clean, reliable and trustworthy. Data analytics, in that sense, is

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simply the science of examining raw data so that we can conclude from the information gathered.

Demand for data science skills is growing as it is crucial to extract knowledge and insight from data captured by companies.

Big data is a field that treats ways to analyse, systematically extract information from, or otherwise deal with data sets that are too large or complex to be dealt with by traditional data-processing application software. Data with many cases (rows) offer greater statistical power, while data with higher complexity (more attributes or columns) may lead to a higher false discovery rate. Big data challenges include capturing data, data storage, data analysis, search, sharing, transfer, visualisation, querying, updating, information privacy and data source [5].

Nearly every industry has begun investing in big data analytics, but some are investing more heavily than others. According to IDC, banking, discrete manufacturing, process manufacturing, federal/central government, and professional services are among the biggest spenders. The fastest growth in spending on big data technologies is occurring within banking, healthcare, insurance, securities and investment services, and telecommunications [6].

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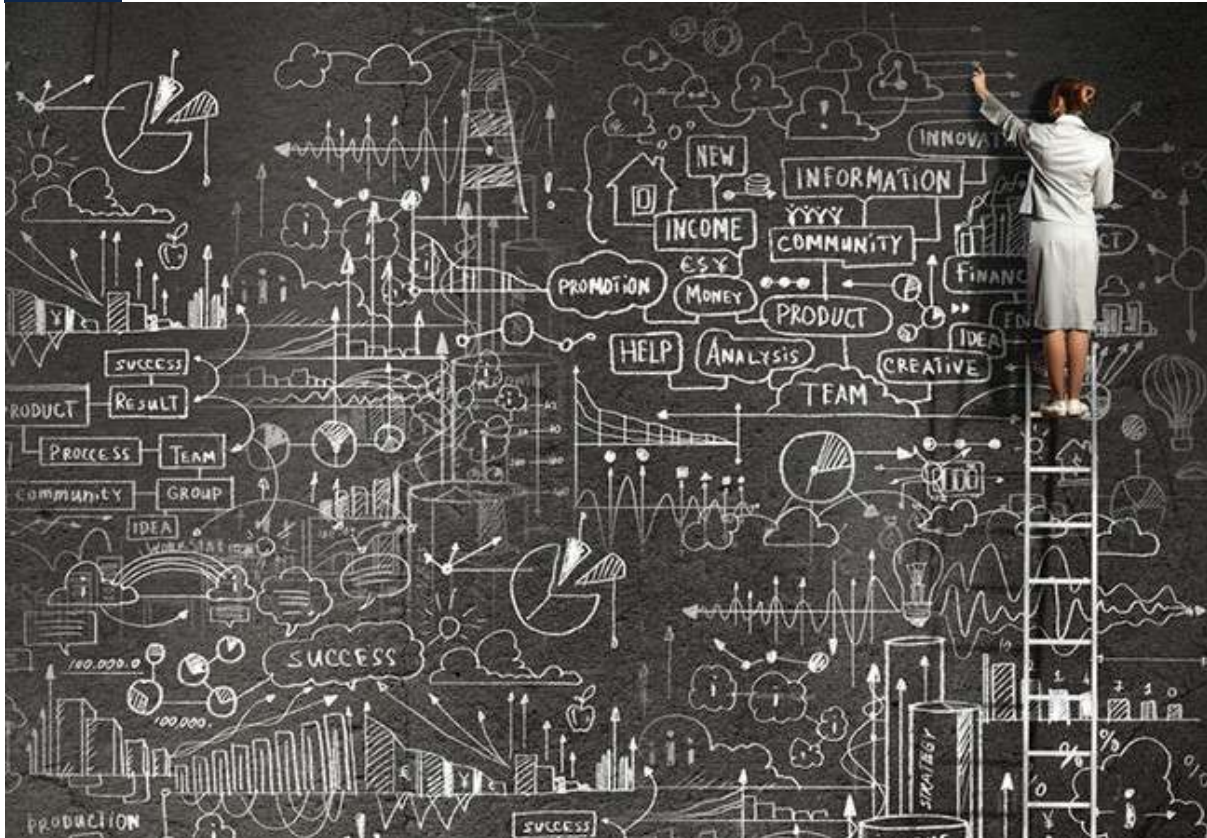
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How can TVET Educators Respond?

