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Trends and Challenges in E-Learning Methodologies

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***Abstract* — In the present paper the authors present a systematic study on the latest trends and technologies used in e-learning methodologies. The authors also compare between the progressing popularity of e-learning as an educational method and finally poses the debate if it is capable of replacing traditional classroom teaching methods.**

***Keyword* — Gamification, MOOCs, personalized learning, LMS, networked teacher etc.**

1. INTRODUCTION

E-learning provides a brand new learning mode, in which the users can learn through internet by via the terminal. E-learning emphasizes on the technology to transform and guide education, which is also known as online learning or networked learning. E-learning can be regarded both as an assist learning forms to traditional education and a self-learning mode of continuing education. With the progressive growth of information technology transferring, updating or sharing knowledge has become extremely fast and thus electronic methods of learning are gaining popularity over traditional methods. E-learning platform is based on digital media technology and the digital resources are available in internet network are being deployed for education. E-learning is a wide set of applications and processes which use all available electronic media to deliver vocational education and training by overcoming geographical boundaries. Network information has insinuated into all facets of human life, which has a huge influence on the concepts and ideas of education per se and to a large extent also tends to influence the ways people learn things. E-Learning platform brings a brand new concept, and is a kind of network information learning mode [1]. It can be used for traditional educational content and internal trainings for enterprises, and it is especially a very appropriate means and methods for the engineering education. In the fast-paced world of e-learning the available technologies to make a course new and exciting are always changing, and course content can and should be updated quickly to give students the very latest information. The supporters of e-learning suggest that it provides real-time learning of critical or just-in-time knowledge. With state-of-the-art e-learning management systems, training costs can be traced to individual learners and costs can then be measured against results. It is established fact that online training is better, faster, and cheaper than conventional training. E-learning has become an integral part of organizational training. E-learning may be delivered via numerous electronic media, including the Internet, intranets, extranets, satellite broadcast, audio/videotape, interactive television, mobile network and CD-ROM. This is especially important if the e-learning training is being given to employees in a sector where keeping up-to-date on industry developments is of the utmost importance. This is one of the reasons why many businesses are now offering training via e-learning - other reasons includes low costs and the ability for employees to study in their own time and place. Overall, traditional learning is expensive, takes a long time and the results can vary. As companies and organizations adopt technologies to improve the efficiency of day-to-day operations, the use of the internet becomes a necessity. As multinational corporations expand across the globe, the chances of working with people from other countries increases, and training all those parties together is an issue that e-learning successfully addresses. The importance of E-learning is now a given fact and it can offer an alternative that is much faster, cheaper and potentially better.

2. THE LATEST E-LEARNING TRENDS

E learning methodologies have improved over the years and the popularity of this method of sharing and imparting knowledge is increasing by the day. There are several methods of e-learning, some of the most preferred e learning methodologies are discussed below.

2.1. Gamification

Gamification makes learning motivating and engaging. Gamification in eLearning [3], [4] is the use of game theory and game mechanics in non-game contexts to engage users in solving problems. The main goal of gamification is to motivate students so that they typically perform better. Gamification in eLearning follows exciting technologies and innovations within the gaming industry; think even more realistic learning experience potential using virtual and augmented reality. Simulation, animations, and narrative based games are expected to be included more in gamification. The basic design of gamification works essentially on four steps engagement, challenge, progression and accomplishment. The challenge and achievement in game design is a blueprint for the type of eLearning that engages and fulfills learners.In addition, gamification focuses on short-term, achievable goals with clear rewards and provides a framework for learning new material. The importance of providing instant feedback and making the

user progress in a friendly environment without any visible instructor makes this method very popular.[5] So to design an efficient game so as to deploy e-learning the designer must focus on learner centricity, engaging the learner, providing essential incentive as well as extrinsic impetuous by giving a sense of accomplishment with successful completion of each lesson that is posted as a well-designed attractive challenge, providing timely feedback, as well as opportunities for learners to take different pathways through the course.

