Instructional Technology and Effects on IDT Practices
Trends in Instructional Technology: Effects on IDT Practices

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The integration of new technologies such as, cloud computing and mobile devices are transforming, and will continue to transform, education. Instructional technology has evolved over the years to become an enormous part of the education and business industries. This paper will include an overview of instructional design models, theory, and educational technology in the United States and globally. It will also discuss how new technologies like cloud and mobile technology are affecting instructional design technology (IDT) practices and how students learn. An interview with Dr. Terri Bubb, an instructional designer, discussing the future of IDT will be included in this paper.

Instructional Design Models and Theories

In order to understand the pedagogy of instructional technology in education it is important to know the history behind it. Good instructional designers will review the history of instructional technology and research future trends. Over the years various instructional design models have been created to help approach the task of instructional design. While procedures may vary from model to model most models include the following: Analysis, design, development, implementation, and evaluation of procedures. During World War II training materials were created based on instructional principals from theory on instruction, learning, and human behavior. In the 1940's and 1950's psychologists began to see training as a systematic process creating more detailed analysis, design, and evaluation procedures. The focus was on learning objectives and learning outcomes. In the mid 1960's task analysis, objective specification, and criterion reference testing were focused on to create models for the instructional design of materials. In the 1970's many new models were created for the systematic design of instruction (Reiser, 2001).

The 1980's and 1990's brought a focus on computer --based instruction and the constructivist theory which required learners to collaborate with each other, solve real and complex problems, view different perspectives, and be more responsible for their own learning. There was also an increase in the idea of rapid prototyping, which is when the design goes through many rapid tryout and revision stages. While the constructivist approach and rapid prototyping are still a focus of instructional design today, since 1995 there has been a major focus on instructional design procedures for distance learning. Today instructional design focuses not only on the analysis, design, development, implementation, and evaluation processes through the use of technology but also the ethical and legal issues related to online learning and the inclusion of social presence in an online environment (Reiser, 2001).

Instructional Technology

Instructional technology has been defined and re --defined over the years. In the past instructional technology consisted of mainly visual instruction. Visual instruction made up of pictures, films, graphs, charts, and other visual aids. The focus then shifted from visual to audio --visual instruction with the addition of sound. However, during the 1960's and 1970's some educational leaders began to look at instructional technology as a process rather than just relating it to media. It was defined as a process by which technology is applied to instructional practices to achieve learning outcomes (Reiser & Dempsey, 2012).

The definition of instructional technology further transcended in 1994 and was defined by Seels & Richey (1994) as, "the theory, practice, design, development, utilization, management, and evaluation of processes and resources for learning" (p.1). This definition focuses on instructional strategies and instructional techniques. The AECT in 2008 then re --defined instructional technology as the study and ethical practice of the facilitation of learning and the enhancement of performance through the creation, use, and management of technology processes and resources (Seels & Richey, 1994). This definition focuses on the facilitation of learning, enhancement of performance, and ethical standards (Reiser & Dempsey, 2012). Today there is a focus on human performance technology, which focuses on improving job performance using instructional and non --instructional methods (Reiser & Dempsey, 2012).

Current Trends

The current trends for instructional technology in education are exciting. For instance, mobile and cloud computing have created a new platform which allows for unlimited computing resources. Data processing and storage happens in the Cloud outside of the mobile device. These types of resources not only save educational institutions money by cutting back on hardware but also keep students engaged outside the classroom. Students can access data any time and from anywhere through mobile devices. Amit Garg the co --founder and director of Custom Learning Solutions predicts the following trends in instructional technology over the next 5 years

- Mobiles become platform of choice;
- Increase of performance support: Using mobile devices to access content when needed and augmented reality to recognize live objects and then activate videos;
- Evolution of the LMS: Learning components become more supportive and less managed;
- Games and simulations become a more central part of learning in the workplace;
- Creation of new authoring tools: Allowing the easy creation of application scenarios;
- Personal Learning Agents: Personal learning software agents that act as learning content mediators; (Garg, 2014).

