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# Journal on School Educational Technology

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## TECHNOLOGY ASSISTED COLLABORATIVE AND PROJECT-BASED LEARNING; OF BLOGS, WIKIS, AND NETWORKING.

By

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### ABSTRACT

*Throughout America today, public schools are struggling with issues surrounding standards and educational relevance and effectiveness. At the same time, a technological and social evolution is taking place outside of the school building. Students are developing new methods of inquiry and information gathering. If the educational system is to remain relevant in a rapidly evolving global society, it must begin to utilize the tools of communication and collaboration that are becoming commonplace in society. The ability to make use of this new technology is often hampered by security software found on virtually all school computer systems. This article will examine the effectiveness of collaborative and project-based teaching and provide suggestions as to how to address the restrictions by suggesting innovative solutions without jeopardizing school security. Suggestions will be provided as how to establish a learning community that will include students, teachers and parents in a dynamic new system of collaboration. There will also be an exploration of the new open source software such as blogs, wiki's and social media tools in regards to their application to classroom learning.*

*Key Words: Project-based Learning, Collaboration, Social Networking, Neo-Millennial Generation, School Filtering.*

### INTRODUCTION

With the expansion of technology, particularly open source and social networking software, there has been a renewed level of interest in technology-aided collaboration. It has been suggested that the way in which students learn and gather information is a dynamic process of change. Dieteroe, Dede and Schrier (2010) have proposed a system of cognition titled the "Media Based Model" and have coined the phrase "Neo-Millennial Learning Style".

Educators need to recognize the impact of these emerging technologies. For some teachers, recognizing the technologies and then their potential value is a great start, but the ubiquitous (anytime, anywhere) nature of communication, collaboration and information greatly impact on how our "digital natives" or "millennial students" learn, communicate and spend their recreational time. This immediacy, the instant nature of modern communications and information access is immensely powerful. This paradigm shift serves to alter how students

may look at the world; it taints and changes their outlook and view.

According to Vygotsky (1978), students perform at higher intellectual levels when they work in collaborative learning situations as compared to solitary study. Likewise, Bruner (1985) has stated that this gain is specifically evident in the areas of critical thinking and problem solving. In a research study designed to measure critical thinking skills. Gokhale (1995) concluded that students engaged in collaborative learning performed significantly better on measures of critical thinking and problem solving and at least equally as well on standard objective assessments.

Much of the work in collaboration has taken place in the 1980's and 1990's. With emergence of open source collaboration software and web-based applications, research into collaborative learning is making a resurgence.

This article will begin to explore how public education can better engage students in the educational process. There

must be an evolution away from "sit and get" classrooms that are increasing irrelevant for today's neo-millennial students. This article will look at emerging strategies for collaboration using the existing technologies of Social Media, open source software and at the same time consider some of the obstacles that may exist for their implementation in the current public school environment. Using a case study approach, the authors will look at one practical method of implementing social collaboration in the K-12 classroom culture.

### **Project-Based Collaborative Learning**

According to Dieteroe, Dede and Schrier (2010), many students today have come to expect increased levels of constant mental stimulation. The authors' further claim that a paradigm shift is occurring among their student populations as they are increasingly exposed to technological wonders such as video games, TVs, cell phones, iPods, and computers. This shift represents a fundamental change in the manner in which students gather and process information. Students have increasingly turned to tools such as FaceBook and YouTube for information, collaboration and communication. Due to the sheer volume of information sources, today's students also have a greater risk of becoming distracted and unfocused. As a result these "digital natives" (Prensky, 2001) do not want to be taught in the traditional "sit and get" lecture manner. Most students today enjoy contributing to their learning process and driving their own inquiry.

Project-based learning allows students to follow their natural inclinations when working on assignments. According to Bell (2010), "most projects include reading, writing, and mathematics by nature and many inquiries are science-based or originate from current social problems." Teachers provide guidance and supervision during all phases of the project and students can elect to work in groups, thus fostering collaboration and communication skills. In addition, project-based learning supports critical-thinking skills, as students brainstorm to determine the course of action that needs to take place and leverage their inductive and deductive reasoning abilities in order to bring projects to fruition.

The need to utilize emerging new collaborative

technologies in an effective manner to expedite this form of learning is a critical component of preparing students for life in the 21st century.

Keefe (1991), states that learning styles combine affective, psychological, and cognitive influences that impact the way learners recognize, distinguish, and react to their learning environment. In the collaborative model, as students work collectively to complete their projects, they are encouraged to incorporate and use the learning style that best fits their needs and personality (e.g., visual, kinesthetic, and auditory). For example, students learning about the various conflicts in the Middle East may create a presentation regarding the views of the various groups who live in the region. The students may organize a mock peace conference. Utilizing social networking technology, it is entirely possible that they conduct interviews with individuals living in this region. Other points of views may be explored through the eyes of service men currently stationed in the region. Student ingenuity combined with social technology allows for the creation of unlimited possibilities.

The principles of project-based, collaborative learning have been practiced for decades. Bas (2008) cites research by Foshay stating that in the early 1920s, "William Heard Kilpatrick, a professor at Columbia University Teachers College and colleague of John Dewey, advocated project-based instruction. His notion was that such instruction should include four components: purposing, planning, executing, and judging." Further, he states that project-based learning methods are based on constructivist theory. According to Wang (2009) "knowledge is actively constructed by learners based on their prior experiences, rather than directly delivered by the teacher. Learners are active knowledge constructors, rather than passive information receivers"

John Dewey (1938) wrote of the benefits linking experience and education. He "emphasized the need for a sound philosophy of experience" He also noted that one of the main functions of teachers is to be aware of the experiences and environment that lead to student maturation. He stated that educators should know how to use the physical and social environment to promote

positive and worthwhile experiences for their students. Technology enhanced project-based learning opportunities provide an avenue for his ideas to be administered.

The evidence also shows that collaborative learning opportunities provide additional benefits for students. Mitchell, Foulger, Wetzel, and Rathkey (2009) cited studies noting that students who worked on projects were better able to understand concepts in diverse learning conditions. Researchers also found that these students had higher self-esteem and positive temperaments. Collaborating provided students with emotional support as they worked together to accomplish a common goal. Furthermore, researchers found that as students realized that they were responsible for their work they learned to negotiate better with one another using appropriate emotional cues and responses. As their feelings of competency increased, they developed an enhanced sense of confidence and self-worth.

### **Collaboration Technology Presents Unique Challenges**

Many educators turn to the Internet for lessons and enhancing their curriculum. Project-based learning benefits from web sites created by fellow educators and students are given targeted web sites instead of searching the entire Internet. When educators research and preview online resources this helps students stay on task and reduces the probability of trying to access a web filter blocked or inappropriate web site. Secondary schools who are federally funded must comply with the Children's Internet Protection Act (CIPA) by creating and approving an Internet Security policy (FCC, 2009, p. 1).

A school district's Internet Security Policy lays out the setup and procedures of the web content filter which determines what sites are allowed or denied based on categories, Uniform Resource Locators (URL), file types, key-words, application types and others (M86 Security, 2010, p. 1). CIPA has a minimum requirement that all school filters to block adult content and material deemed harmful to minors by United States Federal Law. Another requirement is that schools have their Internet Security Policies and technologies in place before they can receive Federal funds (FCC, 2009, p. 1).

One important part of the Internet Policy is the Acceptable Use Policy (AUP), which explains the instructional goals, and general practices in the school district. Proper student and staff behaviors and consequences are detailed for technologies such as email, web access, local network access, and copyright of materials used in the schools. To help students and staff protect themselves online schools are required to offer Internet Safety programs and training such as i.Safe.org. These Internet safety programs should also be directed towards parents and community members.

Web content filters can be as helpful or frustrating depending on how each school district configures theirs. The instinct of schools is to block almost everything and to filter every category possible for fear of something inappropriate getting through the filter. Manzo (2009) examined several school districts and school-related web sites and several indicated that schools are being too aggressive on what gets blocked. Schools are missing out on the true power of the Internet and what it offers when all of the sites and tools students and teachers need are censored. The technology staff needs to work with school administrators, school board, parents and community to demonstrate what the good uses of the Internet are and how it serves an educational value. Being overly cautious will keep teachers from offering the best of the world to their students. Teachers and students are frustrated about what web sites are blocked when doing research on topics such as gun control, drugs, religion and other controversial topics.

McDonald (2007) wrote about a research survey that found in 2006, 71% of parents thought that Internet safety is the responsibility of the school. This is a major concern, as students do not have any web filters at home, which makes them most vulnerable to sites they should not see. Parents are an important part of keeping students safe online. The concern over online safety is why schools need to recommend web sites and programs that are educationally appropriate and safe.

Every web filter has different features, abilities and limitations just as any program. There are web sites and collaboration tools that are easier to unblock and allow in

the schools and at home than others. If a teacher wants to create a blog for their class a site that uses a single URL domain is Edublogs. A teacher can create a customized web site name they choose and all images; pages and other resources will remain under that name. The school web filter can then allow that unique URL to pass through the network to students and other teachers. Edublogs is based of the popular WordPress blog tool and has a very similar feel and available software.

If a teacher wants a microblogging tool such as Twitter that is educationally friendly they can use Edmodo which requires a password to join groups and allows teachers to send short message bursts as well as calendaring, grade books, file sharing, polling and more. A teacher can set up an account and create custom groups. Parents, students, teachers and others may then join these groups even without having an email account. The only requirement to use Edmodo is web access. This makes it a great tool for communicating with parents, community groups, and school clubs.

Teachers want to be able to access and share video and audio files with students. YouTube is very popular but again not educationally appropriate in most cases. Single videos on YouTube can be unblocked but that is more work for the technology staff to unblock possibly hundreds of videos. YouTube also has a video time limit of ten minutes when uploading a file. A safe and feature-rich web site for educational use is TeacherTube. Large video files, audio files, photos and documents may be uploaded and viewed that are educationally appropriate in most cases. Technology staff may unblock TeacherTube easily.

Many states and international standards boards, such as the International Society for Technology in Education (ISTE), call for the teaching and use of social networking and using collaborations tools because almost any job of the future will require the worker to be a connected and participating member of society and the workforce. Administrators and technology staff need to be ready and testing web tools that best fit with their needs and meets technology standards and empowers teachers and students through project-based learning.

## **A Case Study - The Case of a Middle School Social Studies Class**

One of the greatest struggles faced by middle school instructors surrounds the presentation and instruction in topics that are deemed as irrelevant by the students. One such subject area is that of History. Many students today find a discussion of history as being irrelevant to their current lives. In the case to be highlighted here, the students were 7th year students in a behavioral management class. As the instructor, I dreaded teaching about World War II from a history text. I needed to make the experience alive for the students. As a result, a project learning approach was undertaken. Students were told that they were part of a news team. Technology was provided to the students including computer hardware, digital voice recorders, blog and wiki spaces and discussion board areas for collaboration. Using digital voice recorders, students interviewed members of their families who had lived through WWII. The interviews were posted on discussion boards and wikis to be shared with members of the project teams. Students then sorted the topics into War Stories, Life at Home, A Generation of Sacrifice, and Points of View. As the students posted and shared their stories, a great level of interest developed and the groups started using the Internet to expand their knowledge of this period. Higher level thinking started to emerge spontaneously. The "news teams" started to construct stories based upon their findings. Other students used their artistic abilities to begin illustrating the stories, scanning them and editing them using Photoshop and other graphic software programs. A secondary event started to emerge. Parents began reading and posting private little stories to the electronic bulletin boards. One grandfather invited the class to visit the Soldiers and Sailors Retirement Home where the students expanded their interviews and listened for over three hours of stories from the people who experienced this period in history. Students began to explore the cause and effects leading to the war, the outcomes of the war based upon a particular point of view and how the war affected peoples lives both here and internationally. Finally, the students prepared a bound journal of their findings that was donated to the school library. The Art teacher helped the students to create a mural that still hangs in the schools



hallway six years later. Recently, while visiting my old school, I encountered the younger brother of one of my old students who related to me how his brother still speaks of this lesson. These students learned history from the viewpoint of the historical participants. They were able to utilize writing skills, technology skills, communication skills, higher level thinking skills and research skills in a project that they remember years later. This was all possible because of the infusion of collaboration technology as a tool for student growth.

## Implications and Recommendations

The education system needs to remove barriers for teachers to effectively perform their critical work with students and allow them the freedom to teach beyond standardized testing. Project-based learning teamed with appropriate technology tools and support can help students to gain a better understanding of what they are learning. Students can create and expand their own comfortable learning environment and learn more effectively if given the right set of variables such as open learning space, practical applications of what they are studying and an open technology infrastructure that allows for free flowing communication and sharing of ideas.

Teachers must be encouraged to work in concert with their technology department, administration team and students and parents to design the most appropriate classroom uses of technology. One important note to remember is not to rely on the cutting edge technology too much. Just because a technology tool is available that does not mean there is not already a better method already being used. If a teacher feels that they don't see a good fit for their classroom then that is alright. We must trust the classroom teacher as an expert in their field and that they can identify the best resources for their teaching.

Through research, experience and practical application the authors have learned that some of the biggest influences on successful education systems are support and flexibility of administrators, well defined administrative and technology policies for appropriate student behaviors, and a can-do attitude of the technology department.

## Conclusion

Schools across the United States and around the world are

facing a crisis. In some urban American schools, the high school dropout rates continue to rise, in some cases, beyond the 50% level. Part of this phenomenon may be due to a disconnection between what and how curriculum is being taught with what is deemed relevant to students. Increasing neo-millennial students are becoming world citizens. The information that is received through social-media channels are far outweighing what is presented in the classroom. While it can be argued that much of this information is fragmented, not specific and may be suspect in regards to accuracy, it is a fact that it is having a profound impact upon the values and attitudes of students around the world. The attempt to protect and, to some degree, control access to this media in schools is becoming a losing proposition. Most students continue to have access through smart phones, the WWW and out of school social networking activities.

What is really required from schools is to be educators, demonstrating to students a proper use of these tools. Also, students need to be taught how to filter their world, including the world of social media. By engaging the technology in a meaningful manner, and at the same time, permitting students the freedom to become active participants in their learning through the implementation of collaborative project-based learning, students and teachers can become partners in this growth. Most importantly, students and faculty can join together in the process of becoming citizens of the world. In so doing, this approach can once again find relevance in the lives of the students through dialogue and collaboration.

The authors submit that three of the most important skills for the future include: Information analysis and discrimination, effective communication (both personal and virtual) and the ability to work as part of a team effectively utilizing the skills of collaboration. In such an arrangement, the strengths of each individual can be combined and brought to optimal effectiveness.

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# EDUCATION BLENDED WITH YOGA - A SOLUTION FOR YOUTH RISK BEHAVIOR

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## ABSTRACT

All teenagers take risks as a normal part of growing up. Risk-taking is the tool an adolescent uses to define and develop his or her identity, and healthy risk-taking is a valuable experience. Healthy adolescent risk-taking behaviors which tend to have a positive impact on an adolescent's development can include participation in sports, the development of artistic and creative abilities, volunteer activities, travel, running for school office, making new friends, constructive contributions to the family or community, and others. Negative risk-taking behaviors which can be dangerous for adolescents include drinking, smoking, drug use, reckless driving, unsafe sexual activity, disordered eating, self-mutilation, running away, stealing, gang activity, and others. Substance abuse leads to negative outcomes such as unemployment, adolescent pregnancy, drug or alcohol addiction, or imprisonment. Unprotected sex is the primary form of HIV transmission among young people, and every day around 6,000 young people are infected with the virus. Girls aged 15–19 account for one in four unsafe abortions-about 5 million each year. In Nepal and Indonesia, almost 60 % of all males aged 15–24 are smokers. Half of all murders and violent crimes in Jamaica are committed by males aged 18–25, who make up 10 % of the population. These youth risk behaviors will not only hinder their development and their future but also will corrupt the society and finally our country. There is a very effective technology that can deal with human body, mind and soul which will help in coordinating of all the three and prevent corruption of any one of them. This is nothing but the Yogic technology called YOGA. Education when blended with Yoga can avoid all youth risk behaviors and shape them well enough to become the best citizens in the world.

Key words: Risk Behavior, Adolescent, Blended Education, Yoga, Technology.

## INTRODUCTION

Necessity is the mother of invention. Every human need initiates the people to invent something that fulfill the need. At present a number of things are needed for our countrymen. And our country is in need of citizens who could bring prosperity and integrated development. This could be achieved only through proper education. Education alone can change today's youth into tomorrow's well-built citizens. The necessity of education improvement has been recognized recently. But education can only improve a person's intellectual through adding up of knowledge. Moreover education has been considered as a tool that provides a good carrier. But an individual's development consists of four main aspects namely, intellectual, psychological, social and spiritual. Education

deals mainly with intellectual and the rest are developed only by the environment and home. If the surrounding environment and home are suitable and safe for the youth they get developed into well built citizens, but whereas when their home and environment becomes unsuitable and loaded with more problems then the youth, especially who are in their adolescent stage will be developing more dangerous risk behaviors. These youth risk behaviors will not only hinder their development and their future but also will corrupt the society and finally our country. There is a very effective technology that can deal with human body, mind and soul which will help in coordinating of all the three and prevent corruption of any one of them. This is nothing but the Yogic technology called YOGA. Education when blended with Yoga can avoid all youth risk behaviors and

shape them well enough to become the best citizens in the world.

## Youth At Risk

All teenagers take risks as a normal part of growing up. Risk-taking is the tool an adolescent uses to define and develop his or her identity, and healthy risk-taking is a valuable experience. Healthy adolescent risk-taking behaviors which tend to have a positive impact on an adolescent's development can include participation in sports, the development of artistic and creative abilities, volunteer activities, travel, running for school office, making new friends, constructive contributions to the family or community, and others. Inherent in all of these activities is the possibility of failure. Negative risk-taking behaviors which can be dangerous for adolescents include drinking, smoking, drug use, reckless driving, unsafe sexual activity, disordered eating, self-mutilation, running away, stealing, gang activity, and others. Youth who face environmental, social and family conditions that lead them to engage in behaviors that are harmful to themselves and society are definitely youth at risk. These factors include:

- Low connectedness with school
- Low connectedness with their parents
- Gender roles and expectations
- Low self-esteem
- Family poverty
- Poor legislation

All of these factors can lead to risky behavior including school repetition, early entry into the job market, early and unsafe sex, illicit drugs, alcohol and tobacco use and violence.