2.2. Corporate MOOCs (Massive Online Open Courses)

It's been predicted that in the near future universities will award degrees with 100% content on MOOCs. The fact that MOOCs allow distance learning in a virtual classroom and give a feedback of the student performance in the form of credit reports make this as attractive as any other e-learning method if not more. Currently students learning via MOOCs are getting certificates that will soon translate into credit. A growth area to watch for is the rise of co-branded MOOCs between corporations and established academic universities, which will see students paying fees to study rather than accessing free courses. They are considered by many as a solution of the developing countries' difficulty in accessing expensive education as these courses would be accessible as long as anyone has internet access. [6]

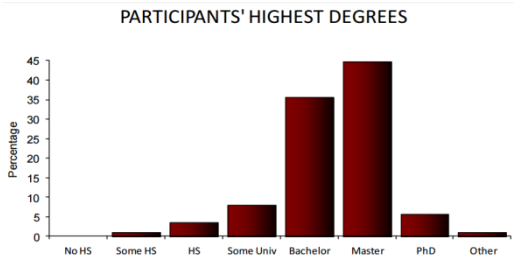

Fig. 1. The distribution of popularity of courses accessed via MOOCs all over the world. [7]

2.3.Personalized Learning

Traditionally, in case of MOOCs or gamification content is "pushed" at learners; however, personalized learning puts the learners in control, allowing them to "pull" information as needed, creating their own learning path. This is mainly aimed at matured learners. Learners are also offered choices as to how they prefer to learn and can choose mediums that suit their learning style and pace. The idea of a Personal Learning Environment recognizes that learning is ongoing and seeks to provide tools to support that learning. It also recognizes the role of the individual in organizing his or her own learning. Moreover, the pressures for a PLE are based on the idea that learning will take place in different contexts and situations and will not be provided by a single learning provider. Linked to this is an increasing recognition of the importance of informal learning.

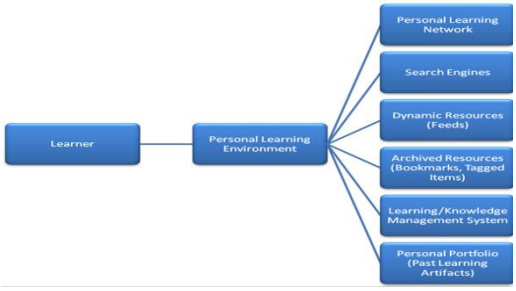

Fig. 2. Visualization of a web-based Personal Learning Environment [9]

There are two types of technologies which influence personalized learning the most namely ubiquitous computing and the development of social software. Ubiquitous computing (ubicomp) is a concept in software engineering and computer science where computing is made to appear anytime and everywhere. In contrast to desktop computing, ubiquitous computing can occur using any device, in any location, and in any format. The growing ubiquitous nature of internet connectivity with the development of wireless and GSM networks, as well as the spread of broadband, resulting in connectivity becoming available almost everywhere in the future. The development of ubiquitous computing may offer new opportunities for the use of ICT for learning. By the development of social software we mean embedding of computer based communication within the tools of the workplace. This offers the opportunity to develop learning environments whilst simultaneously accessing and shaping the production learning and business. [10][11] To sum up "Personal learning networks are the sum of all social capital and connections that result in the development and facilitation of a personal learning environment." [12]

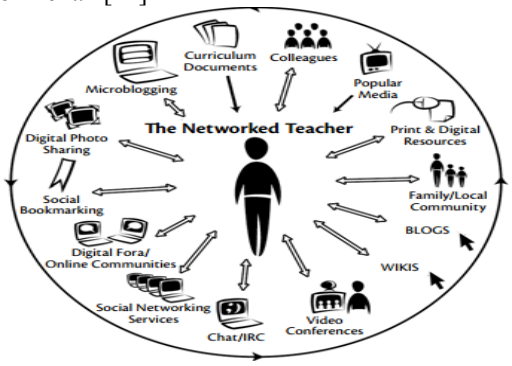

Fig. 3. The Networked Teacher[13]

To navigate the Internet more efficiently, individuals can assemble a virtual toolbox from an ever-growing list of free, and often open-source, technologies to aid in aggregating, organizing, and publishing information online. There are social book marking as well as research tools,aggregators,metagators and start pages. Iskold (2007) [14] sees the range of personal publishing options as a continuum, ranging from content-focused, formal blog posts to socially-focused, informal messages posted

on social networking sites, with micro-blogging falling somewhere in the middle. "In general, the length and full-featured capabilities of blogging offer learners the opportunity to explore topics in depth and reflect, while the speed and simplicity of micro-blogging lends itself more towards posing questions and collaborative brainstorming"[15].