Future of Cloud and Mobile Technology in Education

The cloud and mobile technology are transforming the education field. One reason for this is the emergence of the cloud with its ability to store large amounts of data for retrieval and editing from anywhere at any time. Another reason is the popularity of mobile devices that allow portable access to the cloud from anywhere at any time. These technologies are changing the teaching and learning process in the educational field. Since students are able to access learning resources outside of the classroom by using mobile devices and the cloud they have more responsibility for their own learning. Moreover, the teaching process changes by allowing teachers to become more innovative with teaching methods.

Cloud and Mobile Technology in Education: Global Perspective

Today's world is characterized by digital technology and the need for resources to accommodate these types of technologies is increasing. Mobile devices have become popular in the U.S. and around the world. In many countries outside the U.S. students do not have access to computers, but they do have mobile devices such as cell phones and tablets (Ally & Samaka, 2013). For example in Africa many people have never had access to a computer, but are currently accessing the Internet through cell phones (Scharff, 2014). These mobile devices present many opportunities to students for both formal and informal learning (Scharff, 2014). In addition, students are able to access learning materials 24 hours a day, 7 days a week (Ally & Samaka, 2013). Mobile learning makes it easier for students to learn when they want to and is accommodating to different learning styles.

The emergence of cloud technologies has caused the explosion of mobile devices. The cloud allows students to perform the following tasks, retrieve learning resources, and edit and store documents. Students can perform these tasks from their mobile device at any time and from anywhere (Ally & Samaka, 2013). They do not have to worry about having enough storage space on their mobile device because documents are stored in the cloud. Mobile technologies allow students to have a more personalized learning experience. It also affords a customizable teaching process to educators. Educators can use interactive media to change the level of difficulty. They can give individual feedback to students and customize the learning process for the learner.

Through the use of mobile technologies students are able to generate content and connect with their peers. Also, by using cloud computing with a mobile device there is no need to worry about downloading programs that consume a lot of memory. Students can access programs without having to download them and there is no limit to how many students can access the program at the same time. Security and privacy issues can be taken care of by the employment of a mobile device management solution, which is hosted in the cloud (Scharff, 2014).

Meeting Current and Future Demands in the Field of Education

Nathan Bell is the Director of Products and Marketing for Telstra Global. He states that internet --connected devices will exceed the population of the world by 2017 (Bell, 2014). Mobile devices offer educational institutions innovative ways to teach and learn that improve learner performance (Global System for Mobile Communications, 2012). The demand for mobile technology will increase in the future and so will the demand for cloud services. International Data Corporation's (IDC) research found that public IT cloud services revenue for 2010 surpassed $21.5 billion dollars. They predict that revenue will increase in 2015 to $72.9 billion dollars (IDC, 2014).

The use of cloud computing is increasing largely due to the fact that mobile devices have become more affordable and through the implementation of Bring Your Own Device (BYOD). BYOD has already been implemented in some educational institutions today as a way to save money on school resources. BYOD encourages students to bring their mobile devices to school to use for educational purposes. Students usually bring their mobile devices to school anyway and this saves educational institutions money by eliminating the need for hardware resources. Using the cloud also saves schools money by further eliminating the need for hardware resources.

There have been several initiatives put in place to help foster the use of mobile devices in educational settings. Initiatives such as, providing students with laptops or tablets and there is also the BYOD initiative. Newer technology like Google Chrome --Book provides the user with tools and content by accessing them through the cloud. Mobile campus applications are also a new trend that is gaining recognition. These applications are often linked to an educational institutions learning management system (LMS) and provide students with access to the LMS and resources through the use of mobile devices (Global System for Mobile Communications, 2012).

Some key players in the mobile education market that are changing the future of education and driving the demand for mobile and cloud technology are Apple, Pearson, Blackboard, and Google. Apple distributes educational materials through their App Store and the creation of the iPad has accelerated the use of mobile devices for educational purposes in and out of the classroom. Pearson is a global education company whose service brings digital content to mobile devices and provides for learner assessment. Blackboard created a mobile LMS and application package. Some other players helping to shape the future of education are Sony, Amazon, Microsoft, Barnes & Noble, Inkling, Studycell, and GoKnow (Global System for Mobile Communications, 2012).