Here is some advice about how TVET educators can respond to digital and technological change [7]:

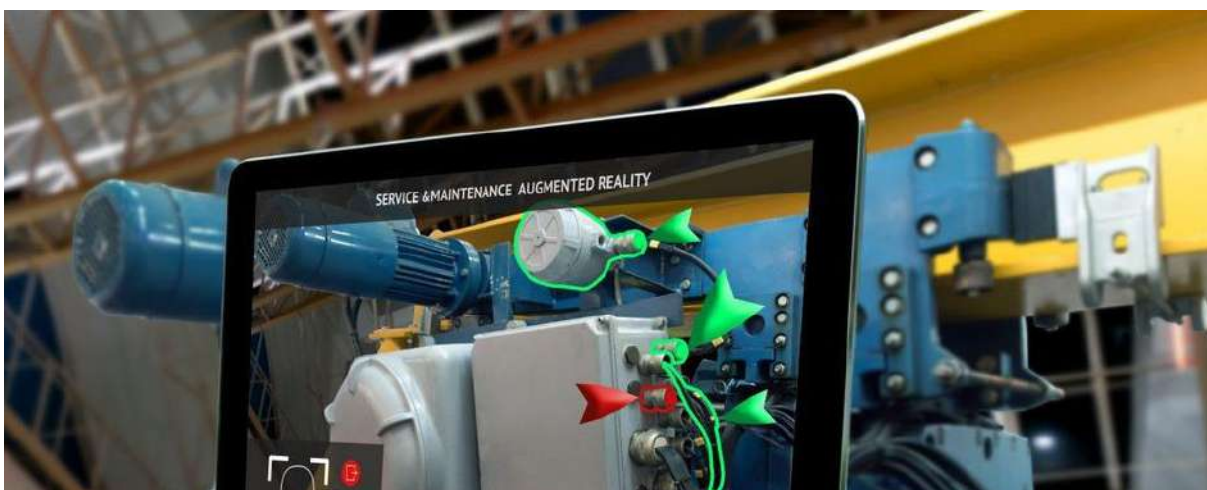
- Link all education in TVET facilities to industries. This may involve paying the industry using newer technologies to do some of the training. The combination of school and O-J-T is already the preferred training model in many TVET colleges and engineering Universities. Planners and legislators need to press hard to achieve this model as quickly as possible.
- Expand the physics programmes in most TVET training. Without a basic understanding of the science behind innovation, graduates will never keep up with workspace changes.
- Increase the commitment to internet-based learning to develop the skills required in graduates to keep up with changing technologies in the workplace. As the job-for-life morphs to the Uber-economy of on-call jobs, employment will be based on the required skills. Period.

- Change recruitment targets for TVET teachers. Recruit from the industries that graduates will join. Teachers who do not understand industry, business and the workplace are not useful.
- Society demands a University degree if for no other reason, to satisfy parents that they have done their job. Once away from home, unemployed/underemployed grads are flocking to TVET right now.
- Rethink TVET institutions programming. Do the initial design around part-time learners who are employed now and let full-time students fit in around the vastly restructured timetable formats.

It's a new world for TVET. Educators will move on, or they will become irrelevant.

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Is Technical and Vocational Education and Training for Men?.

Technical and vocational programmes remain a male bastion, while the opposite is exact for tertiary education. Subject choice is also gender-segregated. Only just over a quarter of those enrolled in engineering, manufacturing and construction programmes, and information and communications technology programmes are women.



The Global Education Monitoring Report [1] describes factors that perpetuate gender inequalities in schools. Here you will find some few of the statements from the report. The comments are related to Technical and Vocational Education and Training (TVET).

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Gender Gaps in Education Attainment and Achievement

Access to a sustainable and quality education is one of the most significant challenges facing the world today and tomorrow. By working to ensure that every child can go to school and that we can all continue to learn throughout our lives, our goal must be to give everyone the necessary skills to contribute to the development of their societies.

Despite the achievement of parity on average in school participation globally, many gender gaps remain in educational attainment and achievement. There are differences between regions: Sub-Saharan Africa is far behind in gender parity at all education levels, while Southern and Central Asia have made rapid progress. There are differences between countries, three-quarters of which have not achieved equality in upper secondary completion, with disparity at the expense of both boys and girls. There are differences within countries: More vulnerable girls and boys, whether as a result of poverty or location, migration or displacement, are most at risk of falling behind. And there are differences between generations,

with older women still suffering from past and current inequality and discrimination in norms, socio-economic opportunities and education systems, all feeding into one another. The next two sections speak to those forms of inequality.