2.4. M-Learning and BYOD (Bring Your Own Device)

With mobile use growing, being desk bound is not necessary for accessing eLearning. Learners are opting to BYOD so they can access training anywhere, anytime. Small screen size means instructional designers need to accommodate appropriately chunking content. The phenomenon is commonly referred to as IT consumerization.[16] Educational institutions are ultimately presented two options: adopt a BYOD program, embracing the technology trend, encouraging student participation, and expanding curriculum to include BYOD-driven topics, or to impose of a BYOD policy, setting rules to govern the presence and practice of these potentially disruptive devices. However there are several issues and design objectives which need to be considered before propagating BYOD in education. [17]. Interestingly Smart watches could soon be considered another "BYOD". Obviously screen real estate is an issue, but the humble watch has applications for in-the-moment, on-the-job performance improvement such as alerting a worker when they are performing a task incorrectly or unsafely through motion-sensor technologies and offering personal coaching. There are some challenges in promoting BYOD which are mainly

- Scalability – the ability to handle the explosion of users in the learning environment.
- Security- controlling the access of users depending on hierarchy, maintaining views on different levels and protecting information.
- Manageability - managing users and devices, and ensuring compliance to polices no matter how one is connected or where they are located on the e-learning network
- Simplicity- Handling the issue without complex protocols so that the environment remains acceptable even to not-so tech savvy people.
- Cost effectiveness – The controlling costs should not exceed the budget of the organisation.
- Accountability: School systems at all levels are being held to extremely high standards. It's critical to show improvements in student outcomes while justifying all technology purchases in terms of how they help the educational experience and increase efficiency.

2.5 Cloud LMS

Cloud computing is now a major technology trend. In relation to eLearning, cloud based LMS services are gaining popularity and have the capacity to reduce operation costs. There are different types of cloud based Learning Management Systems like TalentLMS [18] a **cloud-based learning platform** to train employees and customers. DoceboSaaSLMS [19] which helps in business optimization, training, saving time and budget.Litmos LMS is another such tool. Litmos is a leading learning management system that both trainers and learners love to use. Litmos LMS [20] lives in the cloud which makes it easy to create courses and assign to your learners on virtually any device. Litmos has won several awards and is used by companies of all sizes. WizIQ's LMS is designed to provide educators, administrators, and learners with a robust, secure, and integrated system for creating personalized online learning environments. Colleges and universities, high schools, and training and tutoring centers can use the online learning platform to create and deliver self-paced, live online or blended courses—without the need for third-party plug-ins or added costs to support advanced features and support any number of students with a flexible, SaaS-based pricing model. The WizIQ's LMS includes course management, secure video streaming, content sharing, advanced test and assessment capabilities, virtual classroom for live classes, social learning features, cloud content library and much more. [21] It employs Amazon's vast global infrastructure to ensure that files can be accessed and shared from anywhere, at any time—with just a single click. 30hands Cloud is a platform for online and blended learning that merges personalized, structured content with social media and student publishing for better, student-centric learning. There are other tools such as administrate [22], mind flash online training LMS [23], Latitude Learning LMS[24],Haiku LMS [25] etc. [26]

3. POPULARITY OF E-LEARNING

The global e-learning market is continuing to grow progressively. The global eLearning Market was expected reach $107 billion by 2015 [27]. The global self-paced eLearning market reached $32.1 billion in revenue in 2010 [28], with a five year compound annual growth rate of approximately 9.2%. This meant that the self-paced eLearning market should see estimated revenues of $49.9 billion by 2015 [28].

Fig. 4. World-wide Self-paced ELearning Five year growth by region [28]

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According to the picture it is evident that the growth rates in specific Western European countries are much higher than the aggregate growth rate. For example, Poland, the Czech Republic, and Hungary all have growth rates above 20%. Romania has the highest growth rate in the region. The growth rate in the combined Asia region is robust at 28.4%. The revenue opportunities in specific countries in Asia are attracting suppliers and investors from all over the world. India has the highest growth rate followed by China and Malaysia. ChinaEdu in China has over 311,000 students, the second largest online student population on the planet after the University of Phoenix Online in the US. ChinaCast Education in China has over 143,000 online students, in a tie with Eadcon in Brazil for the third largest online student enrollment in the world. The growth rate in Eastern Europe is 21.8%. This region was a relatively late adopter of Self-paced eLearning, but now is experiencing rapid adoption. Ambient Insight has revised forecasts upward for Eastern Europe. [28] With the variance in popularity of e-learning in different nations it is evident that the concept that "eLearning Readiness" is defined by a country's technology adoption is simply not true. The worldwide market for Self-paced eLearning reached $46.9 billion in 2015. The five-year compound annual growth rate is flat at 0.4%%, but revenues will reach $47.9 billion by 2020. [29]