Four components are required for mobile learning to take place, mobile devices, infrastructure, content, and distribution of resources. Devices include cell phones, mp3 or mp4 players, tablets, notebooks, laptops, eBook readers, game consoles, voice recorders, and assistive technologies. The infrastructure component consists of connectivity providers. Content providers can be a small or large company, the government, educational organization, institution, individual or group, learner, or educator. Distribution of content can be done through an App store such as GetJar or accessed through the cloud. The demand for mobile education stems from employers, training providers, educational institutions, and even the government. Globally there has also been an increase in educational conferences, discussion blogs, and academic papers focused on the future of mobile education and mobile learning. The International Journal of Mobile and Blended Learning is focused on researching, developing, and applying mobile learning (Global System for Mobile Communications, 2012).

The ways that mobile devices and cloud computing are changing the teaching and learning process can be seen everywhere. In South Korea the Ministry of Education, under the Smart Education Strategies Plan, will provide all middle and high school students with access to digital textbooks. All textbooks will be digital only and all learning materials will be accessed online through computers and mobile devices by 2015. Learning materials will be accessed through a cloud computing system and all schools will have wireless networks that support the cloud. In addition, smart education training will be given to 25% of all teachers each year and they will be given smart teaching devices. Smart devices will also be given to students with disabilities and students that come from low --income households (Guo, 2011).

The Impact of the Cloud and Mobile Devices on IDT Practices

The cloud and mobile technologies are having a tremendous impact on the instructional design and technology (IDT) field. These technologies are changing the teaching and learning process in the educational field. Since students are able to access learning resources outside of the classroom by using mobile devices and the cloud, they have more responsibility for their own learning. Moreover, the teaching process changes by allowing teachers to become more innovative with teaching methods.

Structure, Role, and Cost of IDT Teams

The addition of cloud and mobile technology brings many changes to the IDT field. The cloud provides an enormous amount of storage space in which data can be stored, accessed, and edited. This is a great concept, especially for mobile device users since most mobile devices do not have a lot of storage space. Mobile devices include iPads, cell phones, and smart phones. The cloud allows mobile device users to access large applications like Microsoft Office without having to download it on their device. Without the cloud mobile device users would not have access to many popular software applications that are used today. The cloud also allows mobile device users to access these applications from anywhere and at any time.

As for the structure of IDT, the demand will increase for the delivery of education on mobile devices. Hence, it will not be long before mobile technology becomes the preferred method by which student's access educational resources. An example of this is the fact that today in some countries students are using mobile technology as a first choice instead of purchasing a computer. Therefore, instructional designers will focus more on the creation of strategies to implement mobile learning on a grand scale in educational institutions and other organizations (Ally, 2012).

The increased use of mobile technology will increase the need for cloud technology. The CEO of Google Eric Schmidt (2010) stated that we create an average of five exabytes of data every two days (Siegler, 2010). He predicts that by 2015 information that can be accessed on the Internet will double every eleven days (Ally, 2012). In order for students to stay current with information for their chosen field of study, they need to have access to current relevant information at all times (Ally, 2012). In terms of education, this puts even more pressure on instructional designers to make sure that new information can be accessed at all times through mobile devices and from anywhere through the use of the cloud.

The role of instructional designers will also evolve as the demand for cloud and mobile technology increases. Instructional designers will create more personalized student instruction that will be stored in the cloud and will provide students with better learning experiences (United Nations Education Scientific and Cultural Organization, 2013). The traditional education system was designed a long time ago and does not meet the need for flexibility that mobile learning requires (Ally, 2012).

Instructional designers in the education field currently create and deliver educational content and materials; engage with content experts; set standards for course design; serve on curriculum committees; review and revise curriculum content; and collaborate with technology departments, administrators, teachers, students, principals, deans, and more (Rafferty, 2014). However, since cloud and mobile technology are becoming so popular instructional designers will now have to learn more about mobile devices and cloud computing. They will also have to work with other professionals in the areas of mobility and cloud computing (Ally, 2012).

Instructional designers will need to focus on new strategies of designing instruction that can be accessed using mobile devices and cloud technology. Designers that can build and deliver applications that are accessed through the cloud will be in high demand in the industry (Forbes, 2012). In addition, instructional designers will fully incorporate the facilitation of learning communities in design specifications. Learning communities allow students to interact and learn from one another. Cloud technology will provide students with learning communities where they can receive support at any time and from anywhere no matter where they live (Ally, 2012).