Female Students are Often Enrolled in Fields as Food and Nutrition, Cosmetology and Sewing.

Technical and vocational programmes account for 22% of upper secondary education enrolment and are disproportionately male. Globally, the share of females enrolled in upper secondary technical, and vocational programmes are 43%, with regional shares ranging from 32% in Central and Southern Asia to 50% in Latin America and the Caribbean. Female students in such programmes are often predominantly enrolled in fields such as food and nutrition, cosmetology and sewing. Gender norms, which often translate into segmented employment opportunities, determine to a large extent what education opportunities are open to boys and girls.

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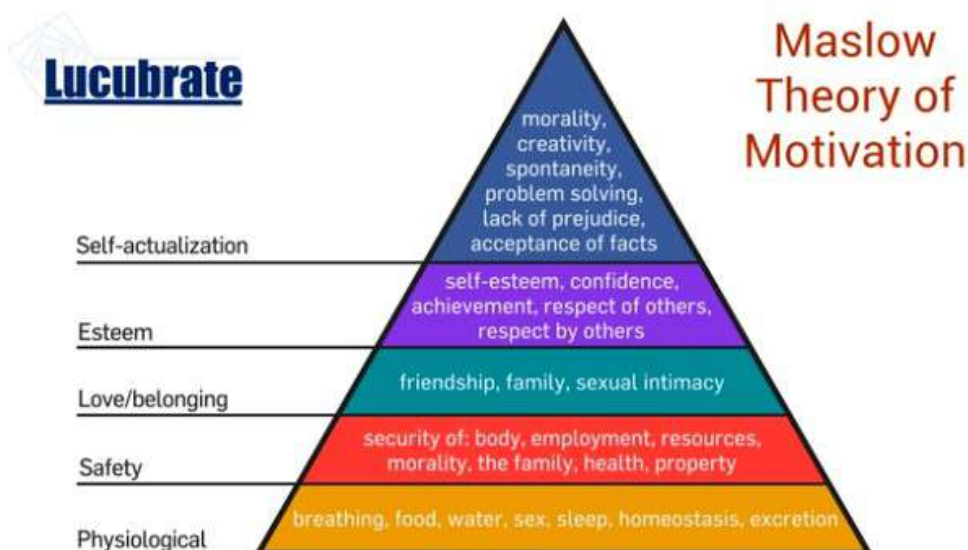
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Pay for the Nightmares



The Nightmare; sleeplessness man suffers from Insomnia, Photo by Rafael Ben-Ari (Adobe Stock).

Suman cannot sleep a night without dreaming. Often, he forgets what the last night dreams. Even though, he likes to try to recall the dreams linked to romance, beauty and women. However, his efforts are in vain. On the other hand, fearful dreams return very often. He can't understand why the nice dreams don't appear that much while the bad ones, come again and again.

His nightmares reached the peak a week ago. He had been sick in three days. His doctor advised him to rest. He was given antibiotics. In such a night he went to bed earlier and within half an hour he reached the land of dream. But the

dreams that came to his sleep were notorious; Aliens from other worlds came with a spaceship to his home. They started shooting



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is based in Dhaka, Bangladesh, is a development professional and researcher. With around 15 years of diverse professional experiences, he has expertise in participatory research, training, investigative reporting and writing in the areas of climate change, natural resource

him and his neighbours. Suman tried to escape. The spaceships were chasing after him. He was caught in between the fires and gradually the aliens became visible.



Aliens with Human face

At one point, in the dream, he discovered that the faces of the aliens were alike people he knows. The faces he saw were the people he gave money to for helping him to get a job or start his own business. They are all middlemen or brokers. Sometimes *Suman* fights with them for recovering his money. However, the brokers never told that they would not payback. However, in the dream, he became impatient and tried to show his power.

The brokers in the dreams are connected with people with influence. That made *Suman* give up. But the brokers in the dreams never gave up. Now they are after him in his sleep whatever he dreams about.

Suman goes out of bed to avoid the bad dream. He walks around, watches TV, drinks water, chats with Facebook friends. However, the night seems to be endless.

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Sleep Again

After a couple of hours, he again goes to bed and sleep. "Now they will not come again, I hope" Suman groans. Within some few minutes, he fell asleep. Then he started dreaming.

