

# Learning Theories Associated with Computer Assisted Instruction

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本論文は教育に不可欠なツールとしてインターネットとWEB2.0のプログラムに焦点をあてています。教師はどのソフトウェアを使うのかはもちろん、コンピューターの操作方法を理解することを要求されます。これらの基本的な問題点への理解を通して、教育プログラムは様々なステージでの学習において学生に適応させることができます。まず、この論文は学習理論に焦点を絞り、伝統的教育を現代の技術的なプログラムと結合させます。次に、なぜインターネットとWEB2.0のプログラムが実行することができるのか教育者に示します。最後に、また教室内へのコンピューターの取り入れ方はどのようにすべきか考慮する必要があります。

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## Introduction

In this modern time of the information age, the classroom has become a place for knowledge to be distributed in new and exciting ways. Developing understanding of various topics can be sought through looking beyond the basic pedagogical approach of composing information on the chalkboard. This paper encourages teachers to support the use of the internet and Web 2.0 programs as an essential tool for conducting authentic learning. Effective education programs are ones that can reflect what is happening in society. This indicates teachers are required to be able to understand 'how' to operate the functions of personal computers. Just as important as to 'what' they should teach, in order to accommodate the needs of students at various stages of learning. This study will pay attention to combining the foundations of traditional education with modern technical programs. Furthermore, it will indicate considerations educators should take in providing the internet and web 2.0 programs. Finally, concentration on how to incorporate the computer inside the classroom will be addressed.

## The Background to Learning theories :

As mentioned in the introduction the principles of combining learning theories appears to require balancing different schools of thought. According

to Sfard (1998) who indicates objectivists and constructivist identify language learning as either 'acquisition' or 'participation', yet underlining both opinions is the fact that learning is taking place, despite disagreement on the nature of learning origins.

A decision that lies with the teacher is whether to adopt a directed approach to instruction. This involves traditional cognitive drills and practice activities to develop learning one step at a time, otherwise, to oppose these styles and opt for an inquiry-based learning program. This is where the learner formulates problem solving tasks in order to discover deeper levels of thought. Irrespective of the approach adopted, it appears the teacher can adapt programs and activities in either directed or inquiry-based programs on the internet (Roblyer and Doering, 2010).

Looking closer at directed learning theories Roblyer and Doering identify the following points :

- *Skills and content to be learned are clearly defined, concrete, and unambiguous, and a specific behavioral response can indicate learning.*
- *Students need individual tutoring / practice to learn and demonstrate prerequisite skills.*
- *Students need to acquire skills as quickly and efficiently as possible.*

(Roblyer and Doering, 2010, p.36)

An example of when direct methods would be an apparent advantage is in the case of looking to improving areas such as foreign language speaking skills. Clearly, all of the above prerequisites to acquiring linguistic abilities exist in the three points mentioned above.

Furthermore, Finger, et al (2007) suggest the foundations of directed theory stem from a range of theoretical proposals. The first being behaviorist concepts, derived from Skinner's (1938) proposal of 'operant conditioning', which focuses on a reward for achievement with goals that can be measured.

Finger, et al (2007) identify 'cognitivism' as the second directed theory with Atkinson and Shiffrin's (1968) work on cognitive mechanisms that allow the brain to process information. This course of action takes information from the short term memory and transfers it into the long term memory. This process is a way the brain constructing information into the learner's memory recall. The final direct learning theory is proposed by Gagne (1985) who produced a 9 step plan of action for teachers. This proposal includes the following issues educators need to consider :

1. *Gaining attention*
2. *Informing learners of objective*
3. *Stimulating recall of prerequisite learning*
4. *Presenting new material*
5. *Providing guidance*
6. *Eliciting performance*
7. *Providing feedback*
8. *Assessing performance*
9. *Enhancing retention and recall*

Changing the focus away from directed learning theories, the focus will now pay attention to Inquiry-Based or Constructivist views. Inquiry-Based learning has been considered by Roblyer and Doering, (2010, p.42) they make the following suggestion to including computers in progressive education :

- *Concepts to be learned are abstract and complex ; teachers feel that hands-on, visual activities are essential to help students see how concepts apply to real-world problems and issues*
- *Teachers want to encourage collaboration and / or allow alternative ways of learning and showing competence.*
- *There is time to allow unstructured exploration to motivate students and help them discover their own interests.*

Finger, et al (2007) consider 'constructivism' as a function of triggering one's personal experiences and sharing those accounts with a group. By doing this, the participants can understand ideas or concepts through real life events which they can relate to. 'constructivism' emerged from the studies of influential researchers who include the famous epistemologist Jean Piaget (1972) and his theories of developmental stages, along with Merlin Wittrock's (1990) generative learning theory, Jerome Bruner's (1961) discovery learning theory and Collins and Duguid's (1989) situated learning. An example of how to recreate issues and turn them into genuine problems solving topics can be found at the radical parenting website in the bibliography.