## Youth Risk Behavior

Risky behavior refers to actions that hinder a person's development and successful integration into society. Simply stated it is any behavior that puts the youth at risk for negative consequences, like future poor health, injury or death. This behavior includes:

- Behaviors that contribute to unintentional injuries and violence leading to criminal activities.
- Tobacco use.

- Alcohol and other drug use.
- Sexual behaviors that contribute to unintended pregnancy and STDs, including HIV infection.
- Unhealthy dietary behaviors.
- Physical inactivity—plus overweight and asthma.
- Suicidal thoughts and attempts.
- Dropping out of school.
- Poor diet.
- Extreme lack of exercise.

## ILL-Effects of Youth Risk Behavior

Substance abuse leads to negative outcomes such as unemployment, adolescent pregnancy, drug or alcohol addiction, or imprisonment. Unprotected sex is the primary form of HIV transmission among young people, and every day around 6,000 young people are infected with the virus. Girls aged 15–19 account for one in four unsafe abortions—about 5 million each year. In Nepal and Indonesia, almost 60% of all males aged 15–24 are smokers. Half of all murders and violent crimes in Jamaica are committed by males aged 18–25, who make up 10 % of the population. In the U.S., 73% of all deaths among school-age youth and young adults result from four causes: motor vehicle crashes, other unintentional injuries, homicide, and suicide. Results from the YRBSS (Youth Risk Behavior Surveillance System, USA) suggest that many high school students practice behaviors that may increase their likelihood of death from these causes -- such as not wearing seat belts and carrying a weapon. Also, substantial health and social problems among youth result from unintended pregnancies and sexually transmitted diseases, including HIV infection and AIDS. In addition, since 67% of all deaths among adults result from heart disease, stroke, and cancer, the YRBSS measures risk behaviors such as physical inactivity and poor nutrition, which are often initiated during adolescence. (Source: excerpt from Facts About Youth Risk Behavior Surveillance -- United States 1997: CDC-OC). These are just a few examples of how young people's risky behavior can seriously hamper not only their personal development, but social and economic development in general.

A study was done by Rahul Sharma et. al. (2008) on Risk

Behaviors related to Inter-personal Violence among School and College-going Adolescents in South Delhi. Among the study participants, 65 (11.8%) reported having carried a weapon in past 30 days. Seventy-four (13.5%) respondents had threatened or injured someone with a weapon in past 12 months. Almost one in every two boys (49.1%) reported being involved in a physical fight in past 12 months. Involvement in interpersonal violence was found to be significantly more amongst males than females. Adolescents who were working part time were more likely to be 'at risk' (67.5%) than those not working (48.5%). In logistic regression analysis, the significant correlates of interpersonal violence were male gender, lower age, number of close friends, having seen role models smoke/drink, and residing in resettlement colonies, slums or villages. The findings regarding violence-related behaviors among adolescents are remarkably similar to those in other countries.

As a matter of fact, the health risk behaviors adopted in youth contribute to the leading causes of death, disability, and social problems in adulthood, specifically tobacco use; unhealthy eating; inadequate physical activity; alcohol and other drug use; sexual behaviors that may result in HIV infection, other sexually transmitted diseases (STDs), and unintended pregnancy; and behaviors that contribute to unintentional injury and violence. These behaviors are often established during childhood and persist into adulthood. However, they are largely preventable. Therefore, school health programs should focus on reducing these health risk behavior areas. Research has shown that school health programs can reduce the prevalence of health risk behaviors among young people and have a positive effect on academic performance. Scientific reviews have documented that school health programs can have positive impacts on educational outcomes, as well as health-risk behaviors and health outcomes. Hence, early intervention can improve long-term outcomes.

### **Need for Yoga Among Youth**

A study was done by Leslie et. al. (2010) from Center on Child and Family Outcomes, Institute for Clinical Research and Health Policy Studies, Tufts Medical Center, Boston, USA

to examine rates and patterns of health-risk behavior (e.g., sexuality, depression/suicidality, substance use, delinquency) among a national probability sample of youth active to the child welfare/child protective services system. Recent federal legislation, P.L. 110-351, encourages child welfare systems, Medicaid, and pediatric experts to collaborate to ensure youth entering foster care receive comprehensive health examinations. Analysis of baseline caregiver, caseworker, and child interviews, and assessment data for a sub sample (n = 993) of youth, aged 11-15 years, from the National Survey of Child and Adolescent Well-Being, a national probability sample of children and adolescents undergoing investigation for abuse or neglect. Almost half of the sample (46.3%) endorsed at least one health-risk behavior. On Poisson multivariate regression modeling, factors related to higher rates of health-risk behaviors included older age, female gender, abuse history, deviant peers, limited caregiver monitoring, and poor school engagement. Given the heightened vulnerability of this population, early screening for health-risk behaviors must be prioritized.

In another study by Shead et. al. (2010) stated that risk factors for youth gambling problems are best understood within an ecological model recognizing the interwoven relationship that exists between the individual and their environment. Empirical studies covering individual, relationship, community, and societal factors associated with adolescent gambling problems are reviewed. The cumulative body of research suggested that males who are exposed to gambling at an earlier age are at greater risk of developing gambling problems. Individuals who report poor family cohesion, have family members or friends who also gamble, and those exposed to and engaged in a wider variety of gambling options are at greater risk. Adolescents with impulsive, high sensation-seeking personalities and exhibit emotion-focused coping styles are more likely to experience gambling problems. Anxiety, depression, ADHD, poor academic performance, substance use, and delinquency are also strong predictors. Many of these risk factors appear to predict a general behavior syndrome encompassed by overall mental health problems, substance abuse, delinquency, and

problem gambling. Increased exposure to gambling opportunities and marketing of gambling is recognized as a potential risk factor at a community level while gambling-permissive cultures may instill positive attitudes and beliefs toward gambling.

Health risk behaviors are established during childhood and adolescence and can extend into adulthood. Therefore, encouraging the adoption of healthy behaviors during childhood is easier and more effective than trying to change unhealthy behaviors during adulthood. Yoga is the best solution to the problem of youth risk behaviors since practice of Yoga inculcates healthy behaviors and brings about healthy body, mind and soul. Yoga enhances the mind-body connection, which can improve the mood and physical health - and even lighten various psychological disorders. While doing Yoga one focuses on inner peace. Self-realization, relaxation, focus, and harmony are the cornerstones of yoga. So practicing Yoga will promisingly bring about healthy behaviors and prevent risk behaviors in the youth. It also helps the youth to identify their risk behaviors and get rid of them.

### **Related Studies on Yoga**

Youth with ADHD (Attention Deficit Hyperactivity Disorder) tend to more likely involve in risk behaviors than the normal youth. And it has been proved that Yoga act as a conventional therapy for ADHD. A randomized controlled pilot study was done by Haffner et. al. (2006) to compare the effectiveness of yoga and conventional motor exercises for children with attention-deficit hyperactivity disorder (ADHD). Nineteen children with a clinical diagnosis of ADHD were randomly assigned to either yoga or conventional exercise. Children in the yoga group showed greater improvements in attention and reduced symptoms of ADHD, as reported by their parents. However, children in both groups improved over time, and at the end of the study, the group means for the ADHD scales did not differ significantly from those for a representative control group. The training was particularly effective for children who were also undergoing pharmacotherapy. The authors conclude that yoga can be an effective complementary or concomitant treatment for ADHD.

Anxiety and its disorders among youth has been an

important reason for their risky behaviors. Kirkwood et. al. (2005) reviewed controlled clinical trials on the effectiveness of yoga for the treatment of anxiety and anxiety disorders. The review covered major databases, as well as organizations such as the International Association of Yoga Therapists and the Yoga Biomedical Trust. Most yoga interventions included asana, breathing, and relaxation. One study compared Kundalini yoga to mindfulness meditation and relaxation, and found that yoga was more effective in reducing anxiety than mindfulness meditation and relaxation. Several studies compared yoga to anti-anxiety medications, and reported greater improvements from yoga than medication.

Depressed youth also tend to behave risky. Kirkwood et. al. (2005) reviewed both published and ongoing research on Yoga-based interventions for the treatment of depression, up to June 2004. 5 randomized controlled trials were identified. Most interventions focused on younger adults (mean ages 18-35), and clinical status varied from mild depression to severe depression. All five trials reported positive outcomes, and only one reported any adverse outcomes (fatigue and breathlessness). Breathing practices were an important part of the interventions and asana practices included back bending, which traditionally has been thought to relieve depression. However, the overall positive results suggest that yoga has potential as a therapeutic intervention for depression.

### **Yoga – Meaning**

Yoga as a system of thought and practice has a primary reference to the philosophical system that flows from the teachings of the ancient Indian Yoga philosopher, Patanjali. Maharishi Patanjali is believed to have compiled his Yoga Sutra around the 3rd or 4th century BC but archeological evidences and the study of ancient scriptures suggest that yoga was practiced in ancient India as early as 3000 BC. This is an ancient but basic text on Yoga as written by Sage Patanjali 400 years B.C. As the printing technology was not available at that time, this text has been transferred through generations by oral recitations (Shruti). That is why the whole knowledge of yoga is very concisely packed in total 196 lines or Sanskrit Sutras by Patanjali so that students can easily remember these



sutras. The word yoga means "union" in Sanskrit, the language of ancient India where yoga originated. It is the union occurring between the mind, body and spirit.

## Types of Yoga

Theologically speaking; there are four divisions of Yoga, that form one of the cornerstones of Hinduism. In Sanskrit, they are called Raja-Yoga, Karma-Yoga, Bhakti-Yoga and Jnana-Yoga. And the person who seeks this kind of a union is called a 'Yogi':

- **Karma-Yoga:** The worker is called the Karma-Yogi.
- **Raja-Yoga:** One who seeks this union through mysticism is called a Raja-Yogi.
- **Bhakti-Yoga:** One who searches this union in love is a Bhakti-Yogi.
- **Jnana-Yoga:** One who seeks this Yoga through philosophy is called the Jnana-Yogi.

## Yoga Techniques

A combination of yogasanas, pranayama and meditation works wonders for those intent on cleansing both physical and subtle body.

### Yogasana

A yogasana is a body posture in harmony with one's inner consciousness. It aims at the attainment of a sustained and comfortable sitting posture to facilitate meditation. Asanas also help in balancing and harmonizing the basic structure of the human body, which is why they have a range of therapeutic uses too. Asana is a Sanskrit word used to describe a position of the body. Patanjali, the founder of Ashtanga Yoga defines asana as "Steady and comfortable posture". Traditionally many asanas are practiced in Hatha Yoga tradition, primarily to achieve better physical and mental health. Asanas have deep impact on the entire body and mind complex, it affects different systems in the body like muscular, respiratory, circulation, digestive, excretory, reproductive, endocrine and nervous system.

### Pranayama

Pranayama forms a vital step in the path of ascendancy through Yoga. Pranayama is derived from 2 Sanskrit words - Prana - life force and Ayama control. Therefore, in its broadest description, Pranayama would mean the control

of the flow of life force. Very few people breathe correctly. Some use only the upper part of their lungs; others breathe with only the diaphragm (lower part) leaving the upper structures of the lungs inactive and partially collapsed. In those parts of the lung that are not used, slimy secretions accumulate and the tissues become devitalized. Thus a luxurious soil is prepared for the tubercle bacillus, pneumococcus and other scavenger germs. This habit of shallow breathing accounts in a good measure for the fact that one third of all deaths result from diseases of the lungs. For one individual perishing from food starvation, thousands are dying from oxygen starvation. Breathing problems can be corrected by yoga through the practice of Pranayama. Pranayama has various techniques that are designed for the maximum capacity utilization of the lungs - something that most of us do not do. Pranayama also help in regulating the temperature of the breath flow thereby solving a lot of problems related to breathing.

### Meditation

Generally human mind is fickle, like a butterfly, which always flies from here and there and does not wait at one place for long. But the speed of our mind is far more than the butterfly or it may be greater than the speed of light. Mind can recollect past experiences, keeps thinking about the future and experiences the present with all its might and we do not have any control over our minds journey. Meditation is the study of deep concentration, calmness and tranquility of the mind. It is the study of attaining complete control over ones mind. Meditation takes the consciousness beyond conscious, sub conscious & unconscious states to super consciousness. It may be impossible to describe meditation; one can only understand it through the direct experience. Meditation can be also explained as the shifting of focus from outer objects or activities to an inner dimension where one may encounter timelessness, a connection to wisdom, or a sense of peace. Meditation increases awareness of intuition, improves concentration and focus, reduces stress, anxiety and tension, increases creativity, brings about better relationships, increases self-awareness and self-acceptance thereby bringing a deeper sense of spirituality and meaning.



## Benefits of Yoga

The health benefits of yoga are initiated because you're focusing on inner peace. Self-realization, relaxation, focus, and harmony are the cornerstones of yoga. Research shows that the health benefits of yoga include improvements of all sorts of ailments, from back pain to fatigue. Improved depression, body image struggles, eating disorders, and even physical problems such as back pain and asthma are some of the health benefits of yoga practice. The most important benefit of yoga is physical and mental therapy. The aging process, which is largely an artificial condition, caused mainly by autointoxication or self-poisoning, can be slowed down by practicing yoga. By keeping the body clean, flexible and well lubricated, we can significantly reduce the catabolic process of cell deterioration. To get the maximum benefits of yoga one has to combine the practices of yogasanas, pranayama and meditation. According to medical scientists, yoga therapy is successful because of the balance created in the nervous and endocrine systems which directly influences all the other systems and organs of the body. Yoga acts both as a curative and preventive therapy. The very essence of yoga lies in attaining mental peace, improved concentration powers, a relaxed state of living and harmony in relationships. Through the practice of yoga, one becomes aware of the interconnectedness between our emotional, mental and physical levels through the following benefits.

- Brings down stress and enhances powers of relaxation
- Boosts physical strength, stamina and flexibility
- Bestows greater powers of concentration and self control
- Inculcates impulse Control
- Helps in rehabilitation of old and new injuries
- Intensifies tolerance to pain and enhancing mental clarity
- Boosts functioning of the immune system
- Enhances posture and muscle tone
- Improves blood circulation
- Results in healthy, glowing skin
- Cleanses and improves overall organ functioning
- Bestows peace of mind and a more positive outlook to life
- Infuses a sense of balance and internal harmony.

## Education Blended With Yoga

Positive youth development has its roots in multiple contexts including the individual, family, school, community, and society. An individual's personality, temperament, experiences, and opportunities all contribute to the youth's behavior and developmental trajectory. The above said positive youth development can be brought about when education is mingled with an everyday practice of Yoga which should be mandatory. Yoga practice for at least 30 – 35 minutes per day including some asanas, pranayama and meditation will bring out tremendous positive effects on the youth. Each day in schools and colleges should start with Yoga. When Yoga is brought into the curriculum of schools and colleges, youth risk behaviors will be minimized gradually and finally the youth can eradicate the risk behaviors. This will finally give rise to a society without any corruption and the country will become free from any terroristic activities and anti-socialistic activities.

## Implications of Yoga Blended Education on Youth

When youth gets education blended with Yoga they will be able to identify their behaviors whether healthy or unhealthy and will definitely avoid the risky behaviors. The implications of Yoga blended education can be illustrated as follows.

- Develop self awareness on both physical and psychological level.
- Help counter feelings of helplessness and depression.
- Increase brain activity which is associated with better performance and doctors even suggests that yoga can enhance cognitive performance.
- Result in an invigorating effect on both mental and physical energy and improved mood.
- Rise in self-confidence and self-esteem.
- Increase in self-knowledge.
- Reduction in tension.
- Willingness to tackle problems.
- Avoidance of fear.

- Acceptance.
- Reduce annoyance with others.
- Tend to be less irritated by others.
- Develop more liking of people.
- Make the practitioner a desirable person.

Yoga helps youth to get rid of depression, anger, anxiety, and any other psychological disorders which cause their risky behavior. When the minds of the disturbed youth get cleared from all sorts of psychological disturbances, they will be definitely able to think in a positive manner and thereby avoid risky behavior.

### Conclusion

Healthy risk-taking is a positive tool in an adolescent's life for discovering, developing, and consolidating his or her identity. Adolescent risk-taking only becomes negative when the risks are dangerous. Youth will become aware of healthy and unhealthy risk behaviors with the help of this Yoga blended education. With adults making poor lifestyle and family choices, a trickle down effect has reached our youth. To overcome the poor lifestyle and family choices, the youth has to be clear in making decision and free from psychological disorders. This can be achieved only by Yoga. Youth behaviors can be also determined by parents and they can prevent the risk behaviors by inculcating healthy behaviors in them. WHO convened a meeting in October with researchers and representatives from some projects currently under way in developing countries. This highlights the importance of parents in preventing adolescent health risk behaviors, the ways in which parents influence these behaviors, and their implications for

programmes aiming to improve adolescent health. Education with Yoga along with parent's extra care will help to vanish the youth risk behaviors and make our country flawless.