This time he found himself in another land of dreams. This land of dreams is a developed country where some of his friends are migrant workers. He was fascinated by nature, roads, buildings, landscapes on the outskirts of the city. He could recall his ex-girlfriend. The girlfriend left him just since he had no job. Suddenly, he found the people around him speaking in his language. They started showing interest in Suman. They took him to the museum, parks, and historical places. Even the restaurants and bars he had heard about many times, were there. He ate all the good food and drank all the drinks.

The dream took him to a tourist bus. This took him and other tourists through the alleys of the cities. "Oh, if I could meet her I could have told that I am now a wealthy person," Suman told himself in the dream. The bus in the dream was heading out of the town. The beautiful landscape, trees, crop field, grape gardens-all were an attraction to him.



Suddenly the bus got stuck in a queue. Why are we not moving, he asked his guide? "We are at the security check," his guide replied. In the dream, *Suman's* face turned pale. He couldn't understand how he came here since he didn't have a passport. He began to sweat and the fear of being in danger engulfed him. The security personnel entered the bus. *Suman* screamed and waked up from sleep.

His parents and younger sister heard him screaming and run to his room. No one in the family could sleep any more this night. The next few nights became terrible for him. Relatives and neighbours advised *Suman's* parents to take him to a psychiatrist. But *Suman* didn't agree. "It is my problem and I would like to handle it. Just give me some days. If I fail then I will follow your advice", said *Suman*.

Suman remembered the people who threatened him in his dreams. He decided to pay them back in the same way. With much courage, he ordered one of the brokers to give back the money that he had used to go abroad. The broker was a little surprised at first glance and thought *Suman* was just joking with him. However, later he understood the change of *Suman* and agreed that he would gradually pay back the money. *Suman* was not convinced. He hired professional consultants and prepared legal agreement between him and the broker to get back the money.

He followed the same strategy to the others who were making trouble to him. He didn't stop dreaming in the nights. However, the people that appeared in his dreams were not as arrogant as before. In the dreams, they looked curious to *Suman*.

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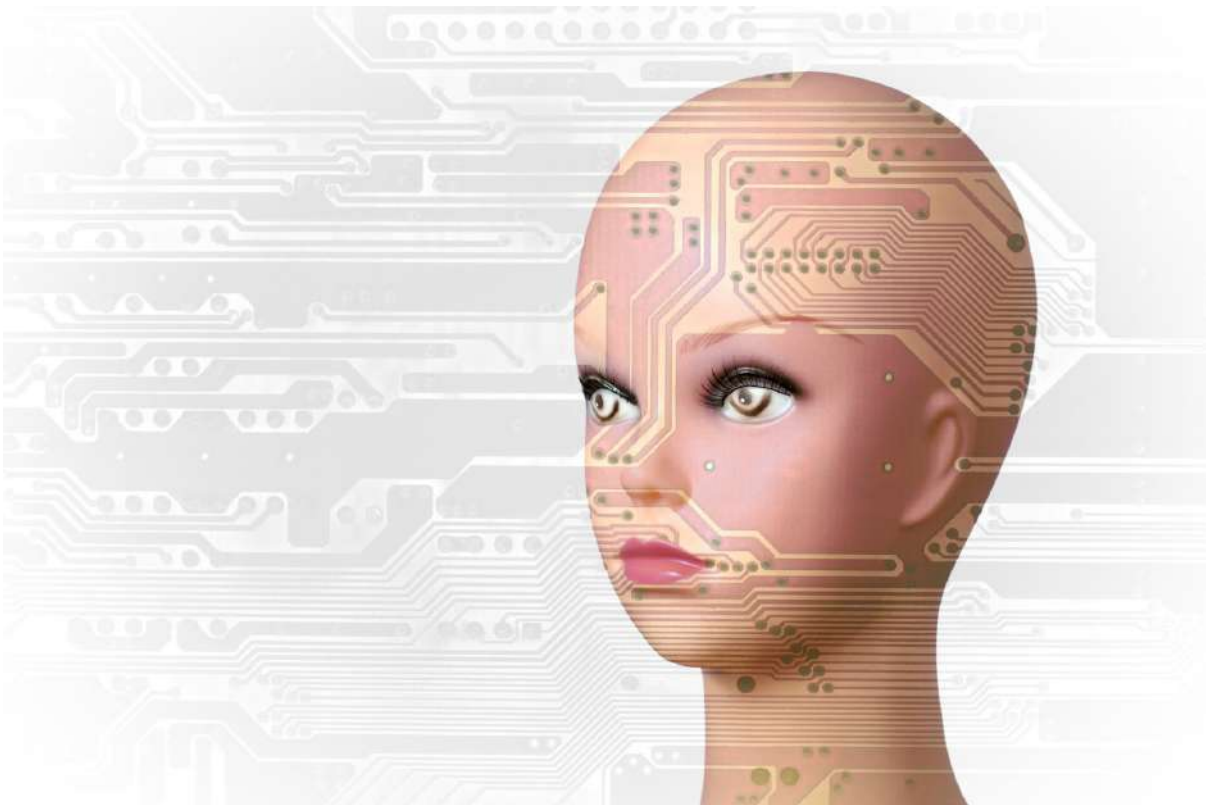
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Sleep during the day