Continuing on with the constructivist perspective comes from the work of Vygotsky (1978) who saw 'social development' as an action which occurred from mixing with people. He saw that when socializing with others we pick up their traits, habits and skills. An example of how Vygotsky's 'social development' theory could be used in the classroom is through websites such as, Moodle, Web Press or any Yahoo online forums. Through social networks students can log on then leave comment on each other's entries. This activity would encourage copying each other's style of writing. Below is a popular blogging site many bloggers actively use.

The final area of constructivist views of learning concerns itself with 'connectivism'. This has been described by Siemens (2004) as a way of sorting out the mass of information internet users are bombarded with. Because there is so much information on the World Wide Web, it is

important to be able to connect ideas. Teachers could introduce this concept in the class by dividing issues up into sections. An example would be to distinguish between local news, domestic news and international news. The teacher may also provide opportunities for students to sort out this information by setting Webquests. A link to Zunal Webquest is provided in the bibliography.

As mentioned in the introduction, this paper supports the combination of both directed and constructivist frameworks which Roblyer and Doering (2010, p.45) point out provide the following advantages of doing so :

- *Integration to generate motivation to learn*
- *Integration to optimize scarce personnel and material resources*
- *Integration to remove logistical hurdles to learning*
- *Integration to develop information literacy and visual literacy skills*

### Learning Theories with the assistance of the Internet

In the next section of this paper, consideration will be given to the different mechanisms the internet can provide the user. Roblyer and Doering, (2010, p.p.77-97) illustrate five instructional activities provided through the following software functions. First, *'Drill and Practice'* they are arrangements sites with activities that displays correct or incorrect answers upon responding. These *'Drill and Practice'* activities can be an effective tool for improving touch typing keyboard skills, developing vocabulary and in preparing for tests or exams. In addition, *'Drill and Practice'* can be performed without teacher supervision, therefore freeing up the teacher's time, so they can spend more time on other duties in the classroom. Second, *'Tutorial Software'* which as the name suggests guides the user through either a straight forward step-by-step tutorial or through a branching tutorial with offshoots for opportunities to answer questions while proceeding in alternative routes. Although there are certainly benefits for the use of tutorial software, it appears there lacks

enough scope for undertaking personal course of learning, because the information is confined to the instruction. In the case of tutorial offshoots, flexibility to follow the user's intentions might not be available. At times when flexibility for learning is not present then Inquiry-Based learning is marginalized. Third, *'Simulation Software'* takes the user through technical tasks like they are in a real situation. These software produces can make the unbelievable, believable and the impossible, possible, so having students achieve tasks thought out of their reach is a powerful way to make learning enjoyable. Also, *'Simulation Software'* has the added advantage of providing opportunities for people who thought they could not otherwise achieve tasks, such as those with disabilities. As a precaution, teachers may want to make sure simulated programs are not misused. Fourth, *'Instructional Games'* are fun learning experiences through challenging activities with structured competition. Undoubtedly, if the learning process is fun, there will be motivation to learn. Finally, *'Problem Solving'* programs require the user to search out and discover answers. The teacher might want to consider encourage the students to share the method of how they reached their goals so as to assemble the learning as a group activity.

Furthermore, Roblyer and Doering, (2010, p.77) recommend directed or constructivist activities from the five software functions mentioned above :

Software Function	Activity	Directed or Constructivist
1. Drill and Practice	Cool Math	Directed Strategy
2. Tutorial	Study Ladder	Directed Strategy
3. Simulation	SimEarth	Constructivist Strategy
4. Instructional	Geography Games for Kids	Directed Strategy
5. Problem Solving	Plato Learning System	Constructivist Strategy

(Links to the above activities can be in the bibliography).