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## EMPOWERING SCHOOL TEACHERS FOR EMERGING TECHNOLOGIES: AN ACTION PLAN

By

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### ABSTRACT

*"Possessing openness to emerging technologies is critical for teachers in the technology-rich 21st Century as technology continues to accelerate at a rapid rate. Readiness for new technologies is a challenge associated with change. Teachers who resist change may impede and/or limit their students' learning and skills. Teachers, therefore, must prepare students by teaching knowledge and skills necessary for students to be successful in the technology-rich 21st Century" (Niles, 2007, p.27). In this context, school teachers need to understand how emerging technologies work, what they offer, and to use them for betterment of teaching learning process. Here a pertinent question arises that what approach should be adopted to empower school teachers for emerging technologies. To critically and systematically deal with these issues, author talks about emerging technologies in education, their impact on teaching-learning process and need for Tech-savvy teachers. This discussion is followed by a detailed action plan to empower school teachers for emerging technologies. The proposed action plan is based on the approach that three parties namely NCTE (National Council for Teacher Education), Teacher Education Departments/Institutions and school teachers themselves are key to fulfill this promise.*

*Keywords: Emerging Technologies, School Teachers, Technologies for Teachers, Technologies for Teaching Learning.*

### INTRODUCTION

#### Background

Technology has caused a revolution in the way we teach and learn but there can be no real revolution unless the faculty changes how they teach (Zemsky and Massey, 2004). Similarly, Geser and Olesch (2000, p. 315) suggests, "What we need is a renaissance of the teacher, a teacher who is fit for working in a networked learning environment and ready to be the guide on the side instead of the sage on stage." In other side, the nature of 21<sup>st</sup> century learner has changed. The 'new learner' is a 'digital native', a 20-something, who takes to technology as a fish to water. This is in contrast to the 'digital migrant', the adult who has adopted technology relatively later in the life (Kanwar, 2008).

Prensky (2007) observes, "In general, students are learning, adopting, and using technology at a much more rapid pace than their teachers, and many teachers are highly fearful of the technologies that the students take for granted (p.40)..... The fact is that today's students know

more – and will always know more – than their teachers about technology and how to manipulate it"(p.42). Prensky (2007, p.42) further offers word of advice, "Teachers can and should be able to understand and teach where and how new technologies can add value in learning. To do this, teachers must learn what these technologies are and can do, and understand them, but without necessarily becoming proficient in their use." These perspectives clearly suggest that school teachers must adapt, learn and use emerging technologies for betterment of teaching learning process.

#### Emerging Technologies: Educational Relevance

The new technologies have already changed our lives and now changing the world of education. In the past five to ten years, we have seen the appearance of scores of new technologies that have strong potential uses in education. They include email, search, texting and instant messaging, blogs, wikis, podcasting, polling devices, peer-to-peer (P2P), complex computer and video games, networking, augmented reality, social and community building tools,

digital cameras/videocams, phone-based cameras/videocams, GPS, speed enhancers, interactive whiteboards, DVDs, wireless technologies, mobile learning, wireless technologies, skype, moodle and instant Messaging (Prensky, 2005). These prominent new or emerging technologies are destined to have potential impact on teaching learning scenario in coming years.

Trapping the potential of emerging technologies for betterment of teaching learning process is a challenge that required to be met effectively and efficiently by educational sector as stated by Daanen and Facer (2007, p.04), "If educators are to shape the future of education (and not have it shaped for them by external technical developments) it is crucial that we engage with developments in digital technologies at the earliest stages. We need to understand what may be emerging, explore its implications for education, and understand how best we might harness these changes."

"Possessing openness to emerging technologies is critical for teachers in the technology-rich 21st Century as technology continues to accelerate at a rapid rate. Readiness for new technologies is a challenge associated with change. Teachers who resist change may impede and/or limit their students' learning and skills. Teachers, therefore, must prepare students by teaching knowledge and skills necessary for students to be successful in the technology-rich 21st Century" (Niles, 2007, p.27). In this context, school teachers in India need to understand how emerging technologies work, what they offer, and how to use them for betterment of teaching learning process.

## **Present Educational Scenario: Key Emerging Technologies**

An emerging technology is one that, as it's maturing, is redesigning the educational process. Emerging technologies such as Skype, Podcasting with Digital Audio Recording, Moodle (a course management system), Wikis (collaborative encyclopedias), and Blogs are redefining the way teacher teach and students learn. These technologies are changing the traditional school environment into one of excitement and cooperative learning. With these emerging technologies, the teacher is no longer the sole dispenser of knowledge. The teacher

instead takes the role of guide and coach (Schuermann, 2008). But before discussing further on this issue, let us discuss about prominent emerging technologies and their potential impact on teaching learning scenario in coming years.

## **Mobile Learning**

Mobile Learning or m-Learning is defined as "using mobile technologies, including mobile phones and hand held devices to enhance the learning process." As "mobile" implies that the technology is wirelessly connected, this means that learners are not restricted to one learning environment and m-Learning allows them to access information anywhere and at anytime. Horizon Report (2008, p.17) states, "Mobiles now keep us in touch in almost all the ways that laptops used to: with email, web browsing, photos and videos, documents, searching and shopping—all available anywhere without the need to find a hotspot or a power outlet."

The fact that many students already own and carry mobiles remains a key factor in their potential for education. Added to that is the tremendous pace of innovation in this sector, where intense competition is driving continual advancements (Horizon Report, 2008). The Report further elaborates that students doing fieldwork are using mobiles to take notes and photographs and send them directly to a course blog, where they receive instructor feedback; colleagues using virtual collaboration tools have access to materials while traveling or otherwise away from their computers. Academics are now beginning to acknowledge the importance of m-Learning. For example, the "new generation" of young individuals or the present and future participants of e-Learning interventions has been described as 'always on, one handed texting, instant messaging, and multi-tasking.

## **Wireless Technologies**

The term, "wireless technologies" by its very terminology, is self explanatory and can be linked to m-Learning to some extent. Wireless technology allows the learner to access information at their convenience. An example of wireless technology is iBurst, which offers wireless broadband internet that allows learners to access the internet at any location. Technologies like iBurst allows cheap telephone



calls over the internet, and as speeds increase, will be able to handle 'video-on-demand'.

This technology makes it possible for learner to access almost any internet content and supports them to learn at their own pace and in an environment that suits them. In this way, iBurst represents an inexpensive and effective learning tool that allows teachers to manage their students more effectively; to have more control over course content and communicate with colleagues easily.

### **Skype**

'Skype' is a software that allows one to talk to people over the computer. With a fast connection, Skype allows one to talk to up to five people over the computer for free. If one has a good internet connection (e.g. broadband), he/she can talk to anyone in the world and the reception, based on digital technology, is crystal clear. To use this service, users are required to have an internet connection, have downloaded the program and have a microphone and headset

Skype is quite helpful for language teachers. By using this technology, they can connect their language classrooms to a world of language speakers. It offers good opportunity for teachers to connect a language class to a group of foreign language speaking students. There are even sites, such as the Mixer dedicated to cross-cultural language exchange. Skype is the best way for students to practice communication of a new language. This way, the students can interact with their teacher and other students who speak the language they are learning.

### **Podcasting**

Podcasting is the method of distributing multimedia files, such as audio programs or music videos, over the internet for playback on mobile devices and personal computers. Podcasts are digital recordings stored in a music file which can then be uploaded to a computer. From this point, much like any file published on the internet, the file can be downloaded to one's own personal media player. The media player can be personal computer, iPod, MP3 player, and even mobile phone. For using podcast technology, one needs the correct (and free) software such as iTunes for Mac or Windows, or Juice for Mac, Windows, or Linux.

The options for using Podcasting as a teaching resource are beyond imagination. Teachers can create their own podcasts using free audio recording software like Audacity or they can refer students to podcasts that are related to the subject they are teaching as supportive information. The Education Podcast Network allows teachers to connect and collaborate via a podcast. They can view podcasts created by academics within their field of expertise, and are also given the opportunity to produce their own programs. In this way, podcasting enables the participating teachers to 'share their knowledge, insights, and passions for teaching. Furthermore, podcasting has the functional capacity to assist students' learning. For example, podcasting not only provides teachers with the flexibility to post important segments of their lectures online, or their interviews with experts, but also allow students to view and create their own podcasts on material covered in class, or in their textbooks.

### **Wikis**

Wiki is sometimes interpreted as the acronym for "what I know, is," which describes the knowledge contribution, storage and exchange up to some point. The name is based on the Hawaiian term wiki, meaning "quick," "fast" or "to hasten." A wiki is a group of web pages that allows users to add content, as on an Internet forum, and also allows others (often completely unrestricted) to edit the content. The wiki is a simpler process of creating HTML pages, and provides tools by which individuals can discuss wiki content and alterations. Content displayed on a wiki can be constantly modified, with changes being recorded as the content is updated. By keeping records of all modifications, wiki creators may at anytime change the content and/or the site's functionality to its previous state.

As wiki functions with the intent of sharing and exchanging knowledge it can be used to support the collaboration of learners. In this way, learners can develop a more comprehensive understanding of all the issues in question. Learners can feel empowered by having the opportunity to build on their knowledge and can subsequently derive a sense of involvement. Group interaction is also promoted as there are set of documents that reflect the shared ideas of the learning group. Wikis allow for student collaboration

and are relatively easy to use and access. Wikis can be used as a general source for class materials and for class communication. Teachers can also post class assignments to a wiki and students can create a portfolio for their peers to review. Other examples of wikis that are used in the e-learning context include, "EdTechPost Resources" which comprises of metadata, simulations, games, and open source content systems and "WikiSpaces" which is a space for teachers.

## **Weblogs**

A weblog is a website where entries are commonly displayed with possibility to maintain, add or edit content on regular basis. A typical weblog combines text, images, and links to other blogs, web pages, and other media related to its topic. The ability for readers to leave comments in an interactive format is an important part of many weblogs. Most weblogs are primarily textual, although some focus on art (artlog), photographs (photoblog), sketchblog, videos (vlog), music (MP3 blog), audio (podcasting) and are part of a wider network of social media. Micro-blogging is another type of blogging which consists of weblogs with very short posts.

Weblogs allow teachers to communicate with students and parents as they can log daily class activities. The teachers and learners can easily create their weblogs to disseminate and share ideas, study material, research work/findings or their views on different educational aspects. They can regularly edit their postings on their weblogs and use weblogs to universalize their ideas and achievement for academic world and community. Teachers can also use weblogs as portals to list homework assignments, classroom procedures, and class work. Students can use the weblog to post their own work and have it commented by their teachers and classmates.

## **Moodle**

Moodle is a virtual learning environment. It is an online space designed to mimick the classroom experience. Moodle is like a virtual classroom and Moodle homepage behaves just like a website does. The downside to Moodle is that it must be hosted by an outside source and is not free. A Moodle homepage (or class website) looks and acts just like a website. There are links to the course calendar, online

syllabus, weekly topics, assignment descriptions, discussion forums and so on. Students are able to jump around from one week to the next so they will always be able to find information they may have missed.

Moodle is especially useful for a teacher because she/he can create links to resources for students, create and assess quizzes, and has control over the entire site. Therefore, the teacher can monitor student activity, add/delete any of the content, keep track of grades, which can be either accessed or hidden from student view. Teachers can post links to the class calendar, links to assignments that need to be completed, an online syllabus, and discussion forums. This gives students the ability to find information they may have missed because they were absent from class. Teachers can also create and give tests, monitor students' activity, edit content and organize grades. Moodle helps teacher to keep total control of the learning environment. Moodle also allows for a class forum where topics relevant to course can be discussed. A great benefit of having a class forum is that students are given the freedom to gather their thoughts and express themselves without the pressures felt in classroom discussions.

## **Instant Messaging (IM)**

Instant Messaging (IM) is a tool that successfully supports informal communication. A form of IM is SMS technology. IM is a synchronous learning tool which in an e-learning context can provide the student with real time and instant learning opportunities. IM, as a real-time communication tool can be utilized as a delivery option for hearing-impaired students. This allows them to access teachers without a third party to interpret. Learners can also use this to get automated feedback from assignments or questions, freeing the tutor from any additional workload.

IM in its SMS form has proved to be extremely effective amongst a group of hearing impaired students. With the assistance of IM technology, these students were able to communicate in real time and use this medium as a tool to facilitate communication with their teachers without the support of an interpreter. The most common use of IM within an e-learning context has been to produce a cooperative learning environment. Users of IM are said to be able to



articulate ideas, issues and opinions in real time. As such, IM can be used to engage and maintain learner interest as correspondence occurs in a timely manner. Although some people may become confused by chat dialogue or the functionality of chat room discussion, it would appear that the positive facets of IM far outweigh this limitation (Hsieh and Hsu, 2008).

## Using Emerging Technologies: Desired Teaching Competencies

The above discussed emerging technologies are quite helpful for teachers to foster a learning environment of excitement and interactivity. But using these technologies to keep students motivated and interested in contributing to the class is not an easy task, as observed by Prensky (2007, p.40), "The twenty-first century will be characterized by enormous, exponential technological change. Our so called 'Digital Native' generation (that is, our students) is already embracing these changes, creating in the process an 'emerging online digital life.'" Similarly Meleises (2008, p.01) suggests, "Success in the use of ICT in education depends largely on teachers and their level of skill in integrating ICT into the teaching process and in utilizing ICT to provide learner-centered, interactive education."

The use of emerging technologies by teachers demands a number of changes that include approaches to teaching and learning, teaching and learning styles and behaviour, and contexts in which teaching and learning take place. School teachers are required to move away from teacher-centered instruction to group work and student-centered learning for effective utilization of emerging technologies. But making these changes happen in teaching fraternity is not an easy task. Teachers are required to work at three levels to make these changes happen. These levels are Mental level (making attitudinal change to accept technologies), Physical Level (acquisition of skills to use technologies) and Social Level (learning with peers and students to promote technologies). Follow-up of these levels will certainly help teachers to change minds, to improve teaching learning process and to serve a changing society.

Besides making attitudinal and social changes, school teachers will be further required to master a new set of

teaching competencies referred as 'e-Teaching Competencies' (the term 'e' denotes technologies). The reason behind propagation of a new set of teaching competencies is that traditional teaching competencies alone are not sufficient to fulfill the demands of technology assisted teaching learning process. One can hope that mastery of 'e-Teaching Competencies' that are discussed below in Table 1 will help teachers to make effective utilization and take maximum benefits of emerging technologies for educational cause.

## Making School Teachers Competent for Emerging Technologies: An Action Plan

Niles (2007, p.27) observes, "Possessing openness to emerging technologies is critical for teachers in the technology-rich 21st Century as technology continues to accelerate at a rapid rate. Readiness for new technologies is a challenge associated with change. Teachers who resist change may impede and/or limit their students' learning and skills. Teachers, therefore, must prepare students by teaching knowledge and skills necessary for students to be

Area of Competence	Desired Competencies for School Teachers
Emerging Technologies based Operations and Concepts	Have knowledge, skills, and understanding of concepts related to emerging technologies Have updated technology knowledge and skills Stay abreast of recurrent and emerging technologies
Emerging Technologies supported Learning Environments	Develop appropriate technology supported learning opportunities Apply technology-supported instructional strategies Create stimulating learning environment to arouse learners by using technologies
Emerging Technologies mediated Teaching and Curriculum	Use technology to support learner-centered teaching Apply technology to develop learners' higher-order skills and creativity Manage student learning activities in a technology-enhanced environment
Emerging Technologies enabled Assessment and Evaluation	Apply technology in assessing student learning Use technology resources to collect and analyze data Evaluate students' use of technology resources for learning
Emerging Technologies enhanced Professional Development	Use technology resources for their professional development Apply technology resources to learn new tricks of the trade Use technology to communicate and collaborate with peers, students, and community
Emerging Technologies empowered Learner Support	Apply technology resources to enable and empower learners Identify technology resources to empower learners for effective use of technology Facilitate equitable access to technology resources for all learners

Table 1. Emerging Technologies and Teaching Competencies

successful in the technology-rich 21st Century.” In this context, teachers need to understand how the technologies work, what they offer, and to understand how to use them for betterment of teaching learning process. Teachers need to apply technologies wisely to real problems, and to reflect and search for the deeper issues that the technologies raise, and to bring up and discuss these issues with the students. The teachers also need to create evaluation criteria, and to make and understand the distinct criterions related to emerging technologies mediated teaching learning.

We need competent teachers for effective utilization of emerging technologies in present educational scenario. Making teachers' competent for emerging technologies is a task that requires efforts at different levels. As Gunter (2001, p.13) suggests, “To prepare educators for the twenty-first century, colleges of education must be leaders of change by providing pre-service teachers with a technology-enriched curriculum.” In Indian context, three parties namely NCTE (National Council for Teacher Education), Teacher Education Departments/Institutions and School Teachers themselves can play important role to fulfill this task. The needed actions required at their part to make school teachers competent for emerging technologies are discussed under following subheads.

### ***(A) National Council for Teacher Education (NCTE)***

A number of studies conducted on the process of educational change show that education policies often lack focus that encourages the integration of technology content into the learning landscapes of schools. This is a clear indication that we must look for ways to re-orient and re-organize teaching learning process to promote technologies usage among teachers. Being the nodal institution of teacher education in India, National Council for Teacher Education (NCTE) is expected to play leading role to motivate and support school teachers to learn and use emerging technologies for educational purposes. The NCTE may take following initiatives to empower school teachers for emerging technologies:

*Make emerging technologies an integral part of teacher education curriculum*

Policy initiatives are the key to promote emerging

technologies usage among teaching fraternity. Formulation and implementation of clear-cut policies and guidelines will help teacher training institutions and school teachers to accept and embrace emerging technologies for betterment of teaching learning process. Therefore, the first requirement at the end of NCTE will be to make emerging technologies an integral part of existing teacher education curriculum. Need based policies and guidelines by NCTE will pave the way for teachers to learn and use emerging technologies for betterment of teaching learning process.

*Frame emerging technology based teaching learning tasks*

The promotion of emerging technologies in schools depends on its use for teaching learning tasks. To support this cause, NCTE is required to frame mandatory 'emerging technologies based teaching learning tasks' in teacher education curriculum. NCTE already made it mandatory for teacher training institutions to establish 'Educational Technology Labs' and addition of this new mandate will further support teacher education departments/institutions to equip future teachers with emerging technologies mediated teaching learning skills.

*Organize training programmes to promote emerging technologies usage*

Training teachers is another major requirement to promote emerging technologies usage in schools. NCTE may fulfill this promise by conducting national/ regional level training programmes in all over the country on regular basis. These training programmes will help school teachers to have knowledge, skills, and understanding of concepts related to emerging technologies. Besides, these training programmes will further help teachers to stay abreast of recurrent and emerging technologies and updating of technology knowledge and skills.

*Promote emerging technologies based researches*

Research is vital to promote emerging technologies usage in classrooms. The researches help us to understand and assess the impact of emerging technologies on teaching learning process. NCTE may offer research grants and projects to willing teachers and researchers to conduct emerging technology based researches (particularly

action researches). Results from these studies will help the NCTE and teacher education departments/institutions to take specific measures for empowering teachers to use emerging technologies.