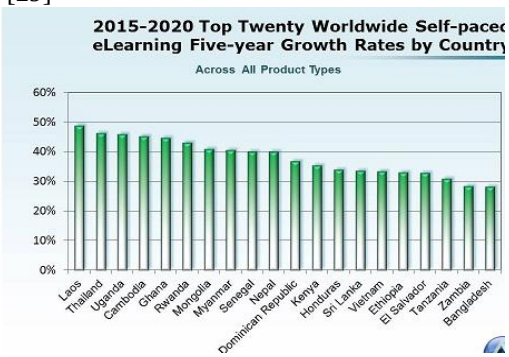

Fig. 5. World-wide Self-paced ELearning Five year growth by region predictions [29]

Growth rate shows how each country adopts eLearning and is a significant indicator since it can reveal revenue opportunities. The growth rate of self-paced eLearning by country is [28]:

- India: 55%
- China: 52%
- Malaysia: 41%
- Romania: 38%
- Poland: 28%
- Czech Republic: 27%
- Brazil: 26%
- Indonesia: 25%
- Colombia: 20%
- Ukraine: 20%

The LMS market was worth $2.55 billion in 2013 with an estimated compound annual growth rate of approximately 25.2% [30]. In other words, the LMS market is expected to worth approximately $4 billion in 2015 and over $7 billion in 2018. The highest proportion of revenue contribution is expected to be generated in North America.The worldwide market for Mobile Learning products and services reached $5.3 billion in 2012 [31]. With a compound annual growth rate of 18.2% for the next five years, it is estimated that the worldwide mobile learning market in 2015 will reach $8.7 billion and it will even reach $12.2 billion by 2017. It is worth to note that while in 2012 the top buyers of mobile learning products and services where US, Japan, South Korea, China, and India, it is expected that by 2017 the top buyers of mobile learning products and services will be China, US, Indonesia, India, Brazil.

Fig. 6. World-wide Self paced Mobile Learning Five year growth by region predictions [31]

The future of mobile learning as a tool for promoting electronic education can be assessed from the picture below.

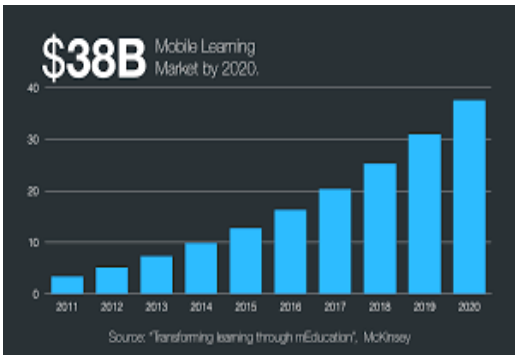

Fig. 7. The future of the mobile learning market[32]

Currently 8% of companies use MOOCs, while another 7% consider to experiment with MOOCs. It is predicted that in the following two years this percentage will rise to 28% [33].

Currently 20% of all formal learning is e-enabled, rising to 57% of all compliance training. Corporate learning is beginning to embrace the concept of MOOCs. On the one hand, they can access a wealth of free, quality content and are realizing the extent to which their staff are engaging in online CPD independently. On the other hand, they are beginning to understand the benefits of

making their corporate learning freely available to the extended enterprise.

Examples: More than 350 companies cooperate with Coursera and Udacity to identify the best students that would probably make the best possible candidates for relevant jobs [34].Google has already enrolled 80,000 of its employees in Udacity's HTML5 course [34]. The online corporate market is expected to grow by 13% per year up to 2017. Today, 77% of USA companies offer online corporate training to improve the professional development of their employees [35]. According to a research conducted in May 2014 [35] "In 1995, only 4% of US companies offered e-learning in their professional development programs – today it is 77%. The entire e-learning market (i.e. not just corporate learning) today is already worth USD 91 billion – It is forecast to grow by over 20% annually up through 2017. The market for corporate e-learning is expected to grow 13% per year up through 2017 3,000 Companies in Europe are involved in the e-learning business. The competition and significant investment will likely give rise to major innovations in e-learning 100 Of India's 140 e-learning companies were founded in the past three years." It is evident that the growth has been even more progressive till 2016. The demand for continuing education changed with Generation Y. Those born after 1980, also referred to as digital natives, have entered the workforce – and they are open for technology trends. They intensively use applications in all situations. They therefore see no reason why education/ learning shouldn't happen online. They are used to having knowledge available anywhere, anytime and tend to look for it at the last minute. They are active in online social networks, but at the same time prefer to learn "face-to-face". A recent study by Allen/Seaman [36] shows that 6.7 million American college students, or about one third, already use online education options – and this figure is on the rise. They take this habit with them into the professional world. The training delivery methods for 2014 were as follows [36]:

- 47% of training hours were delivered by instructor led classroom only setting- increased by 3% as compared to previous year
- 29.1% of training hours were delivered with blended learning methods- increased by 0.8 as compared to previous year
- 28.5% of training hours were delivered via online or computer based technologies (no- instructor)- increased by 2.6% as compared to previous year
- 15% of training hours were delivered via virtual classroom/ webcast only (instructor from remote location)- decreased by 1% as compared to previous year
- 4.2% of training hours were delivered via social learning- increased by 0.9% as compared to previous year
- 1.4% of training hours were delivered via mobile devices- decreased by 0.5 as compared to previous year.

4. Is E-learning Going to Replace Traditional Learning Methods?

With the growing reliance on computers and information technology, we might assume that computer based and online learning had become the rule rather than the exception for work-related training. Especially in the knowledge sector.The truth is a little more complicated. While e-Learning continues to grow in popularity, it's still a long way from taking over as the primary mode of workplace training. One study that examined the training activities of over 1,200 knowledge workers at the end of three year period, found that only 34% had participated in computer-based or online training for work. The following table shows that peer-led and instructor led training sessions and self-training were the far more common modes. [37] There are several advantages of e-learning.Training can be scheduled around work and personal responsibilities. Information can be provided as and when needed and can be accessed wherever a computer with an internet connection is available. Costs for third party trainers are reduced.Costs associated with remote training (travel time and expenses) are reduced. Immediate access to additional online resources can be embedded directly into the training. e-Learning can accommodate different learning styles and support learning with a variety of media. Self-paced learning modules allow workers to learn at their own pace. Instructor led, online training can incorporate chat and bulletin board functionalities that enable workers to pose questions as they arise. e-Learning can make it possible for geographically dispersed teams to meet and train together in a virtual classroom when getting together physically is not feasible. The development of new information technologies in the 21st is expanding the range of information resources; it is also creating conditions for the formation of a global informational, educational and cultural space and therefore changes occur in the education system. Process without integrating new information and communication technologies in the education system. The use of enormous integrated set of computer and internet tools and resources allows us to achieve more efficient and effective training. The students are no longer passive consumers of the educational programs and services, but active participants in the educational process. Their skills and competencies to work effectively with digital technologies are prerequisite for successful and responsible solving and presentation of scientific problems and cases. [38]

5. THE PRINCIPLE ADVANTAGES AND DISADVANTAGES OF E-LEARNING

- More Flexible – eLearning can be done in short chunks of time that can fit around your daily schedule. Unlike public scheduled and in-house training, you don't have to dedicate an entire day to the training that has been organized by your company. Instead, you will have a set amount of learning, normally divided into modules, with a deadline in which to do them in. This way, if you want to do all of the learning in one day as you work better this way, you can. However if your schedule doesn't allow you an entire day off your everyday tasks – then you can easily spend an hour or 2 here and there at times that suit you.
- Mobile – As eLearning can be done on laptops, tablets and phones – it is a very mobile method. Learning can be done on the train, on a plane or any other time that could normally be wasted. Whilst you used to be confined to the classroom, the whole world can now be your classroom.
- No Travel– As just mentioned, eLearning can be done wherever you have a device capable of doing so. Therefore again you can fit it in to your schedule, but also save money on the costs of travel. As mentioned before on the public scheduled blog, external courses can sometimes only be sourced in locations far away from your company so you then have to pay the costs of travel as well potentially accommodation. ELearning takes these costs away completely.
- Lower cost – As you aren't using a trainer's time or any room or equipment, eLearning tends to be the much cheaper option. If you already have a device capable of carrying out the training on, then the savings can be considerable. Therefore if you and your company are on a budget, this can be the ideal option for you. Equally for companies that have thousands of employees then it can reduce the cost per head especially on areas such as Money Laundering, Compliance and Microsoft Office training.
- Tailor it to you – eLearning courses aren't confined to be fixed to try and suit the needs of the majority. If you feel you already know a particular area well and don't need to spend an hour on it again, then you can skim over it and concentrate that time on something you feel you need to work more at. Everyone is able to learn at their own pace – a massive factor that only eLearning can provide for.
- Technological Possibilities – eLearning is fast becoming a more and more popular method and with it, so has the investment into how to improve it further. The computer based nature of training means new technology is being introduced all the time to help with the learning. Different apps are helping to further reinforce the learning whilst forums can be used to greatly increase the amount of interaction and engagement between learners. This is only going to improve as time goes on as well.
- Global – With very few restrictions companies can be confident that their staff can receive the same content regardless of their location, and in many cases, their nationality. Therefore if you wish to provide the same training or have your staff understand and use common methodology, eLearning is a useful way of ensuring this happens with ease and reduced cost.