For the next few days, he divided his sleeping hours between day and nights. It was interesting that the nightmares didn't come at the day time; they only came when he slept in the night. Bad people fear the light and enjoy the darkness, *Suman* understands. "If there were no darkness, these people couldn't have existed," Suman thought. That is how to pay off bad dreams.

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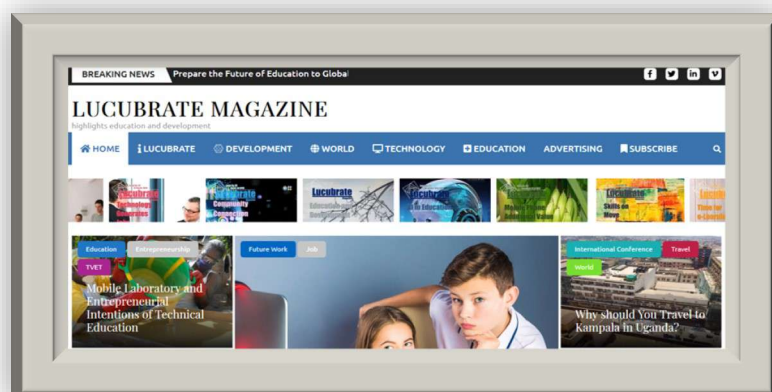
A photograph of several colorful wooden blocks (red, blue, yellow, purple, orange) stacked in a row.

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Learning through virtual environments in Vocational Education*

Vocational education and training will become more widespread, supported by the growth of virtual environments in sound pedagogic reasoning.



A World of Social Networks

Many vocational learners come from so-called Generation Y (or Z). They have grown up and are living in a world of social networks and inhabit many virtual environments. For more than a decade, educators have been considering the degree to which such advances may change teaching and learning. Various researchers have begun to think about precisely how e-learning might be different (1). Just how fundamentally this may change what goes on in vocational education is an open question.

The Virtual Environment is a Context for Learning

But certainly, in terms of pedagogy, the virtual environment is a new context for learning. You don't need to remember things in the way

* The article is from the report "How to teach vocational education: A theory of vocational pedagogy" by Bill Lucas, Ellen Spencer and Guy Claxton, The City & Guilds Centre for Skills Development (December 2012)

you do with pens and books. Searching quickly is the norm. Distinguishing good and bad is essential as the searching goes on, as is approaching the whole endeavour with appropriate scepticism. Through searching, it is far easier to see patterns and connections than ever before. Visual imagery is everywhere, with even what were once 2-dimensional maps now potentially 360° photographs of places.