## **Prepare a resource pool of experts**

It has been observed that majority of existing school teachers need orientation and training about use of emerging technologies for teaching learning purposes. Unfortunately, majority of our teacher training institutions lack expertise to train teachers for technological aspects. NCTE may play a leading role to serve this cause. NCTE may prepare a resource pool of experts having specialization and experience in educational utilization of emerging technologies and may depute these experts to train school teachers in different parts of the country.

## **(B) Teacher Education Departments/Institutions**

To fulfill the educational needs of fast emerging society of digital native learners in schools, the existing pedagogical practices in teacher training programmes are needed to be replaced by e-pedagogical practices ( the term e-pedagogy denotes the art and science of e-teaching). But this is not the case with our teacher training departments/institutions as majority of them lack focus to integrate technology content into pre-service/in-service teacher training programmes. Following measures will be helpful for teacher training departments/institutions to take care of this situation:

### *Provide infrastructural facilities for use of emerging technologies*

We can help teachers by giving them a different perspective, by involving them in meaningful activities, and by allowing them entry into the knowledge networks that define teaching and learning, giving them the hardware, and some technical training, is the first part of their learning journey (Sutton, 2006). Following this advice, teacher training departments/institutions are supposed to mainly provide computer and broadband Internet connection as majority of above discussed emerging technologies are almost available for free. The other required hardware/software will include printer, scanner, digital camera, handy cam, audio-video editing software, etc. Availability of these facilities will help school teachers to

overcome one of the most talked e-barrier regarding usage of technology in classrooms 'material access barrier' and promotion of in-house opportunities for teachers to learn and use technologies.

### *Support teachers to use emerging technologies*

Everyone needs motivation to do any task. Our school teachers also need incentives and promotion to learn new technologies. Therefore, it will be worthy for teacher education departments/institutions to offer incentives and encouragement to motivate school teachers to learn emerging technologies for betterment of teaching learning purposes. Besides, they may also devise a strategy to reward 'e-activities' of school teachers to motivate them for using emerging technologies for teaching learning tasks. These measures will certainly help teachers to make attitudinal changes and come up with new and innovative ideas to use technologies in educational settings.

### *Provide training about emerging technologies*

The researches again and again pointed out about lack of training facilities to train school teachers for world of emerging technologies. Therefore, we need some innovative efforts to train our school teachers for emerging technologies. One of such innovative effort can be peer tutoring. It is a well known fact that in every teacher training department/institution, there are always few teacher educators/trainees who are good in technologies usage. The teacher training institutions may take the services of these technology user teacher educators/trainees to train those teachers who are not so good users of technology. Besides, teacher training departments/ institutions may also invite experts from nearby technical institutions for providing training to their teachers about emerging technologies.

### *Create environment for emerging technologies mediated teaching learning*

Producing supportive environment is key for promotion of emerging technologies usage among school teachers. School administration can help a lot for this cause by offering healthy environment for emerging technologies mediated teaching learning in their schools. The first requirement to create this environment will be to offer a democratic and encouraging set-up for teachers in schools. The schools will be further required to offer

incentives and appreciation to those teachers using emerging technologies. This measure will help teachers to freely embrace and use emerging technologies for teaching learning activities.

### **Collaborate with other educational institutions**

Sharing and learning together is the best way to use emerging technologies. Teacher training departments/institutions may collaborate with other institutions to share best practices among emerging technologies by establishing 'emerging technologies clubs' in their campuses. The main aim of these clubs will be to provide a common place for teacher trainees of different institutions to share their expertise and concerns about emerging technologies. During the meeting of these clubs, the proficient users of technologies will share their expertise and experiences with fellow teachers. Their experiences will motivate other teachers to use emerging technologies for betterment of teaching learning process.

### **(C) School Teachers**

The worrisome fact is that although learners have grown up digitally and may be masters of technology, but the teachers who teach their future has been handicapped with a lack of sufficient knowledge about the use of technology. Majority of school teachers are trapped in their educational practices by a lack of meaningful exposure to good information on the use of technology and of how to initiate new ways of sharing information that will help them to move forward. The following strategies may be helpful for school teachers to come-out of this situation by mastering emerging technologies.

#### *Update knowledge and skills about emerging technologies*

The emerging technologies are changing fast and their effective and fruitful use demands updated knowledge and skills. The first action on the part of school teachers to make this happen will be to continuously learn and update them about emerging technologies and their educational usage. They are required to learn these technologies either in their schools or in other educational institutions by attending different training programmes. The teachers may also take the services of emerging technology experts/peers to learn emerging technologies.

#### *Use available technologies*

Instead of searching for best emerging technologies, use of available technologies is the best way to promote emerging technologies usage. Following this dictum, school teachers are required to start using available emerging technologies. This measure will help teachers to shed their inhibitions and create a liking about using emerging technologies for teaching learning process in a better way.

#### *Share best practices among emerging technologies*

The emerging technologies thrive on the idea of sharing. The main benefit of sharing about technologies is that more you share more you learn. Therefore, technology sharing is a vital component for preparing school teachers for emerging technologies. To ensure the maximum benefit of these technologies, school teachers need to know about the ways of sharing them. To achieve this objective, the best strategy for teachers will be to regularly attend programmes to learn updated knowledge and skills about emerging technologies and sharing of best practices with their peers.

#### *Discuss and Do technology mediated teaching with peers*

Discussion and using together is one of the best ways to learn emerging technologies. Discussion helps us to learn emerging technologies in a better way while collaborative usage supports one to use technologies in more confident manner. The school teachers are required to have a new beginning by applying this principle. Adoption of this principle will certainly help them to promote technology mediated teaching learning in their schools.

#### *Learn emerging technologies from their students*

The excellent educational institutions of the world thrive over the idea 'Learn from your Learners'. Unfortunately in India, we are not appreciative of this idea as mainly students learn from teachers and teachers hardly learn from students. Whereas, learning from students offer numerous opportunities for teachers to learn and promote emerging technologies usage in education. Therefore, school teachers are required to correct this trend by showing their desire to sit with their students and learn from them about emerging technologies. This learning will



ultimately help them to use technologies for betterment of teaching learning process.

## Conclusion

In present circumstances, it is expected from school teachers to become informed users of emerging technologies. They are required to know about software usage as well as some hardware basics and an understanding of networks (local area and Internet). School teachers are further expected to find and adapt efficient measures for learning and using emerging technologies, which are bound to grow well beyond what we envision today, as observed by Daanen and Facer (2007, p.04), "If educators are to shape the future of education (and not have it shaped for them by external technical developments) it is crucial that we engage with developments in digital technologies at the earliest stages. We need to understand what may be emerging, explore its implications for education, and understand how best we might harness these changes." The author has a belief that adoption and implementation of proposed action plan by key parties namely NCTE (National Council for Teacher Education), Teacher Education Departments/Institutions and School Teachers themselves will certainly be helpful to empower school teachers to learn and use emerging technologies for joyful and effective teaching learning process.

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## A QUALITATIVE PERSPECTIVE: PRE-SERVICE TEACHERS DISCUSS EDUCATIONAL TECHNOLOGY ONLINE

By

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### ABSTRACT

*Although there is a push in education to increase the amount of technologies used in the classroom much of the recent literature emphasizes a need to investigate ways to improve the instructional methods used when incorporating technology in education. The focus of the present research is to investigate an instructional technique used in an asynchronous online discussion (i.e., prompts versus no prompts). This research investigates pre-service teachers' positions on the use of technology in K-12 classrooms. Participants were students enrolled in an online Educational Psychology course at a southwestern urban university; the online discussion transcripts were the data source for this qualitative research design. The treatment group received specific directions and feedback and the control group received very limited directions and feedback. The results of the study indicated that given specific guidelines and expectations for the discussion, the treatment group outperformed the control group in every category consistently within the small group analysis and the between group analysis. In addition, the in-depth analysis points to several findings with regard to how pre-service teachers view Educational Technology in schools, based on the dilemma posed in the online discussion forum.*

*Keywords: Online Asynchronous Discussions, Argumentation Discourse, Educational Technology.*

### INTRODUCTION

Online discussion forums are constantly employed in education courses to enhance student discourse leading to an enriched understanding of course content (Chinn & Waggoner, 1992; Spatariu, Hartley, Schraw, Bendixen, & Quinn, 2007). Factors such as background knowledge, instructional tasks, group structure, personal characteristics, assigned reading, and scaffolding are key factors to effective online discourse (Erkens, 1997; Stein, & Miller, 1990; Veerman, Andriessen, & Kanselaar, 1999; Veerman & Treasure-Jones, 1999). Researchers contend that more qualitative analysis of discussions is necessary to understand the intricacies of discourse construction and results within education courses (Marra, Moore, Klimczak, 2004; Gibson, 2003; Rourke & Szabo, 2002; Winiacki, 2003). Spatariu et al. (2006) explored the influence of a discussion leader procedure with specific instructions on the quality of online argumentation and interactivity from a quantitative perspective. The results of the study indicated that students

participating in groups receiving specific instructions produced better argumentation discourse and exhibited increased interactivity patterns. However, the particular participant reactions both at individual and group level were not captured. The researchers examined in-depth the reactions and ideas of each participant as they contributed to the construction of arguments based on the issue at hand, whether or not schools should adopt new educational technologies, which led to instrumental information that can be used for future design and structure of online discussion groups.

Argumentation for the purpose of this study, as well as defined by other researchers, refers to making convincing claims backed up by sound evidence and understanding various aspects of an issue involving recognizing conflict presence and being willing to engage in debate (Stein & Miller, 1991; Coirier, Andriessen, & Lucille 1999; Golder & Pouit, 1999). The aim of the study is to investigate the nature of the discussion among participants in the same group

and collectively between groups. The authors wanted to conduct an in-depth analysis of the participant's reactions, ideas, and positions to identify how they are influenced by the group dynamics and the leader instructions. Thus, the study answered two main research questions:

- Does online instruction impact student discourse during asynchronous online discussions?
- What are the similarities/differences within the treatment and control groups? If there are differences between the treatment and control groups, to what extent are the results between groups different?

This paper is divided into four sections. First, they present a succinct overview of existing qualitative discourse analysis studies. Second, they provide a descriptive overview of the methods used and describe the methodology and data analysis procedures. Third, they report the results and analyze the findings. Finally, based on the results they discuss instructional interventions that can be instrumental in boosting the quality of online arguments.

### **Qualitative analysis and online discussions**

Although there is a growing body of quantitative research on arguments in online settings not much has been done in the realm of qualitative research in this area (Tesch, 1990). Existing quantitative research studies show that argumentation is related to factors such as group dynamics (Chang, 2009; Clark, D'Angelo, & Menekse, 2009; Jeong, 2004), message labeling (ChanLin, Chen, & Chan, 2009; Jeong & Joung, 2003; Valcke, De Weaver, Zhu, & Deed, 2010), note starters (Nussbaum, Hartley, Sinatra, Reynolds, & Bendixen, 2002), discussion instructions (Heejung, Sunghee, & Keol, 2009; Jorczak, & Bart, 2009; Nussbaum, 2005; Richardson, & Ice, 2010; Spatariu, et al., 2007), and personal characteristics of learners (Bendixen, Hartley, Sas, & Spatariu, 2003; Nussbaum et al., 2002; So, 2009; Zhang, Kohler, & Spatariu, 2009).

A number of recent studies employ discourse analysis related to the use of online discussions. Marijke, Hilde, Bram, & Martin (2010) used grounded theory to explore cognitive processes of undergraduate students engaged in online discourse in science education classes. The results identified a number of issues such as strategy use, intervention scope, interaction, previous discussions

experience all of them mostly related to peer tutoring. Based on these some suggestions were made to help the tutors feel more at ease as they could experience uneasiness related to lack of subject matter expertise or timing of intervention. The purpose of the current study was not to focus just on the discussion leader participation; it could be that such factors play a role especially in argumentative situations involving peers as leaders. Another study Baran & Correia (2009) applied qualitative inquiry methods to uncover strategies used by graduate educational technology students to manage challenges resulting from instructor dominated online discussions. Results of the study showed, strategies that were inspirational of practice oriented led to a more relaxed and conducive learning participatory environment. In the present study the treatment group was given specific instructor guideline, therefore expectations were imposed on the participants which presented possible pressure. However, the instructions were posted once then the groups took the discussions further with instructor intervention or probing. The control group was provided with less instructor guidance and feedback. A qualitative study on online discourse in a math and science pre-service course (Liang, Ebenzer, & Yost, 2010) revealed that collaboration was employed in developing research proposals. Although the online discourse enhanced the class overall, the critical aspect of evaluating others view points through scientific inquiry was not present. This study prompted participating students to openly think critically and debate an important educational aspect of their career as future teachers.

### **Methodology**

Technology is a hot topic in education and receives positive and negative attention in the literature from a variety of perspectives (i.e., students, teachers, parents, government). In this study the researchers investigate asynchronous online discussion from an instructional perspective. In this section they present their method for this research and provide an overview of the method of analysis. They conducted preliminary quantitative analysis which revealed statistical significance; these results are in-line with recent research literature; and guided more in-

depth qualitative analysis. They will discuss the quantitative results that coincide with the qualitative data analysis only to identify the foundation for this fine-grained analysis; and demonstrate their motivation to examine the data more closely, using content analysis, which is the focus of this research.

## Participants

The participants were 44 pre-service teachers enrolled in undergraduate educational technology courses at a large southwestern university in the United States. Demographic and discussion data was collected via WebCT, an online management system tool. All participants were randomly assigned to either a treatment position (N=23), 6 small discussion groups with a leader and pre-determined argumentation instructions, or control position (N=23), 6 small discussion groups with a leader but no instructions. Study procedures involved completion of consent forms and demographic profile. Neither student leaders nor group members had any knowledge of the assessed discussion outcomes as per this study.

## Procedure

This study investigates pre-service teachers by proposing an educational technology dilemma that required them to think critically about the topic, as they will inevitably be faced with making decisions about technology in their own classrooms in the near future. The goal in this research was two-fold: (i) to investigate the potential impact of online instruction using increased detailed instructions, instructor feedback and probing (treatment group) versus skeletal instructions and less than useful feedback and no probing from the instructor (control group); and (ii) to identify the similarities/differences within the treatment and control

groups. If the authors prediction that the treatment group would excel was correct, they wanted to delve deeper into the different reactions between the treatment and control groups. In order to accomplish this goal the instruction and instructors involvement needed to be identifiably different for each group but the dilemma was the same for the treatment and control groups. The dilemma used in this study was chosen from a collection of controversial issues in education; should teachers adopt new technologies in K-12 schools (Abbeduto, 2000)? The online discussion took place over a two week period of asynchronous online discussions regarding the dilemma about educational technology in the schools. The guidelines were different for each week (see Appendix A for instructions for week 1; and see Appendix B for instructions for week 2).

The dilemma and instructions for the control and treatment groups for week 1 were posted on the discussion board after a face to face meeting. The directions for week 1 were to discuss the dilemma asynchronously online. The treatment group received instructions to read the dilemma and post at least 3 times during the week following these specific guidelines:

- Provide an initial posting (taking one side);
- Then a challenge (debating a group member position); and
- A response to a challenge (responding to the debate).

The control group was given the same dilemma to read and simply asked to post 3 times with no other explanations (see Appendix A for instructions for treatment and control groups).

At the end of the first week the leaders in the control and treatment groups were asked to provide their group with a brief summary of the discussion trend that developed over the course of the first week. During the second week of the asynchronous dilemma discussion the control and treatment groups were asked to respond to two items: (i) what is your reaction to the discussion topic as it evolved in your group; and (ii) what is your final resolution to the dilemma?

In terms of the instructor's feedback to the groups, this was thoughtfully executed between the control and treatment

	Control Groups N=23	Treatment Groups N=23	
Group C1	3 Female 1 Male	Group T1	3 Female 1 Male
Group C2	3 Female 1 Male	Group T2	4 Female
Group C3	4 Female	Group T3	3 Female 1 Male
Group C4	2 Female 1 Male	Group T4	3 Female 1 Male
Group C5	4 Female	Group T5	3 Female 1 Male
Group C6	3 Female 1 Male	Group T6	2 Female 1 Male

Table 1. Group Distributions by Size and Gender

groups. During the first week of discussion, the treatment groups received brief but regular interaction from the instructor. The feedback from the instructor was supportive and directed toward individual responses, often it highlighted critical points that an individual made and aimed at posing more probing questions that required the groups to reflect on their knowledge and beliefs about educational technology. Below are four samples from the instructor's posting to different treatment groups, because there were six separate treatment groups the transcripts convey a variety of different comments but the nature of the instructor's responses remained consistently guiding, supportive, and probing.

### **Sample 1**

I encourage you to think and generate as many reasons as you can to support your claim. For example, if you are on the pro side of the issue try to go beyond what is presented in the dilemma by bringing in ideas from other classroom readings, your own experiences, and/or established facts. This would also be the case if you adopt the con side of the argument. When you do your second posting this week, which is the challenge to a group member's initial post, I encourage you to do the same. For instance, when you adopt the con side as a response to a pro side posting, make the case for why technology is so beneficial all the time by bringing in evidence from readings, experiences, facts etc. Even though you may not agree with the con side imagine that you do and think broadly and deeply for reasons and evidence that could be valid arguments for the position. Then in your third posting you can restate your belief again. They may be the same or you may see things somewhat differently after being engaged in this disagreement process.

### **Sample 2**

These are very important concerns. It looks like you are not against new technologies but advocate for wise ways to use them. Any thoughts on what teachers can do to avoid technology dependency and still benefit from its use?

### **Sample 3**

I am glad you took the con side. It is important to analyze both sides of the issue. You discuss most of the cons from your experience with online classes as a student. However,

if you put yourself in the role of the teacher, can you talk about any technological cons? For example, distance education entails more prep work on the instructors as they have to design the courses.