The cost of IDT will not outweigh the benefits received by shifting the focus of instructional design to using cloud and mobile technologies. In order to make education available to everyone, everywhere, educational institutions must embrace the use of cloud and mobile devices. Some major reasons why students do not have access to receiving an education is the lack of funding for hiring and training new teachers, and the inability to find the funding necessary to build new schools and maintain them (Ally, 2012).

The money saved not having to purchase hardware, software, and IT resources by using the cloud will free up more funding for teacher training and other educational resources.

Implications of Course Development and Training

Courses will be developed for mobile accessibility and accessed through the cloud by students from around the world. There will also be an increase in Massive Open Online Courses (MOOCs) which are accessed through the cloud (United Nations Education Scientific and Cultural Organization, 2013). One current barrier to education in the U.S. and developing countries is the lack of teacher training with the technology already in place in the education system (Ally, 2012). This is also the case of what is happening now with the explosion of mobile devices and the cloud. Therefore, more strategic training programs will need to be put in place for teachers in order to provide them with the necessary skills to implement mobile learning.

Impact on Return on Investment for Schools and Other Organizations

Mobile technology is becoming increasingly popular among students and among employees in other organizations. The demand for mobile technology will increase in the future as mobile devices become cheaper and the cloud continues to grow (Hinchcliffe, 2011). The use of mobile devices and the cloud in educational institutions will show an excellent return on investment and the same will be true for other organizations implementing these technologies. The cost of mobile devices has been on the decline and is predicted to continue to become even cheaper to purchase in the future. For example, globally tablet sales increased 261.4 percent in 2011 and are predicted to continue to grow through 2015 (Gartner, 2011).

Additionally, the use of the cloud saves organizations money by not having to purchase extra hardware and software and not having to hire more IT staff to maintain it. Currently the use of cloud computing in organizations is on the rise for non -mission critical applications because of storage capacity and cost savings. More benefits of using cloud technology are increased agility, vendor choice, and next --generation architectures (Hinchcliffe, 2011).

Evolving IDT Practices in Education and Other Industries

Instructional design technology (IDT) practices have changed over the years and with the increase of instructional technology resources and the demand for online instruction more changes are evident. Cloud and mobile technologies are major contributors to the changes taking place concerning IDT practices along with the increase in online courses. In addition, there are other new technologies on the horizon that will play a major role in changing IDT practices such as, gamification, which is the process of applying game design principles to non - game applications to make them more engaging. Instructional designers will need to produce higher --quality courses in order to meet learner needs in the future (Shaw, 2012).

In the past instructional designers have played a behind the scenes role in instructional design by focusing on designing learning materials, but the future will call for instructional designers to play more of a leadership role by providing vision and framework that will aid in the evolution of IDT. A focus on new instructional delivery methods like cloud and mobile technology will be necessary in order to assure access for all learners. The successful transition of new instructional delivery methods will depend on the IDT practices of future instructional designers (Shaw, 2012).

There are many different instructional design models and theories available to aid instructional designers in the design process. A popular design model used today is the ADDIE model and one theory that has gained more popularity over the years, with the evolution of technology, is the constructivist theory. In order for IDT to progress into the future instructional designers must continue to research and envision new design models and theories.

Changes in IDT Practices, Models, and Theory

The roots of instructional design (ID) stem from educational psychology and academic IDT programs today continue this affiliation. However, through the integration of instructional technology grew the creation of additional procedures, models, and strategies designed to meet pre -defined educational outcomes. For example, the ASSURE design model focuses on the implementation of technology into the curriculum. Today the focus of IDT is on training and adult learning environments, concentrating on human performance in the work environment from the K12 level through college (Wilson, 2005).

IDT research is an important and ongoing process in which the learning sciences have become a part of. IDT graduate programs focus on practitioner concerns of use, design principles and practices, and non-psychological bases for theory development. The learning sciences graduate programs focus on cognitive --science, prototype tool and environment development, and basic theory and research. The continued growth of graduate learning science programs in education prove that the correlation between educational psychology and learning --theory principles to learning technologies is important in the design of instruction (Wilson, 2005).