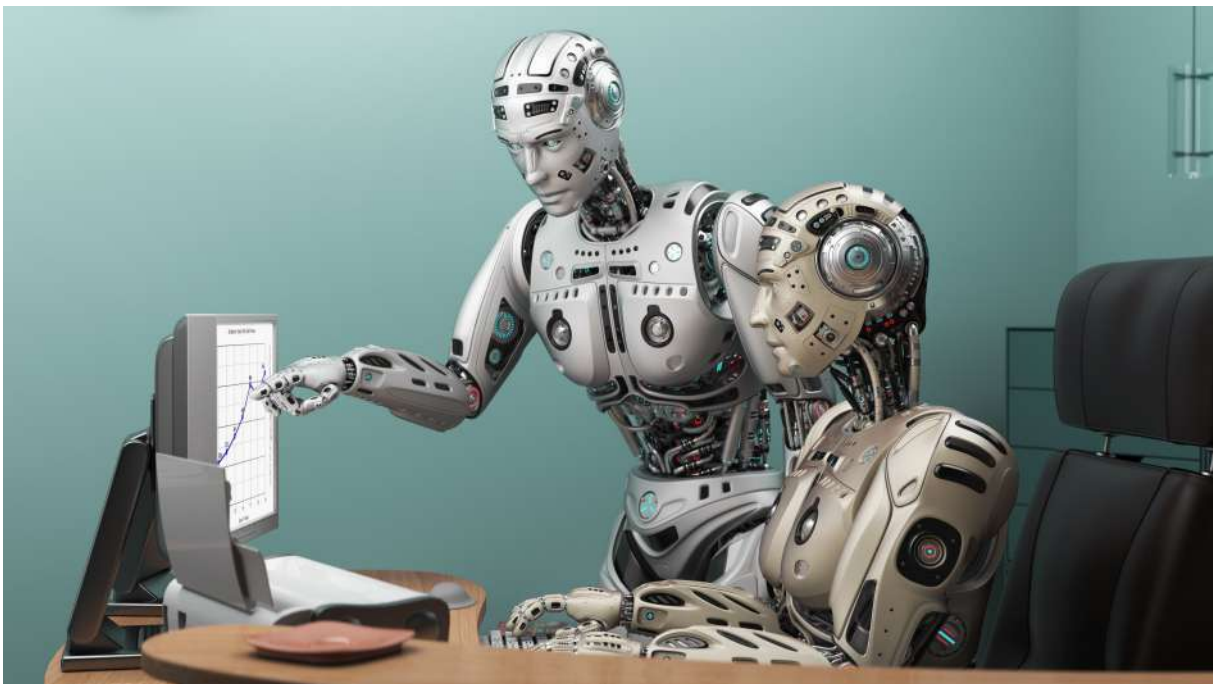
In an educational context, one innovation beginning to be used in vocational education is flipped teaching. Drawing on work by Eric Mazur, the 'flip' here is to assume that, with technology, much of the lecturing and instruction can be done outside the classroom and time at college or school can be focused on higher-order interactions between teacher and learner (2). This kind of approach would seem to be a significant element of a contemporary approach to developing a vocational pedagogy.



A Number of Benefits using Virtual Learning Environments

In a construction industry context, Abdel-Wahab (3) suggests that 'when integrated with rich pedagogical scenarios', Virtual Learning Environments (VLEs) can be used to enrich classroom activities, to provide virtual spaces for student interaction in 3D, and to simulate the operation of work-related equipment, or project management scenarios. He argues for a number of benefits:

- The task environment is free of danger.
- An authentic task or work environment can be replicated.
- Cost savings can be made.
- Faster throughput of individuals is possible.
- Learners are motivated.
- Learning can be more efficient, and faster.



While recognising that FE colleges, many of which are currently undergoing modernisation, have limited funds with which to invest in such technologies, he proposes that the outlay could be made in tandem with industry investors.

In an analysis of developments in online learning for vocational education and training, Dave Whittington and Alan McLean (4) predict that growth in

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capabilities in online technologies will impact profoundly upon vocational education and training. They suggest that vocational education and training will become more widespread, supported by this growth, but that if it is driven forward by motives other than sound pedagogic reasoning, 'this could turn out to be an ironic but minor detail in the history of education' (4). They argue that the most important feature of the Internet for vocational education is that it is 'dialogical'; it supports dialogue among learners, and between learners and teachers.

Contero et al.,'s study of engineering students explored the use of sketch-based software applications, concluding that such applications 'can provide an effective way of improving spatial abilities and capturing students' attention' (5).

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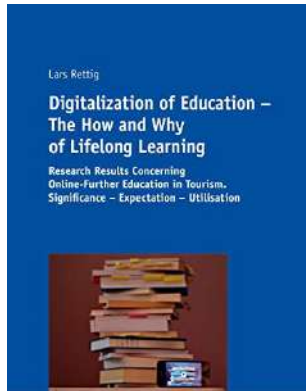
Seventeen effective pedagogical methods in vocational education

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Book

Digitalization of Education.

By by Lars Rettig



Digitalization of Education. The How and Why of Lifelong Learning: Research Results Concerning Online-Further Education in Tourism. Significance Expectation Utilisation

More and more parts of our lives are being digitally enriched. The field of education is no exception. The learning and working worlds are changing, and therefore also the requirements for education, continuing education and further education. At the same time, the period in which knowledge is up-to-date is ever shorter. Thus the ability to do Lifelong Learning is not only decisive for the success of the individual, but also for the sustainable existence of companies, economic sectors and whole regions/destinations. On the basis of psychological, pedagogical and economical concepts the author deals with the How and Why of learning. Based on this he investigates the significance of Online-Further Education in Tourism by means of qualitative expert interviews.

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