### **Sample 4**

The Internet provides great resources but not everyone has access to it. Some parents may be able to buy a book for their children but not a computer. Even though they may have a PC, they might not have internet access. This is speaking in terms of families; but what about schools? There are many 'at risk' schools that do not have computers. Then we need to look at the schools who might have the technologies but do not use them; still kids do not get computer exposure either way. Do you think there is anything that can be done about availability of computers in schools? How do veteran teachers who have computers in their classrooms but lack knowledge and understanding to capitalize on the student learning? Can anyone find statistics about how many families or schools have or do not have access to computers or the Internet?

During the first week of the discussion the control group did not receive any consistent feedback, it was generally once for each of the six control groups. The feedback did not address individual participants; it usually reiterated what was presented in a vague and generic manner. More importantly in the end it might be more important to notice what was missing in the feedback; such as, amount of instructor involvement, consistent and regular instructor interaction, void of positive comments, lack of specific examples or extrapolation of the student's thinking, and the absence of any type of probing questions. For example, this is an excerpt from instructor's feedback to a control group.

Some good points being mentioned. Technology is already present, we just need to learn how to use it.

During the second week of the discussion, again the control and treatment groups received different directions (see Appendix B for instructions). There was one other difference in the directions for week 2; the directions were not posted on the discussion board as with week 1, but rather appeared as informal discussion from the instructor in each group's small group discussion area. The feedback

for week 2 followed the same patterns for the treatment and control groups as they did for week 1. Here are abbreviated transcripts from feedback to the treatment and control groups for week 2.

### *Treatment Sample 1*

This is an excellent point that is being made by a couple of the group members. It is true that today's students are more technologically advanced and educators have to try to keep up with that. Does this have to be a negative consequence? Can you talk more about benefits of students being more advanced than teachers? What might be some activities that could support technology if the students are more advanced?

### *Treatment Sample 2*

This group is really exposing some great points! I am Glad that you are able to look in-depth at both sides of the issues that are being raised in your discussion. It seems that you are moving to the idea that technology in isolation is not so much a problem but how it is being utilized is what really makes the difference. What do you all think are some key elements to executing the use of technology? Do you see any differences in how this should be done for different age groups or to meet the individual differences of students with special needs or who come from culturally different backgrounds?

### *Control Sample 1*

It helps move the discussion along if everyone participates in the discussion. I think you all have some knowledge of this based on your personal experiences.

### *Control Sample 2*

It could be that there are students who are not interested in technology and would rather not use a computer to Accomplish classroom tasks.

Initial preliminary analysis was conducted using *t* tests to compare the two groups and support our qualitative investigation (quantitative results were reported in detail by Spatariu et al. 2007). In summary, argumentation was measured and results indicated subjects performed better both weeks in the treatment group (first week  $M= 3.088$ ,  $SD= .361$ ; second week  $M= 2.934$ ,  $SD= .816$ ;  $N=23$ ) than in the control group (first week  $M= 2.845$ ,  $SD= .464$ ; second

week  $M= 2.193$ ;  $SD= .734$ ;  $N=21$ ). Interactivity was also measured and results indicated subjects performed better both weeks in the experimental group (first week  $M= 3.036$ ,  $SD= .557$ ; second week  $M= 2.978$ ,  $SD= 1.060$ ;  $N=23$ ) than in the control group (first week  $M= 1.872$ ,  $SD= .324$ ; second week  $M= 1.838$ ,  $SD= .941$ ;  $N=21$ ). However, the argument quality was not statistically significant the first week even though the mean was higher in the treatment group ( $t_{(42)} = 1.942$ ,  $p = .059$ ). This prompted a more in-depth qualitative analysis of the content and quality of the discussions.

The qualitative analysis was done on 272 discussion transcripts generated by both groups over the two week duration of the study. Transcripts were coded based on group (treatment/control), small group (1, 2, 3 etc.), and participant; and uploaded into Atlas-Ti, a qualitative software program used for assisting in the coding, organization, analysis, and interpretation of the data. The researchers took a three step systematic design approach, open, selective, and axial coding to analyze the online postings (Creswell, 2008). Data was coded initially and then subsequently by two researchers for inter-rater reliability (.90).

## **Results and Discussion**

In this section the researchers will report their findings for the treatment group in depth and provide the final analysis of the control group. The analysis procedure was conducted with three levels of content analysis; (i) conventional, (ii) directed, and (iii) summative (Hsieh & Shannon, 2005). The findings are rich in content, particularly for the treatment groups which demonstrated the most consistency and continuity within and between the six groups. Their belief is, this is the case due to the explicit guidelines and feedback that the treatment groups received compared to the control groups. All levels of analysis were initially conducted by the researchers and subsequently underwent two separate rounds of interrater reliability checking completed by graduate assistants working in the field of online discussions and argumentation but were not involved with the data collection or the course.

Level 1 analysis used the conventional approach to organize the large amount of data. The conventional



content analysis uses the text from the data to identify codes for a particular way of thinking or position which was later able to be placed in larger categories. Level one conventional content analysis was completed on all 272 posted responses which resulted in 84 codes emerge from the (see Appendix C). In appendix C the numbered items reflect the initial level of coding and represent that all items were identified in the treatment and control groups. These items were further reduced into categories (see Appendix C; lettered and bolded items). Appendix C is presented to demonstrate the rigor of the qualitative analysis and to allow other researchers to use a similar coding scheme in future research; space does not permit extrapolation of the coding scheme. They found that the responses had a high degree of evaluative characteristics (especially within the treatment groups), that is, the responses were not dichotomous; such as, simply a pro or con for educational technology. Instead, the breadth of participant responses went beyond; to include a pro and con label; in addition they included the following: don't know, don't care, could be both, and it all depends. Later the 6 initial coding labels for the category used as the example above were reduced to the following 4 labels: (i) pro, (ii) con, (iii) don't know and don't care; and (iv) could be both and it depends. This approach to content analysis is a mixture of inductive and deductive perspectives, below are a sample of our coding from the original transcripts.

### ***TEBSP: Treatment Group Evaluation Based on Student Perspective***

I am definitely all for using technology to help teach students in the classroom. The fact that students can be figuring things out for themselves can be much more beneficial than someone simply showing them how to do it.

### ***TEPE: Treatment Group Evaluation Based on Personal Experience***

Even though I took the con side, at home I am addicted to the internet and other computer software! I do learn things that I do not learn in class but sometimes it keeps me from doing what I need to do and I am not focused on what the teacher wants me to focus on. Students need to stay focused and I see computers and other technology as a big distraction for today's young students.

### ***TB: Treatment Group Both (it depends)***

Let me clearly state that I do not believe that technology should be the only method of instruction in order to yield desirable results. It all depends on how we choose to incorporate it that could potentially make the difference.

Level 2 was primarily deductive directed content analysis based on preliminary quantitative data analysis; and categories found in the research (see Appendix C). In a directed content analysis the researcher begins with a theory or relevant research as a driving force for the initial coding of large amounts of data (Hsieh & Shannon, 2005). In appendix C we identified 5 categories that appear as boldface: (i) position on dilemma; (ii) support of position on dilemma; (iii) perspective of dilemma evaluation; (iv) nature of dilemma evaluation; and (v) nature of response to others. For example, using the quotes used in level 1; TEBSP and TEPE were placed under the category of Perspective of Dilemma Evaluation; and TB was categorized under Position on Dilemma. Once all codes were evaluated and they were assigned to a category, all codes for each category were counted and ranked highest to lowest within each category for each group. Then the rankings were compared between all of the treatment groups and all of the control groups. The findings of the study show that there were similar rank orders for the categories of most of the treatment groups but not the control groups. Out of the six treatment groups the researchers found 5 groups that had very similar trends in their rank orders in three of the categories:

- Perspective of dilemma evaluation (Figure 1);
- Nature of dilemma evaluation (Figure 2);
- Support of position on dilemma (Figure 3).

Perspective of dilemma evaluation comprised the arguments that had to do with how the student presented support for their position on educational technology. This category encompassed arguments that were set in the context of personal experience (54%), background knowledge (28%), based on a teacher's perspective (9%), or from a student's perspective (18%) (Figure 1). Treatment group 6 was the only treatment group that had a different ranking in this category. It was primarily the females in this group that shifted the results; they used more information

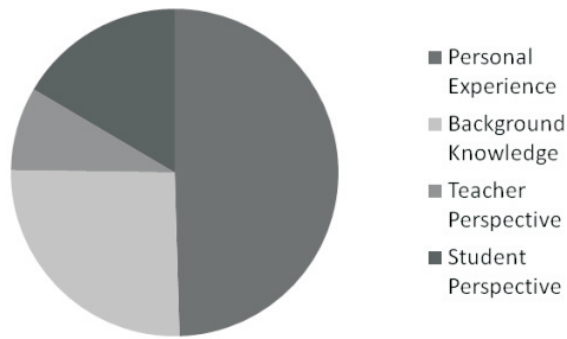


Figure 1. Treatment Perspective of Dilemma Evaluation

from the text and background knowledge as opposed to personal experience. This could be because admittedly they disclosed they were not computer savvy; they found it to be cumbersome and time consuming. Treatment group 6 also had the bulk of the student perspective responses. Interestingly, the responses that were derived from a teacher perspective were the least represented. We think this may be because of the undergraduate status of the students and the lack of teaching experience. It is standard for pre-service teachers to view themselves in the role of the teacher; and conversely identify with a student role which they are currently experiencing. The control groups varied drastically in this category, there was little continuity between the groups and typically each of the control groups took on the perspective of their leader. That is, if the leader used a personal experience, the others followed in suite. Two of the control groups were identified as personal experience, three groups supported their positions with background knowledge or more objective text and research materials, and one group represented the student viewpoint in their discussions. The large amount of text-based background knowledge responses indicated a lack of individual thinking and a lack of critical perspective-taking that appeared to be present in the treatment groups. The control groups had less interaction and the discussion was more linear.

Nature of dilemma evaluation comprised excerpts of the discussions that could be labeled as cognitive (39%), solution-oriented (or metacognitive) (31%), emotional (26%), and social (14%) (Figure 2). The researchers saw the exact same trend in all six of the treatment groups. However, the trend in this category was more consistent among the control groups; it was not remotely consistent

with the treatment group. The nature of the dilemma for the control groups were based primarily on and fueled by social and emotional responses. There were no varying levels of cognitive perspective as seen in the treatment groups. Again, this speaks to the linear course of the control groups' discussions and this category demonstrated the lack of evaluation between the objective and subjective perspectives that lead to proper evaluation of a dilemma. The control groups discussion were more opinion and not well developed for adequate solutions; this was promptly visible in the week 2 discussion of the control groups as seen in the short responses and frequency of responses. The treatment groups all had the same rank order and the nature of the dilemma was more evenly distributed among the treatment groups; typically a response would cover two or more of the areas in this category. For example, a student would begin with lower level thinking and develop a train of thinking that would consist of higher-order thinking (application, synthesis, evaluation). The responses of the treatment groups appeared to be more organized (another indication of critical thinking); integrated amongst group members (they were interacting and responding to each other), and the trajectories of each groups discussion was solution-oriented. This level of thinking set the groups up nicely for the second week of discussions. They had more exhaustive debates on both sides of the dilemma because they had to look at alternatives that they may or may not have agreed with because they were directed to respond and argue the opposite point of their group-members. This clearly had an impact on the sophistication of the treatment group's discussions. As indicated earlier, there were clear complexities in the nature of evaluation in the treatment groups as was seen in the integration of domains

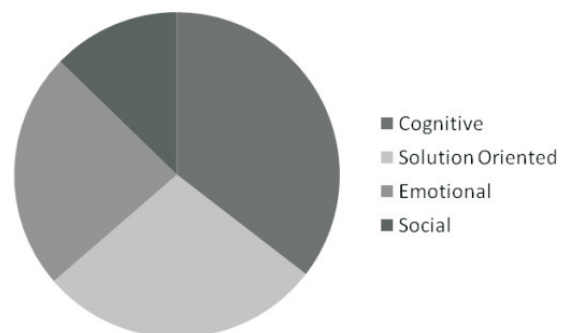


Figure 2. Nature of Dilemma Evaluation

within single responses. That is, a single response entailed not only cognitive views but integrated views that included emotional and social dynamics; this was more the norm among the treatment group's responses.

Support of position on dilemma was comprised of the responses according where the individuals stood on the dilemma regarding educational technology in the schools. This category looked at two variables; whether they were for or against educational technology and whether or not they provided explicit examples for their position. The distribution was as follows: examples for support (71%), no examples for support (4%), examples against (9%), and no examples against (6%) (Figure 3). Five of the treatment groups presented the same rank order for this category. The outlier in this category was treatment Group 3; which consisted of 4 females who were more against educational technology. The interesting part of treatment Group 3 being the outlier in this category was that the bulk of the social response in the Nature of the Dilemma Evaluation category were derived from Group 3 participants as the primary reason they were against educational technology. Even more interesting was that when the other treatment groups provided examples for supporting educational technology one of the most prominent reasons for supporting it was because they believe in a constructivist approach to learning or they favored a Vygotskian approach which included peer or collaborative learning. Now two things are important to mention here; when these were the emphasis of their argument it was coded as cognitive because of the application of learning theory; but one could also have interpreted that they were getting at a social perspective

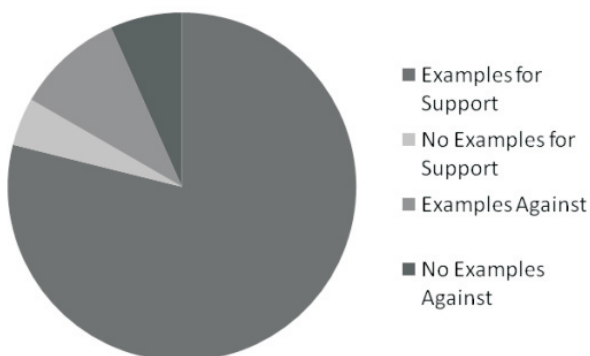


Figure 3. Support of Position on Dilemma

because that underpins Vygotskian and constructivist approaches. They contemplated this issue and decided that their intention was not so explicitly social but more entailed more critical thinking and reflection but the researchers mention it here because it could be an argument for a social perspective. Therefore, their first finding for this category was that the treatment group had a significantly broader and more in-depth view of the dilemma due to the overwhelming support of their responses by providing examples for their position. The second finding was the treatment group overwhelmingly supported educational technology in schools. On the other hand, the control groups, who were more mixed on the dilemma with regard to being for or against educational technology. In addition, the control groups demonstrated more limitations to their discussions by having far less support for their positions. The control groups floundered by comparison to the treatment groups in this category by far the most. They did not have enough depth or breadth in their discussions to justify support for educational technology and it was primarily driven by emotional responses to the dilemma.

Level 3 analysis procedures were conducted to show the process of the discussions between the treatment and control groups. The frequency distributions do not enable, however, the examination of the evolution of the process (e.g., changes in the knowledge production over time, differences in discourse patterns, or the role of individual ideas in broader context). The researchers used more descriptive methods to evaluate the differences in the nature and style of the knowledge production in the differing conditions. For this purpose, the unit of analysis was extended to cover the entire material for each group to enable a process perspective on the discourse. Small group data was merged and recoded using the more narrow categories. Consequently, the process analysis presents a synthesis of what were considered distinguishing features of the process in between group differences. The following features were judged as representing plausible operations, background knowledge, personal experience, explanation process, developing ideas in dialogue, and self-reflection.

It was clear by the findings in level 2 analysis that the treatment groups outperformed the control groups. Also, the researchers identified patterns among the treatment groups but they did not find any coherent patterns among the control groups. This raised the curious question about the discourse processes that occurred between the control and treatment groups. They conducted a summative content analysis, which is inductive, guided by emerging categories in the data. Here they reduced the data further by collapsing the treatment groups and the control groups as a means of identifying a broader perspective about the course or process on the discussions as they related to the larger categories. In other words, they wanted to know how the larger categories were represented in the treatment group versus the control group. Summative content analysis involves counting and comparing groups within and between by using keywords or content, followed by interpreting the underlying context. Using this method of analysis patterns emerged in terms of how the categories were addressed and evolved throughout the discussions. This provided an overview about the nature of students' knowledge, critical thinking, argumentation, and counter-argumentation.

The important finding identified in the level 3 analysis was the clearly different patterns that emerged between the treatment and control groups regarding how the participant's thinking about the dilemma evolved throughout the discussion. Evaluation of the treatment groups indicated a more complex and sophisticated developmental pattern that took seven steps to achieve a viable solution to the dilemma of educational technology in the schools (Figure 4). The treatment group appeared to be manipulating the information that was presented in the discussion to achieve a solution; and perhaps the participants had a notion or understood that they may be heading for a change in their perspective based on the information that was produced during the discussion. Although, it is thought through our analysis that even though they may have anticipated some change in their viewpoint, there was an underlying sense of ambivalence and some amount of struggle during the process. This apparent struggle was noticeable at this level of analysis because all groups revisited two of the larger categories

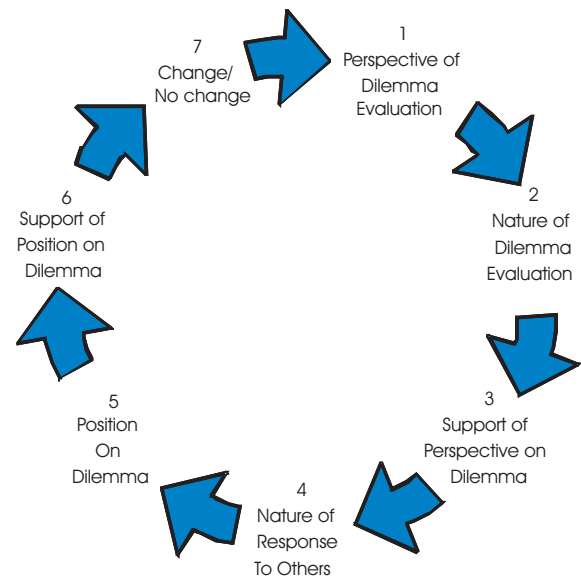


Figure 4. Treatment Group Discourse Process

identified in level two analysis; perspective of dilemma evaluation and support of position on dilemma.