An Instructional Designers View on the Future of IDT

Below is an interview with Dr. Terri Bubb, PhD, an instructional design instructor at Keiser University. The interview discusses Dr. Bubb's thoughts about how IDT practices are changing and will continue to change across industries as a result of evolving IDT practices, models, theory, and advancing technologies. Listed below are Dr. Bubb's responses to questions involving changes in IDT practices:

Interviewer: How do you think IDT practices will change the education industry as a result of evolving IDT practices, models, theory, and advancing technologies?

Dr. Bubb: "What I see in industry when attending conferences, especially in higher education, is that they are starting to see a need for us. In higher education you don't have to have a teaching degree like you do in k -- 12, because most professors are brilliant in their field, but may not have instructional designing experience. In relation to online learning this need increases to help professors learn how to design instruction or teach a concept". An example of this might be a cosmetology course: The instructor may know how to cut hair, but needs to know how to present this knowledge to students so that knowledge transfer takes place (T. Bubb, personal communication, April 10, 2014).

Dr. Bubb: "I see more of a push towards self --directed and personalized learning. We can now do more with LMS's and students can take more responsibility for their learning. I see more of a push towards flipping the content. We should be implementing having students research the internet for higher level content and use higher --order critical thinking skills (especially for undergraduates). We should add supplements to online courses and have students' research content before coming to class again. I would use discussion questions to help facilitate student's research. This way students' would already know the basics of the subject being taught before coming to class. Then during class discussion we would be able to dig deeper into the subject and students would be able to discuss more pertinent information regarding the subject." (T. Bubb, personal communication, April 10, 2014).

Interviewer: How do you think IDT practices will change other industries as a result of evolving IDT practices, models, theory, and advancing technologies?

Dr. Bubb: "I am seeing a push because of standardized testing. Standardized testing doesn't work because there is no problem --solving edge. Real life is not a multiple choice question. There is a push for IDT to design quality instruction in higher education and K --12 to make sure students can critically think, work in groups, and communicate effectively." IDT also needs to help teachers plan courses more effectively because there is always not enough class time. We need to work smarter, not harder" (T. Bubb, personal communication, April 10, 2014).

Interviewee: What IDT practices, models, and theory do you think will have the most impact on the evolution of IDT?

Dr. Bubb: "Businesses need to understand the difference between instructional designer in educational institutions and businesses. In businesses everything is the same and they want the same course content or book to be used, but in education we know everything is different. As an instructional designer in the education field if I don't take into account the faculty and what they say should be included in the design they will not like it and disengage. They need to have an instructional design that works for them and for their students. I could design without their input, but if it doesn't work for them then it would never be used" (T. Bubb, personal communication, April 10, 2014).

Interviewer: What new or emerging technologies do you think will have the most impact on the evolution of IDT?

Dr. Bubb: "We are beginning to see how web 2.0, the cloud, and even the beginning stages of web 3.0 which using tagging for more personalized learning is effecting IDT. Avatars and the use of smartphones are also being used more. In the education industry we need to see that technology is our friend not our enemy. With technology use students take a more active role in their education. However, it is hard still for some professors to let go of control and technology is sometimes feared" (T. Bubb, personal communication, April 10, 2014).

Interviewer: What do you think of mobile devices like cell phones being used in the classroom for educational purposes? In some countries this is already being implemented.

Dr. Bubb: "I hope so. We need to embrace technology more. For example: teachers could create a general twitter account for their class and show it on the projector. Then have students tweet a question during a class discussion if they have one. Another example would be polling on the cell phone. Students like this and they can remain anonymous. Teachers can use polling to prove that information that student may have about a subject that is preconceived is not true and because students remain anonymous they don't get embarrassed. We can still have guidelines for classroom management to help ensure that students are using their cell phones for educational purposes" (T. Bubb, personal communication, April 10, 2014).

Evolution of the Educational Industry as a Result of Changes in IDT Practices

Currently instructional design technology (IDT) faces some threats to coherence in the field. These threats consist of loss of control from growth making it hard to follow trends and theory development; Encroachment from related fields as more researchers from other fields engage in IDT development; Evolving technologies and new ID models; specific focus on population, education versus corporate, navigating away from IDT general principals; Performance concerns regarding informal learning and workplace performance influencing IDT practices; Competing instructivist and constructivist paradigms; and difficult knowledge base because IDT rules and theories are not specific (Wilson, 2005).