However like any other technology there are several disadvantages as well.

- Lack of Control– Learners with low motivation tend to fall behind when using eLearning as there are no set times to be doing it and they are responsible for the organization themselves. A lack of routine or fixed schedule can mean eLearning becomes complicated with various deadlines often given to different people at different stages of their learning.
- Learning Approach – It doesn't appeal to all learning styles so some learners will not enjoy the experience – especially strong activists and pragmatists. It is still a challenge to make eLearning appeal fully to these groups as different people learn better or worse using different styles. Some may prefer images, some prefer just reading words and some prefer to talk about or actually do a task in order to learn.
- Isolated – A lot of questions are a lot easily answered when face to face with someone when you can guarantee an instant answer. ELearning often doesn't allow that with trainers often having to answer numerous questions all of the time and only doing it within working hours – where a lot of learners may prefer to do their learning out of working hours. This feeling of isolation can often demotivate individuals as they feel they don't have the support and reassurance that the physical presence of a trainer provides.
- Technology Issues – With heavy reliance on computers that eLearning brings, comes the potential risks that comes with it. Firstly, you need to ensure that all learners have a device that is able to support the training modules. Some eLearning tools require software such as Flash that devices like iPads don't support. So all requirements need to be set out at the beginning. Poor internet connection and unavoidable general random faults also can interrupt learning and so need to be planned around. This is especially true if it is a global roll out as Internet connections and power reliability changes dramatically between countries.
- Computer Competency – Some employees might not be too comfortable using computers, especially if their jobs don't require them to. Therefore even if the software is user friendly, the very idea of using the software can be daunting and demotivating for some. Therefore these employees are likely to learn a lot less than they would from a physical course.

- Social Issues- One of the most important challenge in implementing e-learning or use of technology for education is that most if not all software / applications' user interface (UI) are developed in English. Although majority population of UAE locals speaks and understands English, still in AIS, there were teachers from several nationalities from various Arab countries and many of them can only understand Arabic. Therefore teachers' training to use the classroom management system in English needs to be done or to develop applications and materials to be custom developed in Arabic in order for this project of implementing tablets in classroom for elearning a success.[39]

9. CONCLUSION

In considering the relationship between technologies, pedagogy, and content, it is important to explore how teaching and learning can change as the result of using a particular technology. E-learning has been around for longer than most would realize, though it has just recently become a more popular competitor with traditional classroom learning. Although there are many advantages and disadvantages for both e-learning and classroom learning, the main deciding factor for the use of either is each individual's personal learning style. For some, a flexible schedule, ability to work through problems on their own, and personal motivation seems desirable. E-learning would definitely be suitable for this particular individual. However, if someone prefers working in groups and interacting with other people on a regular basis, classroom learning might have a stronger appeal. Overall, the finishing product is a higher education and a more confident self. Given the speed of change and the resulting need for continual reinforcement and enhancement of employee skills, the important of effective e-Learning can't be overstated. As employers discover more about the advantages of self-directed, just-in-time learning and better understand how people learn online, their ability to use e-Learning as a cost-effective, highly flexible training option will grow. Undoubtedly, certain types of training will always be more effective face-to-face. By embracing e-Learning for routine, skills-based training, employers can offer more focused and impactful experiential learning opportunities when teams are brought together. Governments and donors in developing countries realize the critical importance of education for economic and social development. Many especially in Africa are now implementing ambitious plans to rapidly increase the number of schools. This investment is leading to significant progress in increasing the quantity of schools and students, and the next challenge is to update the curriculum and improve the quality of education. Governments are turning to eLearning in this endeavor. Many have started e-learning programs and are putting computers into schools. [40]

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