Figure 4 helps to explain the treatment groups discourse process as it unfolded. The groups began by, first, providing a perspective of the dilemma, second, they moved to providing some indication about how they viewed the nature of the dilemma, third, each member of the group provided support for their perspective, and then fourth, each member progressed to responding to other's. Rather than continuing to proceed with the goal of the assignment (provide solutions for the dilemma), the treatment groups consistently across all 6 groups retreated back to rehashing their position on the dilemma; and then again revisited support for their position prior to indicating a change. From Figure 4, step 1 and 5 are the same but we chose to name step 5 slightly different to distinguish the recycling back to this category. Although the topic was the same, there were some definite differences the second time around. For example, this is where many of the responses for the treatment group's emotional nature of the dilemma were identified; and the length of the responses were more brief but straight to the point at hand; and this is also a section of the discussion in which responses were posted without support.

The last of the differences (posting without support) is particularly interesting because it is the second category to be revisited by the treatment group. From Figure 4, steps 3



and 6 are the same; they chose to use the same label because there was no apparent difference in the discussions. What did occur here was that initially when the participants supported their perspective it was generated by the individuals, but when it was revisited in step 6 it was because other group members pointed out that some members were posting perspective without support and responded accordingly to request that support be provided. Where individuals did not generate the support, their peers activated a request for support and so the category was revisited. These 6 steps prompted some changes to individual's responses to the educational technology dilemma, some changes were drastic and others were mild to moderate.

The control group's discussion patterns were more abbreviated in the process. Like the treatment group, the control group demonstrated overlapping characteristics in the content of the discussions and patterns in the discussion; however they could only uncover three stages within the control group's discussions (Figure 5). The first stage in the discussion was shared among two of the categories identified in level 2 of the content analysis; perspective on the dilemma and support for perspective; the second stage in the development of the discussion was the nature of the dilemma; and third nature of the response to others.

Addressing the first stage which is shared by two categories is important because it occurred often in the control groups but not at all in the treatment groups. Frequently, participants would not state their own perspective but rather they adopted the perspective of the previously

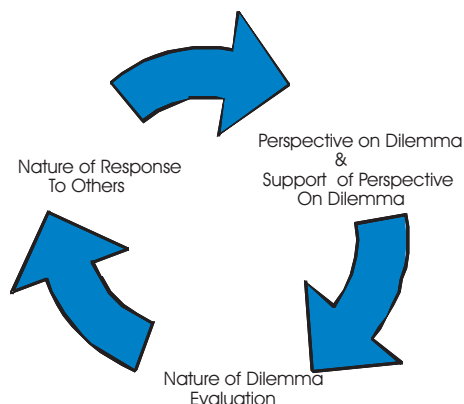


Figure 5. Control Group Discourse Process

posted response and proceeded to discuss support for another participant's perspective. It was not uncommon to see initial postings that stated a perspective without any support. This lack of support may have prompted the other students to feel the need to provide support for another participant's perspective due to the absence in the original posts. In general, the control groups had little organization that could be identified in their responses. There seemed to be disjointedness in the control groups, in that there was not movement or advancement in the discussions. This made the findings of the third stage (nature of response to others) not surprising on one hand but somewhat perplexing on the other hand. The nature of response to others for the control group was completely dichotomous to the treatment group. In the control groups there were no challenges to others comments, no matter how poor in thought quality they may have been; there were detachment among posted responses that clearly did not even align with any post previously made in the groups. It was as if the individual thought of the post in advance and posted it regardless of what anyone else had to say. There were no attempts do any problem solving or identify possible solutions, in fact, the underlying feeling of apparent change that was prominent in the treatment group was not even remotely scratching the surface in the control groups. The emphasis was more on opinions and subjectivity than on objective knowledge; this is interesting because they seemed to use the text as a point of reference but there was no ownership of the content. There was an absence of social and emotional domains aligned with their low level cognitive responses.

The researchers believe the profound differences that were identified in the control groups, as compared to the treatment groups, on an individual group basis and collectively were strongly indicative of the lack of specific guidelines provided to the control groups. Remember that the control group was not given directions to think or reflect in a metacognitive manner. In addition, the control group received only minimal vague feedback from the instructor. This is a good indication that instruction during the use of educational technology platforms may require both detailed instruction; and constant and consistent feedback from the instructor.



## Discussion and Conclusion

The selected dilemma pertained to the level of the cognitive (topic appropriate for discussion in an undergraduate educational technology course), social (an issue that directly concerns current schooling system), and domain level of the subjects (the issue concerns them directly as future teachers faced with the rapid advancement of learning technologies) thus meeting basic argumentation requirements (Coirier et al., 1999; Golder & Poutit, 1999; Stein & Miller, 1991). This analysis indicated that the treatment group outperformed the control group in every category consistently within the small group analysis and the between group analysis; and provided richer text in order to specifically identify the following main themes: Position on Dilemma; Support of Position on Dilemma; Perspective of Dilemma Evaluation; Support on Perspective of Dilemma Evaluation; Nature of Dilemma Evaluation; Nature of Response to Others; Nature of Position Change.

The primary research questions involved with the present study were: (i) What are participants' reactions to the educational technology dilemma within and between groups; and (ii) are the reactions within and between groups different? If so, how are they different? The above analysis of the discussions shows what the particular reactions were and how they differ at both group levels.

In summary, first, the process between the treatment group and control group, demonstrated more sophisticated critical thinking in the treatment group. The most distinctive result is the emphasis between the perspective-taking (opinion-based) and deciding on a position (evidence-based); and the nature of the support. The treatment group progressed through a series of discourse and evaluation (7 steps); whereas, the control group functioned much less critically (3 steps) and rarely settled on a position but rather provided more opinion than evidence based perspectives.

Second, the treatment group reflected more perspectives initially and interacted with their peers prior to settling on a position; and because of this some students indicated a change of perspective. The control group never indicated a change in their perspective.

Third, support in the treatment group, reflected 3 main areas in a clear hierarchical manner: (i) personal experience; (ii) use of technology examples; and (iii) background knowledge; and rarely based support on teacher or peers. The control group lumped their perspective and support in a single effort; and generally based on personal experience and peers (often no support was ever provided). Additionally, some gender differences were observed but more research would be necessary to make valid inferences since there were very few males present in all groups.

This study realizes the complexity and rigor of a qualitative analysis in this area. This study summarizes categories that may promote or inhibit higher order thinking during on-line discourse and demonstrates that discussion leader prompts can generate better arguments and increase the interactivity within small group online discussions. When instruction is structured and goal oriented students thinking is less impacted by the instructor's comments. They also recommend training students in being the discussion leaders within the groups. That way they are more empowered and overtly trained in critical thinking engagement and strategies. From a research perspective there may also be a difference in between student lead discussion and instructor lead discussion as students interact differently with their peers.

In terms of future research, they recommend a more in-depth look at the, nature of the responses category in order to better evaluate the cognitive, social, and emotion facets of the two groups (e.g., have the students write a reflective paper or take a survey specifically geared to these areas). This may provide a richer understanding of the differences that underlie critical thinking skills, argumentation, and decision-making/reasoning abilities.

With the rapid advancement of technologies, another important future recommendation for research is to automate prompts by programming them in the discussion board software. For example, a more intelligent system can be built, based on key critical thinking words, which give students prompts such as metacognitive questions while they write their posts.

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## Appendix A

### Instruction given by the discussion group leader to the treatment group:

- Read the technology dilemma carefully. You have to do at least 3 posts for this week's discussion (initial, challenge, and response to challenge).
- Make the first posting. In this first posting you will adopt the side of the dilemma you mostly agree with (either the pro or the con presented). State your claim clearly and support it with evidence and/or reasoning.
- Read other group members postings. Respond to at least one of them. The response has to be a challenge to the posting you are responding to. The challenge means adopting and supporting with evidence the opposite side of what is presented in the posting you are responding to.
- Make a third posting. This will be a response to one of the challenges addressed to you.

### Instructions given by the discussion group leader to the control group:

# RESEARCH PAPERS

- Read the technology dilemma carefully.
- You have to do at least 3 posts for this week's discussion.
- Make an initial posting as an answer to the dilemma.
- Respond to at least 2 other people postings.

## Appendix B

### Instructions given to the treatment groups for week 2 dilemma discussion:

- Here is what we have to do this week. After discussing the dilemma of whether new technologies should be adopted by the schools or not; a certain group direction has emerged. Read your group leaders summary carefully and respond to the following to questions.

1. What is your reaction to the discussion topic as it evolved within the group?
2. What is your final resolution to the dilemma?

- Respond to each of these two questions in separate postings. First, post your response to question 1, then, wait a

day or two before you post your response to question 2. By waiting to post your response to question 2, you will have the opportunity to read other group members' reaction to the group direction. Take the time to reflect on your initial thoughts and the reaction of your group-mates; think through your response thoroughly using your abilities to be critical thinkers.

### Instructions given to the control groups for week 2 dilemma discussion:

- Here is what we have to do this week. After discussing the dilemma of whether new technologies should be adopted by the schools or not; a certain group direction has emerged. Read your group leaders summary carefully and respond to the following to questions.

1. What is your reaction to the discussion topic as it evolved within the group?
2. What is your final resolution to the dilemma?

## Appendix C

CODES		MEANING	CODES		MEANING
A	Control Position on Dilemma		AA	Tx Position on Dilemma	
1	CPRO	Control Pro (for computer technology)	43	TPRO	Treatment Pro (for computer technology)
2	CCON	Control Con (against computer tech.)	44	TCON	Treatment Con (against computer tech.)
3	CN	Control Neutral (don't care, don't know)	45	TN	Treatment Neutral (don't care, don't know)
4	CB	Control Both (could be both, it depends)	46	TB	Treatment Both (could be both, it depends)
B	Control Support of Position on Dilemma		BB	Tx Support of Position on Dilemma	
5	CSUPPRO	Supports Argument for Tech.	47	TSUPPRO	Supports Argument for Tech.
6	CNSUPPRO	No Support of Argument Tech.	48	TNSUPPRO	No Support of Argument Tech.
7	CEXSUPPRO	Uses Examples for Support Tech.	49	TEXSUPPRO	Uses Examples for Support Tech.
8	CNEXSUPPRO	No Use of Examples for Support Tech.	50	TNEXSUPPRO	No Use of Examples for Support Tech.
9	CSUPCON	Supports Argument for Against Tech.	51	TSUPCON	Supports Argument for Against Tech.
10	CNSUPCON	No Support of Argument Against Tech.	52	TNSUPCON	No Support of Argument Against Tech.
11	CEXSUPCON	Uses Examples for Support Against Tech.	53	TEXSUPCON	Uses Examples for Support Against Tech.
12	CNEXSUPCON	No Use of Examples for Support Against Tech.	54	TNEXSUPCON	No Use of Examples for Support Against Tech.
C	Control Perspective of Dilemma Evaluation		CC	Tx Perspective of Dilemma Evaluation	
13	CEPE	Control Evaluation Based on Personal Experience	55	TEPE	Tx Evaluation Based on Personal Experience
14	CEBK	Control Evaluation Based on Background Knowledge	56	TEBK	Tx Evaluation Based on Background Knowledge
15	CEBTP	Control Evaluation Based on Teacher Perspective	57	TEBTP	Tx Evaluation Based on Teacher Perspective
16	CEBSP	Control Evaluation Based on Student Perspective	58	TEBSP	Tx Evaluation Based on Student Perspective

# RESEARCH PAPERS

D	Control Nature of Dilemma Evaluation		DD	Tx Nature of Dilemma Evaluation	
17	CEC	Control Evaluation Cognitive	59	TEC	Tx Evaluation Cognitive
18	CEE	Control Evaluation Emotional	60	TEE	Tx Evaluation Emotional
19	CES	Control Evaluation Social	61	TES	Tx Social
20	CEPRB	Control Evaluation Problem	62	TEPRB	Tx Evaluation Problem
21	CESOL	Control Evaluation Solution	63	TESOL	Tx Evaluation Solution
22	CER	Control Evaluation Reasoning	64	TER	Tx Evaluation Reasoning
23	CECT	Control Evaluation Critical Thinking	65	TECT	Tx Evaluation Critical Thinking
24	CEDM	Control Evaluation Decision Making	66	TEDM	Tx Evaluation Decision Making
25	CECMPR	Control Evaluation Compromise	67	TECMPR	Tx Evaluation Compromise
E	Control Nature of Response to Others		EE	Tx Nature of Response to Others	
26	CRCH	Control Response Challenging	68	TRCH	Tx Response Challenging
27	CRCHM	Control Response Challenge Multiple Points	69	TRCHM	Tx Response Challenge Multiple Points
28	CRU	Control Response Understanding	70	TRU	Tx Response Understanding
29	CRA	Control Response Aggressive	71	TRA	Tx Response Aggressive
30	CRD	Control Response Detached	72	TRD	Tx Response Detached
31	CRC	Control Response Cognitive	73	TRC	Tx Response Cognitive
32	CRE	Control Response Emotional	74	TRE	Tx Response Emotional
33	CRS	Control Response Social	75	TRS	Tx Response Social
34	CRPRB	Control Response Problem	76	TPRB	Tx Response Problem
35	CRSOL	Control Response Solution	77	TSOL	Tx Response Solution
36	CRR	Control Response Reasoning	78	TR	Tx Response Reasoning
37	CRCT	Control Response Critical Thinking	79	TCT	Tx Response Critical Thinking
38	CRDM	Control Response Decision Making	80	TDM	Tx Response Decision Making
39	CRCMPR	Control Response Compromise	81	TCMPR	Tx Response Compromise
F	Control Nature of Position Change		FF	Tx Nature of Position Change	
40	CCGG	Control Change	82	TCGG	Tx Change
41	CCGL	Control Change Based on Logic	83	TCGL	Tx Change Based on Logic
42	CCGNL	Control Change Based on NO Logic	84	TCGNL	Tx Change Based on NO Logic

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# LEARNING BEHAVIORS AND INTERACTION PATTERNS AMONG STUDENTS IN VIRTUAL LEARNING WORLDS

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## ABSTRACT

*The goal of this study is to investigate how students behave themselves in the virtual learning worlds. The study creates a 3D virtual learning world, entitled the Best Digital Village, and implements a learning program on it. The learning program, the Expo, takes place at the Exhibition Center in the Best Digital Village. The space in the Expo is divided into three zones: the Lobby, the Exhibition Hall, and the DIY Rooms. Students have to form teams in four before entering the Expo and carrying out their learning tasks respectively. In the Lobby, students are encouraged to sign up in a guestbook and browse through the user guide of the Expo. The Exhibition Hall consists of 3D objects of famous architectures and landmarks around the globe. When students approach the 3D objects, information about the objects will show up in a separated window. Students are encouraged to discuss about the objects online while they are in the Exhibition Hall before taking a quiz about them. Finally, students are asked to enter their team's DIY Rooms together with team mates and create a 3D artifact with embedded online tools.*

*There were 16 teams of school students from two different countries took part in a 5-week experiment for the study. Twelve items of quantitative data were collected with the data logging mechanism of the virtual learning world. The statistic t-test is utilized to analyze these data. Results show that school students engaged more in communication with peers than in navigating learning objects in the virtual learning world. The study also reveals that virtual learning community and proximal learning community play an equal role in terms of interaction patterns among school students inside the virtual learning world.*

*Keywords: Virtual Worlds, Virtual Learning, Community of Practice, Learning Behaviors, Game-based Learning.*

## INTRODUCTION

Due to the enormous promises in providing better learning experiences (Chittaro & Ranon, 2007; John, 2007; Monahan, et al., 2007) and the influence of the widespread of online games, the inhabited virtual learning worlds poised to be mainstream in online learning both in higher education and K-12 school levels. But there are few of evidences or knowledge so far about how school students behave in the virtual worlds in terms of learning behaviors and community of practice.

It is asserted that online community design is the key in successfully crafting the next generation IT systems (Friedl, 2003). It is also claimed that learning community is one of the decisive factors to the success of networked learning

(Schwier, 2001; Redfern & Naughton, 2002; Barab, 2003; Lin, 2005). In the wake of shifting the focus on information delivery to the communication opportunities in the design of learning management systems, the application of human content is getting more attention versus generic binary content or digital content while creating networked learning environments. The trend denounces the significance of the role of learning community of practice in the fields of networked or online learning. Nevertheless, there are two distinctive categories of learning communities in the aspect of networked learning. One is composed of members who have never met in their tangible living worlds. The other one consists of members who are bound to the identical local organizations or

settings and already are acquainted with each other in their tangible living worlds. These learning communities, virtual and proximal respectively, exist in networked learning environments simultaneously.

Although it is claimed that the virtual learning community of practice is one of the most significant and invaluable features in networked learning environments (Barab, 2003; Friedl, 2003; Lin & Kuo, 2006; Lin, et al., 2007), a research finding showed that the performance of virtual learning community lagged behind proximal learning community in conventional web-based learning environments (Lin, et al., 2009). However, as the new paradigm of the networked learning environments, inhabited virtual learning worlds might hold the promise of taking advantage of virtual learning community of practice.

## Objective of the Study

The objective of this study is to investigate the learning behaviors of school students in general inside the inhabited virtual learning worlds and the patterns of their interpersonal interaction in specific in terms of community of practice. An inhabited virtual learning world, the Best Digital Village (BDV), is implemented following the architecture drawn from the techniques and principles of the successful genre of Massively Multiplayer Role Playing Games. A learning program entitled the 'Expo' takes place in the Exhibition Center of the Best Digital Village and is used as the instrument for the empirical study.

## 1. The Architecture of Virtual Learning World and Its Metaphor

A virtual learning world is created for the purpose of collecting empirical data. The architecture of the implemented virtual learning world is drawn from both the successful Massively Multiplayer Online Role Playing Games (Friedl, 2003; McFarlane, 2006) and theories of networked learning (Bonk, & Cunningham, 1998). In addition to the design of the architecture, it is asserted that the metaphor of a virtual learning world could either hinder or enhance learners' perceptions about the learning environment, and affect their learning performance as a result (Tashner, Riedl, & Bronack, 2005). As such, choosing an appropriate metaphor for the virtual learning world is as important as designing its architecture. Therefore, the study

implemented the virtual learning world based on the metaphor of a digital village, which provides a living space that resembles the tangible world of young learners. Hence, the virtual world the study created is entitled the Best Digital Village (BDV). The BDV is composed of a 3D World, a Supporting Pane, a Control Pane, and a Message Pane in terms of its system architecture.