Today design in the education industry is human --centered, social, and rooted in technology and science (Norman, 2014). The high demand for online learning which usually includes social media proves this statement. This is also evident because, as Dr. Bubb stated in her interview, industry is pushing for IDT to design quality instruction in higher education and K --12 to make sure students can critically think, work in groups, and communicate effectively.

Evolution of Other Industries as a Result of Changes in IDT Practices

Currently ID in business and industry focuses the transfer of knowledge to employees, job performance improvement, and solving organizational problems. Instructional designers in business and industry often must contend with producing instruction that is better, faster, and cheaper. The corporate environment defines the role of the instructional designer and the design process (Reiser & Dempsey, 2012).

Justin Brusino (2012) is the community of practice manager for learning technologies at the American Society for Training & Development. When asked how he sees the learning profession changing in the next few years he stated the following:

I see the learning profession dropping the 'learning' and opt into operations. I believe the technology will be so overwhelming that those who can't leverage what businesses are already implementing within their core won't have a place within the organization. As a result, learning professionals need to become aware of "operations" and how they can assist in the overall performance of the system as opposed to a focus on performance of individuals. (Brusino, 2012)

Justin Brusino's statement gives merit to Dr. Bubb's response that businesses need to understand the difference between instructional designer in educational institutions and businesses. She stated that in businesses everything is the same, which calls for the same course content or book to be used. In the education industry learning is more personalized focusing on the learner.

The Effects of Changing IDT Practices on Learners

As IDT continues to evolve various design models and theories will continue to be researched and implemented. The design model that is used has an effect on student learning.

For example, the ASSURE model focuses on the technology to be implemented, were as the ARCS model focuses on motivating learners (Kumarawadu, n.d). Design models such as, the Attention, Relevance, Confidence, and Satisfaction model (ARCS), which focuses on student motivation, will have an impact on how students learn. Other IDT practices such as, theories used in design, technologies that are selected and used in instruction, and how instructional materials and technologies are facilitated will also have a tremendous effect on student learning.

Motivational Design

Motivation in learning is important and can be intrinsic or extrinsic. An example of intrinsic motivation is when a student sets their own educational goals. An example of extrinsic motivation is when a student needs to learn new skills for monetary reward. The ARCS model encourages collaborative learning and it has been proved that collaborative learning has positive effects on motivation (Kumarawadu, n.d.). Learners often find independent work boring and lose interest (Kumarawadu, n.d.). Therefore, it is important that online content be presented in a way that motivates learners (Kumarawadu, n. d.). Motivation plays an important role in retention. Simply by informing learners of the expectations of the course can motivate them in various ways. Other powerful motivators are making learning fun and interesting to students. This can be done by using real --world applications and including student collaboration (Kumarawadu, n. d.).

Motivational design is the process of arranging resources and procedures to create changes in student motivation (Kumarawadu, n. d.). Motivational design can be used in an educational or work environment to help improve student learning (Keller, 2013). It can also help to improve the individual's self -motivation skills (Keller, 2013). ARCS is a systematic problem --solving approach and the process includes: identifying the elements of human motivation; analyzing audience characteristics; Identifying characteristics of instructional materials and what stimulates motivation; selecting motivational methods; and applying, and evaluating motivational methods (Keller, 2013). Motivational design connects instruction to learner goals providing learner stimulation, challenge, and influencing the learners' feelings of goal achievement and failure (Keller, 2013). The ARCS model is used by teachers and trainers in educational institutions at all grade levels and for adult learning in corporations. It is also used in government agencies, and nonprofit and military organizations (Keller, 2013).

Constructivist Theory

IDT Theory has a major impact on how students learn. The theory that the Instructional designer selects to implement in the design process will determine how students learn. For instance, if the behaviorist theory is followed then the learners characteristics, temperament, personality, and environment is focused on during the design process and the learners progress is placed mostly in the teachers hands (Hall, n.d.). However, if the constructivist theory is followed during the design process then learners become more responsible for their own learning (University College Dublin, n.d.). With the constructivist theory learning is more hands --on, collaborative, and real --world based (University College Dublin, n.d.).