## Improving Learning through Technology

Increasing the amount of potential learning in the classroom is the reason for using a computer in school programs. If the computer was not a necessity and was only being used for fun to entertain the students then it would be an inappropriate tool. It would be better to save the schools money and go back to the basics of using cheaper traditional teaching methods. According to Finger and Grimmett (1993, cited in McInerney and McInerney, 2002) they adhere to the usefulness of computers for the following three reasons, first, '*as a personal amplifier*', relating to the amount of output (work) produced by the user. Second is, '*as an educational actualiser*', this refers to the ability to cultivate real learning. And the Final point, '*as an intellectual tool*', meaning the user can gain deeper understanding of topics.

The teacher can devise a plan of action for introducing the computer into the classroom by following the Roblyer and Doering, (2010, p.p.50-51) recommended six phases called the 'Technical Integration Planning' (TIP) model. This plan integrates the computer into the classroom follows the course of action below :

- Phase 1. Assess Technological Pedagogical Content Knowledge*
- Phase 2. Determine relative advantage*
- Phase 3. Decide on objectives and assessments*
- Phase 4. Design integration strategies*
- Phase 5. Prepare the instructional environment*
- Phase 6. Evaluate and revise integration strategies*

Student's using computers in the classroom is referred to as 'Computer-Assisted-Instruction (CAI). The benefit of CAI includes aiding or boosting learning, providing immediate responses while it can enrich programs. In addition, the user can proceed through the activities at their own pace from one stage to the next. It is recommended the student should still be actively participating throughout the passage of the program. An example of not actively

participating is in paired keyboard typing practise. The inactive student cannot progress, because there is no cognitive development taking place from only watching. Furthermore, if the program does not provide feedback in an adequate timeframe then the understanding of the task is at risk of not being comprehended (Roblyer and Edwards, 2000, p.86, cited in McInerney and McInerney, 2002).

In the above paragraph, it recommended the student was required to be actively involved in hands on activities throughout the learning process. Alternatively, there are approaches recommended by Polin (1992, p.7) who identifies group learning as 'shared or distributed intelligence' whereby the learning environment can be inside the class or it can transcend outside of the classroom to connect with people who are online anywhere around the world.

An example of a globally connected website has been put forward by Copen, (1995, cited in McInerney and McInerney, 2002) who identifies the program called '*I\*earn*' (referring to I learn) as a platform to interconnect. '*I\*earn*' goes into regions all over the globe, and is suitable for learners of all ages from kindergarten to adult. This program promotes intercultural understanding and can promote information on humanitarian issues.

## Conclusion

This paper addressed learning theories associated with traditional versus modern Inquiry-based schooling. Fundamentally, considerations for facilitating CIA needs to maximize learning principles in order for authentic learning to take place. Furthermore, the essence of classes reflecting society relies on the teacher's choice of programs to engage students, while providing them with the foundations of learning. These learning principles have not changed with the addition of CIA. The only thing which has changed is the appearance of the classroom. This modern look will encourage development of knowledge, while looking into topics

with greater accessibility for research. In the future, hopefully there will be no child left without access to the internet as well as skills to be able to operate its functions. These CIA skills will promote enriching experiences throughout the years of schooling and beyond.

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## Links :

Cool Math :

<http://www.coolmath-games.com/>

Facebook :

[www.facebook.com](http://www.facebook.com)

Geography Games for Kids :

<http://www.kidsgeo.com/geography-games/united-states-america-map-game.php>

I\*earn :

<http://www.iearn.org/>

Khan Academy :

<http://www.khanacademy.org/video/21st-century-challenges--royal-geographic-society?playlist=Khan+Academy-Related+Talks+and+Interviews>

Moodle :

<http://moodle.org/>

My Education Lab :

<http://www.myeducationlab.com/>

Plato Learning System :

<http://www.plato.com/high-school-social-studies>

Radical Parenting :

<http://www.radicalparenting.com/2009/10/01/10-best-virtual-worlds-for-teens-tweens-and-kids/>

SimEarth :

<http://www.freegameempire.com/games/SimEarth>

Speed Danki :

[http://www.speedanki.com/cards.php?action=view\\_go](http://www.speedanki.com/cards.php?action=view_go)

Study Ladder :

<http://www.studyladder.com/>

Word Press :

<http://wordpress.com/>

Zunal WebQuest :

<http://zunal.com/>