### 1.1 3D World

The 3D World provides a metaphor of the virtual shared learning space in the three-dimension format. This is the primary component of the architecture. It consists of avatars, which are the representation of users in the virtual world, and objects such as learning materials and teleports.

The graphical presentation of the 3D shared space allows a group of people to interact socially and see each other's actions and responses through avatars. Hence, it is imperative for the immersive interface of the virtual world to equip with interaction functionality for avatars' communication that is implemented with several related interface panes in the system architecture.

In the scene of the 3D world of BDV, there are several building blocks. Table 1 summarizes the roles of building blocks in the BDV respectively.

### 1.2 Supporting Pane

There are several features or tools in the Supporting Pane aiming at assisting users to explore and interact with the 3D World. For instance, the Overview Map is equipped with a radar function that could spot the locations of the online avatars. Users could approach any avatar on the map by clicking at it with their mouse. In addition, users could also

Building Blocks	Descriptions
Town Hall and Plaza	Reception, Kiosk, Documents, and Archives of the town
Community Center	Information exchange, Who and Who
Exhibition Center	Exhibition, Artifacts and arts objects displays
Library	Digital Library
School	Learning Space
Mall	Shopping Mall, E-Business, Cinema, and Bank
Park	Recreation Spot and Playground
Residential Area	Apartment for single, House for senior and married couple
Airport	Teleports for connecting to other virtual worlds

Table 1. Building Blocks in the Best Digital Village

search for the current location of a target avatar by keying the name in the search box in the map. Furthermore, users can access the chat room in the Supporting Pane for chatting with peers who are surfing in the 3D World. As to the Informatics window in the pane, it provides data or feedbacks that are related to instructional design of learning activities taking place in the 3D World.

### 1.3 Control Pane

It is composed of tools and features that are designed to enhance the quality of usability of the virtual world. For instance, Who is Online displays the names of users who are currently presented in the 3D World. When users click on the name displayed in the Who is Online, the Learner Profile (LP), which contains information about the user's personal identity and learning status, will pop up over the name.

### 1.4 Message Pane

There are two kinds of message in the virtual world. One of those is the interpersonal interaction message generated by chat room. The other one is the broadcasting message initiated by the system. The Message Pane displays these two types of message in text format.

Figure 1 depicts the architecture of the BDV. Figure 2 demonstrates the 3D world of the BDV with avatars. From a technical point of view, the architecture possesses the following features: (i) It is a distributed architecture metaphorically represented by a 3D virtual world that allows multiple users to interact in a shared space. (ii) Objects in the virtual world are persistent over time. (iii) It is extendable and scalable with run-time editing capability. It allows users to extend the virtual world and make changes to it while it is running (Vellon, et al., 1998).

## 2. Methodology

In order to explore how students behave inside virtual learning worlds in empirical manner, a learning program, entitled the Expo, was designed and implemented on the BDV as an international online collaborative learning program. The program was announced to the international K-12 community through Internet for recruiting autonomous participants. Since the program was implemented as a team-based learning activity, school students had to form a team online with four members

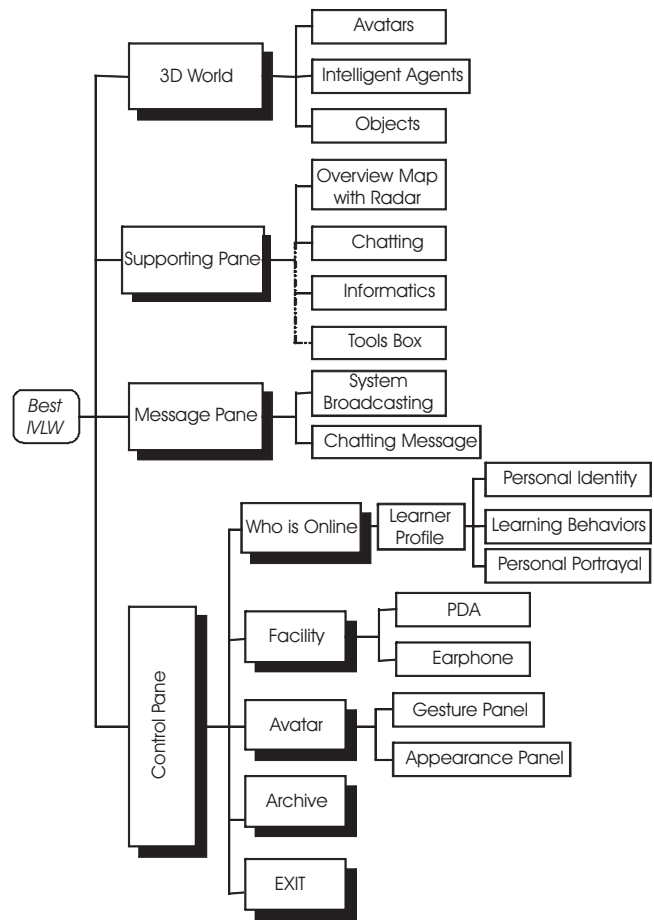


Figure 1. The Architecture of BDV



Figure 2. Avatars in Best Digital Village

before participating in the learning activities of the Expo. The time span of the program was 5 weeks.

### 2.1 Design of the Learning Program: the Expo

The Expo takes place in the Exhibition Center of the BDV and it is composed of three zones in space, which are Lobby, Exhibition Hall, and DIY Room.

#### 2.1.1 Program Overview: the Lobby

There are both a user guide of the Expo and a guestbook in the Lobby for participants' convenient access. In essence,

the Lobby is the place of entrance to the Expo and it provides participants the opportunity for getting acquainted with each other and ready for the program.

The learning tasks for participants of the Expo are divided into individual and group tasks in sequence, which are located at the Exhibition Hall and the DIY Room respectively.

### 2.1.2 Individual Task: the Exhibition Hall

In the Exhibition Hall, there are 3D objects of representative architectures, landmarks, or statues in different countries. Figure 3 is a screen shot of the Exhibition Center.

To complete the individual task, participants have to earn two types of sticker, which are artwork sticker and charisma sticker. To receive an artwork sticker, participants need to pass quizzes about the exhibits. When participants approach an object in the exhibition area, the information about that object will show up in the Informatics window in Supporting Pane. After reading the information about the exhibiting object, participants can click on the "Get a Sticker" button and answer a question about the object. An artwork sticker is awarded when participants provide the correct answer to the quiz. Each participant is required to collect at least three artwork stickers.

To receive a charisma sticker, each participant needs to collect charisma points by chatting with people or reviewing information about online participants containing in learner profiles (LP) or the Guestbook in the Lobby. Table 2



Figure 3. The Exhibition Hall in the Expo

Evaluation Parameters	Weighted Points
Frequency of chatting with people. (X)	$X * 5$
Frequency of reviewing the Guestbook. (Y)	$Y * 1$
Frequency of reviewing learner profiles. (Z)	$Z * 2$

Table 2. Evaluation Rubric for Earning Charisma Points

explains how the charisma points are calculated:

The sum of the three parameters is the total amount of charisma points a participant receives. A participant needs to collect at least 10 charisma points for exchanging a charisma sticker.

### 2.1.3 Team Task: the DIY Room

After all team members have explored the Exhibition Hall and completed the individual task described in the previous section, the team is then granted access to its own DIY Room – a room for the team to design a 3D artifact collaboratively with teammates (Figure 4). In the room, team members are asked to arrange several lego-like blocks and create a 3D artifact by manipulating imbedded tools such as "Translate Object", "Rotate Object", and "Scale Object".

Each team's DIY Room is open to public for visiting and reviewing of the artifact. The participants in the program are encouraged to evaluate the quality and creativity of 3D artifacts created by their peers by providing scores to artifacts in peer evaluation manner.

## 2.2 Research Questions

There are two research questions that the study will address on, which are:

- Are school students more interested in reviewing learning objects than interacting with peers?
- Are school students more interested in interacting with their virtual peers than proximal ones?

Overall, the study wants to explore how school students behave themselves in the virtual learning worlds in terms of learning behaviors and interpersonal interaction patterns.



Figure 4. The Screenshot of DIY Rooms.



### 3. Results of the Data Analysis and Discussion

There were 19 teams from two different countries enrolled in the program of the study autonomously. The teams were also from different schools, which are located at different geographic sites respectively. The fact implies that participants were strangers to each other among teams before the program started.

There were 3 teams didn't really completed assigned learning tasks and dropped out of the program before the ending. Therefore, the valid team number and amount of participants for data analysis are 16 and 64 respectively.

Twelve items of quantitative data were collected through the system data logging mechanism. Those 12 items are frequency of login, time spent in the Lobby, time spent in the Exhibition Hall, time spent in the DIY Rooms, frequency of chatting with teammates, frequency of chatting with other teams, frequency of accessing user guide, frequency of accessing my learner profile, frequency of accessing others' learner profiles, score in quiz, score in charisma, and score in artifact in DIY Rooms. The t-test is utilized to analyze these data.

The average of frequency per team in accessing the Expo within 5 weeks is 78.9. The average of total time per team in accessing the Expo is 472 minutes in the duration of 5 weeks. Table 3 is the data about the time students in 16 teams spent in three different zones of the Expo respectively. The data indicates that the time students spent in the program varies in three zones significantly as anticipated due to the facts that each zones has its own specific required learning tasks respectively. Whereas the standard deviation of time spent in DIY Room, which required the most sophisticated learning skill among the three zones, is too big due to be ignored, the data implies that students like to spend time on manipulating objects in the virtual worlds.

It is one of the hypotheses of the study that people are more interested in discovering what others are and what

Zones	N	Mean	SD
Lobby	16	17.9	7.5
Exhibition Hall	16	54.0	36.8
DIY Room	16	400.5	1046.6

Table 3. The Time Teams Spent (Minutes) in Zones in the Expo

they are doing in the virtual space than tracking their own status. Table 4 indicates that frequencies performed by students in the program in accessing their own learner profiles and others' learner profiles (LP) are not different significantly ( $P > 0.05$ ).

How about the frequencies in chatting? Table 5 also indicates that school students in the program chatted with their own teammates almost in the same amount of times as chatted with their virtual peers from other teams.

The facts shown in both Table 4 and Table 5 imply that students did not concern more on their virtual peers than on themselves and these are not aligning with the hypothesis claimed by the study. The detour probably is resulted from the consequence of few occasions for participants to be online at the same time with virtual peers and, subsequently, they did not have many opportunities to chat with their virtual peers or access their learner profiles, which are only available when people are online together. The fact implies that if there were virtual peers online together, they would have interacted with each other intensively.

The other alternative response to the aforementioned hypothesis claimed by the study, the facts in Table 4 and Table 5 might have revealed the hidden desires in participants while they were residing in the virtual learning world that, in addition to their virtual peers, they were also concerning about what their teammates and themselves have done or what were doing inside the virtual space. Above all, the data here suggest that both virtual learning community and proximal learning community all have their own roles to play in virtual learning worlds.

In addition to interaction patterns, the study also wants to explore whether participants were more interested in accessing learning objects, such as the user guide in the Lobby, than communicating with people? Learner profile, which is embedded in the BDV system, contains

Variable	N	Mean	SD	$\Upsilon$	df	P
Accessing My Own LP	16	24.2	32.5	0.71	15	0.49
Accessing Others' LP	16	19.8	22.5			

Table 4. Summary t-test: Frequencies in Accessing LP

Variable	N	Mean	SD	$\Upsilon$	df	P
Chatting with Teammates	16	13.9	17.2	0.24	15	0.82
Chatting with Other Teams	16	12.9	17.7			

Table 5. Summary t-test: Frequencies in Chatting



information about people in the community and it is a tool for enhancing the quality of communication. Figure 5 shows that students accessed a lot more on LPs as a whole than on the user guide. When the frequencies of accessing learner profiles were aggregated together as a whole and compare with the frequency of accessing the user guide in the Lobby with a t-test, the result in Table 6 indicates that the difference is significant ( $P < 0.01$ ).

The comparison of the frequency in chatting with people with the frequency in accessing the user guide was also conducted with another t-test. The result in Table 7 also indicates that participants were more interested in communicating with people than browsing the learning objects such as the user guide significantly ( $P < 0.01$ ) in this case.

The facts in both Table 6 and Table 7 imply that participants in the virtual world were more interested in discovering people than browsing or exploring learning objects. In addition, after examining the averages of Frequencies of Chatting and the Scores of Charisma teams received against the average Frequencies of Login, the study also realizes that participants did spend a great deal of time on interaction with or learning about their peers when they

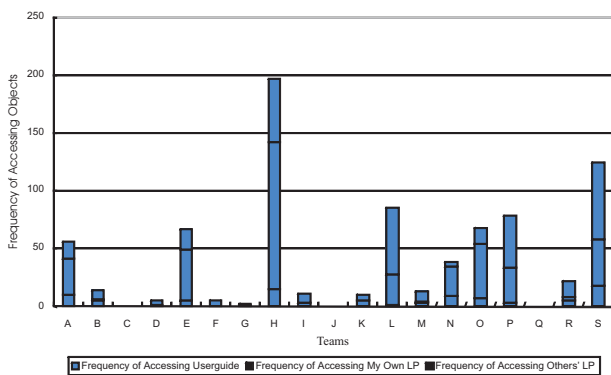


Figure 5. Proportion in Accessing LPs and User Guide

Variable	N	Mean	SD	$\Upsilon$	df	P
Accessing Lps	16	43.9	50.0	3.26	15	0.00
Accessing User Guide	16	5.8	5.1			

Table 6. Summary t-test: Frequencies in Accessing Lps and User Guide

Variable	N	Mean	SD	$\Upsilon$	df	P
Chatting	16	26.8	29.9	2.92	15	0.00
Accessing User Guide	18	5.8	5.1			

Table 7. Summary t-test: Frequencies in Chatting and Accessing User Guide

Variable	N	Mean	SD
Frequencies of Login	16	78.9	51.1
Frequencies of Chatting	16	26.8	29.9
Scores of Charisma	16	64.3	77.2

Table 8. Proportion of Interpersonal Interaction in the Virtual World

were in the virtual world (Table 8). Overall, these all imply that students were more interested in interaction with peers than in navigating digital learning objects inside the virtual learning world.

The study is also wondering about what would be the facts which influence the learning performance of participants inside the virtual learning world? In the experiment, the scores teams received both in quizzes and peer evaluations on artifacts are the only two indicators related to learning performance of participants. But both of them don't have any correlation relationship significantly at all with the rest of variables collected in the study. Hence, the study is unable to generalize the conclusion about the factors which could influence the learning performance. Obviously, more vigorous and bigger scale research design is needed in order to exploring the issue regarding learning performance in virtual learning worlds.

## Conclusion

Research and practice in the field of networked learning in the past couple of years have shown that the issues of telepresence and community of practice have to be resolved before virtual learning can really take place and be relevant to education (Lin & Kuo, 2006). This study designed and implemented a virtual learning world, which capitalizes on the strengths of online 3D shared learning space: a combination of immersion, telepresence, immediate visual feedback, and interactivity. The virtual learning world provides a 3D shared learning space for avatars, which are the representations of individual learners in networked learning environments. Through the use of such avatars along with their learner profiles, geographically isolated learners can inhabit inside virtual learning worlds simultaneously and communicate with each other in a more immersive manner theoretically. The rationales of the study for implementing the virtual learning world are that telepresence and shared space are important to both fostering vibrant virtual learning communities and developing unique collaborative

learning experiences for learners in networked or virtual learning environments.

The expectation of the study is that the virtual learning worlds might be possible to create a networked learning environment that not only resembles real-life learning environments, but also augments the value of traditional education by immersing students in the virtual learning space and extending the horizon of learning experiences, in the sense that virtual learning worlds might hold high promises for resolving issues of virtual learning communities and scaffolding learning supports in networked learning environments.

For enhancing the practice of the virtual learning worlds in the context of global education, the purposes of this preliminary study are to explore and investigate how school students behave themselves inside the virtual learning worlds in terms of learning behaviors and communication patterns among peers. Based on the empirical data collected by the study, there are two significant findings. One of those findings is that participants were more interested in communicating with peers than navigating static or semantic learning objects while they were inside the virtual learning world in terms of learning behaviors. The finding pertaining to learning behaviors has two implications, one is positive and the other is negative in the aspect of current practices of virtual learning worlds. The positive implication is that the immersive and telepresence features of the virtual learning worlds could indeed foster interpersonal interaction among peers which might in turn bring up exchange or construction of knowledge. In essence, raising the quality and quantity of interpersonal interaction is one of the critical issues that have been targeted for years in the field of networked learning. The negative implication is that the design of learning objects, which are embedded in the virtual learning worlds, definitely needs more sophisticated consideration and enhancement. As a matter of facts, instructional design, especially in the categories of learning content and activities, has been the toughest issue for years in the practice of networked learning. The unique features of the 3D virtual learning worlds make the issue even more complicated than in the conventional web-based

networked learning environments.

The other finding of the study is about interaction patterns, which is that participants interacted equally in terms of frequency with their own teammates and people in other teams whom they were unacquainted with inside the virtual learning world. The finding implies that both proximal learning community and virtual learning community play their roles respectively in the virtual space and might hold equal impacts on learning behaviors. The significance of this finding is that with sound implementation of the networked learning environments, such as the virtual learning worlds, the virtual learning community, as the existing proximal learning community, could have its own role to play with in terms of facilitating scaffolding learning supports and peer coaching.

Although results of the study provide strong empirical evidences on learning behaviors and interaction patterns of school students inside virtual learning worlds, which is one of the most prominent tools in education currently, the extent of impacts of the study on the practice of virtual learning worlds is limited by lacks of measurement pertaining to learning performance in the research design. It would be an enormous contribution to the field if the learning performance is embodied as an dependent variable in the future study and administrate the correlation analysis between it and both learning behaviors and interaction patterns respectively. However, such a study would need a great deal of efforts on designing learning objects and activities for virtual learning worlds before considering the measurement of learning performance, not to mention developing an appropriate approach of measuring learning performance in the sense of constructive learning. Explicitly, a bigger scale of study that place focus on figuring out how to gauge what and how students learn in the unique virtual learning worlds is favored to proceed based on current research findings.