Technology

The technologies selected for instruction and for student use will also have an effect on learners. For instance, eLearning is popular across the globe and with new eLearning technologies and pedagogies emerging its effectiveness will increase. These technologies are inter --cultural, and provide learners with formal and informal learning, and twenty --four hour access (Kumarawadu, n. d.). Some other technologies IDT is using that also affect the way students learn are gamification, cloud, and mobile technology. Gamification helps to motivate students and is the process of incorporating game elements into a non -game setting (Lee & Hammer, 2011). For example, a New York charter school uses game design to organize the framework for teaching and learning. Teachers and game designers work together and add game elements to all curriculums (Lee & Hammer, 2011).

The cloud provides educational and business environments with resources to store and maintain applications and resources that are needed by their students or employees. Cloud technology affects the way students learn in a positive way. Students are able to access resources from anywhere and at any time. Another technology that has affected the way students learn that is becoming more popular is mobile technology. Students are always on their cell phones or mobile devices. Making learning materials available to students on their mobile devices and through cloud services provides strong motivation for students and affects their learning. Students from low --income areas are also affected by mobile technology, because many do not have computers at home, but often have cell phones. Mobile devices allow students to have access to learning materials outside of the school's walls.

Lastly, the way IDT delivers learning materials to students affects their learning. The eLearning technologies must be reliable and robust (Kumarawadu, n. d.). There must be equal access for all students and there should be careful selection and use of technology. Technological support of e --learning areas needs to be present and the integration of different platforms needs to be included in the design process (Kumarawadu, n. d.). Finally, learning activities should be automatically timed and location aware (Kumarawadu, n. d.). Cell phones have GPS location awareness technology and provide opportunities for students to learn content in a different way (The Pennsylvania State University, 2007). Location aware technology pinpoints its own geographical location (The Pennsylvania State University, 2007). A good example of using location aware technology in order to maximize student learning is: Relate history events to points on a map to navigate content and discover relationships (The Pennsylvania State University, 2007).

Summary

Instructional technology has been used in education for many years now. However, it has slowly evolved to be the intricate part of education that it is today. Starting out introducing visuals to the learner. Then adding voice and eventually interactive media such as, videos. Now with the addition of technology like the Cloud and mobile devices instructional technology is breaking the down the boundaries and allowing learning to take place outside the classroom. These technologies are focusing on transformation of education in the future.

Since mobile technology and cloud computing has emerged in the education field, the teaching and learning process has undergone a huge transformation and is still transcending. The increased demand for these technologies can only mean the future growth of them. Mobile devices and cloud computing allow students to access educational resources from anywhere and at any time. This means that students have access to resources outside the classroom walls. Having unlimited access to resources encourages students to take more responsibility for their learning.

The continued creation of App Stores, mobile campus applications, and mobile devices proves that mobile technology is here to stay and is still evolving in the U.S. and all over the world. The popularity of mobile devices exists even in developing countries where mobile devices are now popular because the cost to purchase them has dropped. Moreover, cloud computing will also continue to evolve because of the high demand for mobile technology, large data storage space, and quick access to data. Educational institutions continue to invest in mobile and cloud technology because these technologies bring opportunities to reach more students and cut costs on resources like hardware needed, IT hardware and software maintenance, and IT staff.

There are great changes in IDT going on in the education field as well as in other organizations since the introduction of mobile devices and the cloud. It is predicted that these technologies will continue to evolve and help transcend instructional design, educational institutions, and the business environment. The structure of IDT and the role of IDT professionals will also continue to change as mobile devices become more popular and the demand for cloud technology increases. Furthermore, instructional designers will take on more of a leadership role in educational ID in the future, helping to provide the framework and guidance for change in the field.

IDT professionals will focus more on creating content that can be accessed by mobile devices and cloud technology for the delivery of that content. The future of IDT will be one that focuses on mobility and availability. Using mobile devices and cloud technology in educational institutions will save money and in the long run provide results for a positive return on investment. Additionally, the changes that take place in educational institutions because of these technologies will provide students with the best possible education and instill in them a desire for life -long learning.

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