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## CONDITION OF SAFE ENVIRONMENT CREATION IN PRESCHOOL EDUCATIONAL INSTITUTIONS AND ITS DEVELOPMENT PROSPECTS

By

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### ABSTRACT

*Educators should attempt to create a common and solid strategy in preschool educational institutions in order to sufficiently ensure a safe social environment of children. A research examining health and safety issues in Lithuanian preschools was carried out in Klaipeda. The aim of this paper was to analyse the conditions of safe environment creation for children in preschool educational institution and its development prospects. The following research questions were asked:*

- *What are the factors that influence the safety of preschool educational institution environment and could these factors be developed?*
- *What difficulties arise in the process of safe environment creation for children?*
- *How could the creation of safe environment be developed in contemporary preschool educational institutions?*

*A theoretical and empirical analysis of a safe environment creation allowed determining the following development perspectives:*

- Possibilities of safe environment creation in a preschool educational institution depend on analysis of the activity condition in the institution,*
- Formation of organisation mission and targets, strategy formation,*
- Implementation and control of organisation.*
- Collaboration of directors.*

*The article firstly defines the research problems and the relevance of the topic. Subsequently the research design and methodology is described. Finally findings are reported and discussed in the light of the literature and conclusions drawn.*

### INTRODUCTION

Today a Safe Community Programme is being implemented in different countries of the world. The measures of Children's Environment Development must be safe and carried out at the highest level. It is stated in Article 31 in the "The Convention on the Rights of the Child" (1989) that "all children have a right to relax and play in a safe environment corresponding to their age".

Following the "WHO Ideology "European Health for All"(2010), the first Safe Community Programme was created in 1975. According to the opinion of the World

Health Organization (WHO), carrying out the universal children's safe environment programme, it is necessary to define criteria on the basis of which the programme would include all age groups, areas, situations, including public and independent sectors of the community to the preventive activity.

The entire attitude towards the health development is common to all foreign country preschool education programmes. The main objects and tasks of health development are included in the section "Physical Training" (European Health for All, 2010 and <http://www.unesco.org/>),



(the following programmes were formed in this way: Belgian programme – section “Les activités psychomotrices” / Programme des activités, 1985; French programme – section “Les activités physiques” / L' école maternelle, 1986; Swiss programme – section “Education physique” / Le printemps de la vie scolaire, 1987; North Carolina programme – section “Movement”).

The creation of safe communities is relevant to Lithuania as well (Much space is assigned for education on children's safety Ankstyojougdymovadovas, 2001, General Preschool Education and Learning Programme, 2002, Project of Interior Audit Methodology in Preschools, 2004 and Ikimokykliniougdyimoistaiigos. Higienosnormosirtaisyles, 2002). prevention issues in the Lithuanian Health Programme (1997-2010). It is emphasized in the Guidelines of Lithuanian Education Reform (1993) that proper environment is necessary for health strengthening and conservation and its foundation is already laid at the preschool age (Healthy Lifestyle Development of Preschool Age Children, 2004). The contemporary science proves that health development foundation is formed at the early age of children. The early age of children is a period when physical, psychical and moral health foundation is laid. Therefore it means that in order to strengthen the health of children the directors of preschool education institutions should create a safe environment and organize the health teaching. “Programme for Development of Safe Lifestyle Skills of Preschool Age Children” (1997) includes social, psychological and physical safety of children and provides the factors hazardous for life and health.

In order to develop the creation of safe environment in the preschool educational institutions it is necessary to identify the occurring problems, factors determining the safety of children. The following scientists carried out the scientific researches in Lithuania: Adaskeviciene (1994), Andrikiene (2003), Leliugiene (1997), Kucinskas (2004), Kucinskas, Poderiene (2006), Kvieskiene (2003), Vaitkevicius (1995), Jonutyte (2002), Targamadze (1996, 2001), Mikoliuniene (2000), Jonutyte and Budreikaite (2004), Raipa (2001), Jucevicius and Juceviciene (2003) and others. It is necessary to analyse the works of foreign scientists (Hopkins, Ainscow, West, 1994; Robbins, 2003; Schindler,

Thomas, 1993; Caughlin (1997). However, the experience of other states does not always correspond to the contemporary experience of Lithuanian preschool institutions and therefore it can only partially help the directors of preschool institutions and pedagogues to prepare the strategic guidelines for development of safe environment creation for children in preschool institutions. Scientific problematic questions occur: what are the factors that influence the safety of preschool educational institution environment? How to develop these factors? What difficulties arise in the process of safe environment creation for children? How could the creation of safe environment be developed in contemporary preschool educational institutions?

### **The research design**

The aim of this research was to analyse the conditions of safe environment creation for children in a preschool educational institution and its development prospects.

### **Objectives**

- To research and assess the condition of safe environment creation for children in preschool educational institutions.
- To determine the problems of safe environment creation and its development prospects.

### **Research questions**

- What are the factors that influence the safety of preschool educational institution environment and could these factors be developed?
- What difficulties arise in the process of safe environment creation for children?
- How could the creation of safe environment be developed in contemporary preschool educational institutions?

### **Data collection and analysis**

A written survey in the form of anonymous questionnaire intended for directors and pedagogues of preschool educational institutions and parents was selected to be the main research method.

### **Structure of research instrument**

The questionnaire has an introductory, main and final part. It is attempted to comply with certain requirements and

recommendations in the introductory part. First of all, it is briefly explained in the survey what the purpose of the survey is. Then the anonymity of the respondent is guaranteed and a short instruction of the questionnaire is provided.

The main part contains questions by which it is attempted to receive the information necessary for research. The final part of the questionnaire comprises socio-demographical questions, i.e. questions for directors and pedagogues of preschool institutions about the age of the person researched, how long he has been working in the institution, what type of work he does in the institution and also questions for parents about the age, sex of the researched person, how old their child is, how many years their child attends this preschool educational institution.

The questionnaire of respondents consists of 30 closed questions. Since they are comfortable and clear the respondents could quickly answer them. The statements were assessed on the scale: "yes", "partly", "no" and "no opinion". The frequency of answers is provided in percentage emphasizing positive and negative answers.

### **Methods of questionnaire compilation**

The persons researched had to answer the questions provided in the questionnaire by marking the answer corresponding to their attitude.

### **Processing of the data received**

Based on the above mentioned method of quantitative research a statistical analysis of research data was carried out. The questionnaire was divided into several co-centres. The first co-centre was used for identification of assessments of safe environment in preschool educational institutions. 4 questions were used for this. The second co-centre was used for identification of compliance with hygiene norms in a preschool educational institution. It consists of five questions. The third co-centre comprises six questions and it is used for identification if material provision is sufficient in a preschool educational institution. The fourth co-centre is used for identification how factors influencing the state of children's health in a preschool educational institution are assessed. 8 questions were used for this. The fifth co-centre is used for clarification of nutrition assessment in a preschool educational institution. Two

questions are used for this. The sixth co-centre was used for clarification of education quality assessment in a preschool educational institution. This co-centre consisted of three questions. The seventh co-centre comprised two questions and they were used for identification of psych emotional climate in a preschool education institution. The statistical data analysis was carried out using software SPSS 13.0 for Windows and Microsoft Excel 2000.

Mann – Whitney Test was applied for comparison according to the feature acquiring two values. Significant differences were defined according to the calculated values of p. P-value and averages of answer ratings were the most significant features in the test. Differences between answers of respondents of two groups are statistically significant only if p-value is lower than 0.05. If the differences between group answers are statistically significant, then the authors assess what the differences are. They analyse the averages of group answer ratings: which one is bigger and which one is smaller. The more the average is bigger the more respondents approve of the opinion expressed and the more the average is smaller - the less they approve of it. They provide the data of non-parametric criteria in this article only in the cases when they are statistically significant and directly related to the problem analysed.

### **Research procedures**

The preparation for empirical analysis was consistent complying with the certain sequence of actions, data collection fixation and analysis procedures. The following research procedures were adhered to: scope of the research, choice of selection method; questionnaire formation; survey management; data analysis and generalization.

An empirical research was carried out during 2006 - 2007. Having selected preschool institutions a connection with the directors of these institutions was made and official permissions for implementation of the research were received. The questionnaires were spread by presenting them in certain institutions and submitting to the representatives of preschool institutions in person. The questionnaire compilation procedure and their restitution issue were explained in the questionnaire. A total of 600

questionnaires were distributed with the restitution percentage of 85 %.

## Scope of the research

A random selection method was used for formation of the research scope: randomly 5 Klaipeda, 3 Kaunas and 2 Marijampole preschool educational institutions were selected and directors, pedagogues and parents were questioned in these institutions. 20 directors (directors and deputy directors), 240 pedagogues and 250 parents participated in the research. This number of researched persons is sufficient in order to identify the tendencies of safe environment creation in a preschool education institution. It was made clear during the research that there are no statistically significant differences between the attitudes of directors and pedagogues therefore the data of director and pedagogue survey is provided after generalization as the opinion of pedagogues.

The analysis of the scope of the research shows that 55.2% of the persons researched consisted of 31 – 40 years old respondent parents, 32% consisted of parents up to 30 years old and 12.8% of parents participating in the research were 41 – 50 years old. The majority of directors and pedagogues - 49.2% consisted of 41 – 50 years old persons, 22.3% - of 31 – 40 years old persons and 12.3% persons were elder than 51 years. 1.5% of directors and pedagogues did not indicate their age. 65.6% of parents participating in the research were women and 34.4% were men. 100% of the pedagogues surveyed were women.

The length of relation of directors, pedagogues and parents with the institution researched is defined by the length of children attendance at the preschool educational institution and the length of work experience of directors and pedagogues in the institution researched (Table 1).

Pedagogues and directors with 6-10 years of work experience in the institution researched form 6.2% of the researched, 11-20 years of work experience form 47.7% of the researched and 21 and more years of work experience in the institution research form 43.1% of the researched. The major part, i.e. 38.4% of parents have 3 and more years of experience of communication with the preschool institution since their children attend this institution for this

period of time, 32% of them have 2 years of communication experience and 29.6% of them have 1 year experience.

Directors, pedagogues of preschool educational institutions and children's parents participating in the researches distinguished by age, experience (work experience and relation with the institution researched) and other differences. Therefore it is possible that the methodology of safe environment planning and assessment in preschool educational institutions is comprehensible to the research participants. We can also state that the majority of the researched have sufficient experience in order to properly assess the conditions of safe environment creation in preschool educational institutions.

## *Assessment of safe environment creation in a preschool educational institution: attitude of pedagogues.*

Attitude of preschool education institution directors and pedagogues towards safe environment in preschool educational institutions was researched. For this reason it is very important to assess the current situation, what safe environment creation strategies were useful and what should be changed and improved. During the research it was attempted to clarify the level of safe environment assessment of preschool educational institution pedagogues. The results are provided in Table 1.

From Table 1 it is shown that more than a half of preschool education pedagogues (56.9%) know how the environment safety is assessed, however less than a half (40%) think that they only partly know how the environment safety is assessed in a preschool educational institution. The major part of preschool education pedagogues (71.5%) stated that safe environment for children was ensured however more than a half (57.7%) thought that parents

Question	Yes	Partly	No	No opinion
Do you know how the environment safety of preschool institutions is assessed?	56.9%	40%	1.5%	1.5%
Do you think safe environment for children is ensured in your institution?	71.5%	23.8%	3.8%	0.8%
Are parents included in the creation of safe environment in the preschool institution?	26.2%	57.7%	15.4%	0.8%
Do children feel safe?	80%	14.6%	0	5.4%

**Table 1. Attitude of pedagogues towards the insurance of safe environment creation in a preschool educational institution**

were only partially included to the creation of safe environment in a preschool educational institution. 80% of pedagogues think that children feel safe in a preschool education institution.

It was attempted by the research to explore what the attitude of pedagogues towards hygiene conditions in a preschool educational institution is. The data on this question of the analysis carried out is provided in Table 2.

As from the data provided (in Table 2) bathrooms are of sufficient condition, 49.6% of pedagogues' state so. The research results disclose that more than a half of the questioned pedagogues, i.e. 76.9% of respondents assess the lighting in a preschool educational institution is sufficiently proper. The major part of questioned pedagogues, i.e. 80% of respondents think that normal work noise prevails in the institution and only a small part 15.4% think that such situation is provided only partially. Pedagogues of preschool educational institutions (73.8%) positively assess the warmth in a preschool educational institution, they state that it is warm enough, 20.8% of respondents declare that it is only partly sufficient and 5.4% state that the temperature does not satisfy them. 93.1% of pedagogues positively assess the compliance with the hygiene norms in preschool educational institutions.

The authors provide the attitude of pedagogues towards material provision of a preschool educational institution in Table 3.

Taking into consideration the above provided data, it shows that the quality of furniture in preschool educational institutions is satisfactory, i.e. 31.5% of pedagogues think that they are satisfied with the quality of furniture therein, 43.8% think that they are partly satisfied. 23.1% pedagogues of preschool educational institutions are not

Question	Yes	Partly	No	No opinion
Are you satisfied with the bathrooms of this institution?	49.6%	35.7%	10.9%	3.9%
Is lighting sufficient in this institution?	76.9%	19.2%	3.8%	0
Is normal work noise prevailing in this institution?	80%	15.4%	3.8%	0.8%
Is the temperature of the rooms in this institution sufficient?	73.8%	20.8%	5.4%	0
Are hygiene norms adhered to in this institution?	93.1%	6.9%	0	0

**Table 2. Attitude of pedagogues towards hygiene conditions in a preschool educational institution**

Question	Yes	Partly	No	No opinion
Are you satisfied with the quality of furniture located in groups?	31.5%	43.8%	23.1%	1.5%
Are you satisfied with the quality of flooring in groups?	66.2%	26.9%	6.9%	0
Is the inventory located in the institution premises well fastened?	81.5%	13.8%	4.6%	0
Are you satisfied with the condition of pitches and territory of the institution?	17.7%	50.8%	30.8%	0.8%
Is material provision of the institution sufficient?	26.9%	42.3%	30.8%	0
Do you think the inventory and equipment in groups are renewed or supplemented sufficiently enough?	20.8%	56.9%	22.3%	0

**Table 3. Attitude of pedagogues towards material provision of a preschool educational institution**

satisfied with the current quality of furniture. 66.2% of preschool educational institutions are satisfied with the quality of flooring, almost a third – 26.9% think that it is only partly satisfactory. Inventory located in the premises is well fastened. The major part - 81.5% of preschool educational institution pedagogues declared so. The research data shows that more than a half (50.8%) of respondent pedagogues replied that they were only partly satisfied with the condition of the institution territory and pitches, 30.8% of them think that this condition is not satisfactory. Regarding material provision of preschool educational institutions, 26.9% of pedagogues told that material provision of the institution was sufficient. The major part – 42.3% of pedagogues told that in their opinion the material provision of the institution was only partly sufficient, 30.8% of the questioned persons were not satisfied with material provision of a preschool educational institution. With reference to the data provided (in Table 4) it can be stated that inventory and equipment in groups of preschool educational institutions are only partly renewed and supplemented 56.9% of pedagogues' state so. The fifth part of respondents, i.e. 20.8% state that they are sufficiently renewed and 22.3% think that they are insufficiently renewed.

Based on the data of the analysis carried out the following results of attitude of preschool educational institution pedagogues towards the health education quality are provided (Table 4).

With reference to the data provided (in Table 4) it shows that more than a half (53.8%) of preschool educational



institution pedagogues are satisfied with the condition and quality of sports inventory in the school, 33.4% of pedagogues are partly satisfied. 83.1% of pedagogues state that health strengthening programmes are carried out in a preschool educational institution. 86.2% of the questioned state that the weekly load of physical training activities in preschool educational institutions is sufficient. 79.2% of preschool educational institution pedagogues think that the number of different festivals, matches and meetings organized promoting the health strengthening in institutions is sufficient, 13.1% of research participants state that they are only "partly" organized.

The quality of room service has much influence on creation of safe environment in preschool educational institutions. The preschool educational institution pedagogues were asked if they were satisfied with the medical room service quality. 74.6% of pedagogues are satisfied with the service of medical rooms in preschool educational institutions. 24.6% of pedagogues are partly satisfied. The majority, i.e. 86.9% of preschool educational institution pedagogues state that children like sports. It was attempted during the research to know the attitude of pedagogues towards health condition of children attending a preschool educational institution (Table 4). It was determined by the research that the opinions of pedagogues were grouped in the following way: 36.2% of them state that in their opinion the health condition of children attending the preschool educational institution is satisfactory, 46.9% of them think that is only partly satisfactory and 14.6% of them think that it is not satisfactory.

Question	Yes	Partly	No	No opinion
Are you satisfied with the condition and quality of sports inventory?	53.8%	35.4%	8.5%	2.3%
Are health strengthening programmes carried out in the institution?	83.1%	11.5%	4.6%	0.8%
Do you think the current load of physical training activities is sufficient?	86.2%	9.2%	4.6%	0
Is the number of different sports festivals, matches and meetings sufficient?	79.2%	13.1%	7.7%	0
Are you satisfied with the service quality of the medical room?	74.6%	24.6%	0.8%	0
Does the child like sports?	86.9%	13.1%	0	0
Is the health condition of children attending groups sufficient?	36.2%	46.9%	14.6%	2.3%
Does the child get tired?	28.5%	53.1%	18.5%	0

Table 4. Attitude of pedagogues towards health education quality

It was determined during the research that according to the pedagogues' attitude the preschool age children attending preschool educational institutions get tired (28.5%) or get partly tired (53.1%). Only 18.5% of pedagogues think that children do not get tired.

With reference to the data of the research analysis carried out the authors provide the attitude of preschool educational institution pedagogues towards the children education quality (Table 5).

Taking into consideration the data provided (in Table 5) it can be declared that almost a half, i.e. 49.2% of pedagogues are satisfied with the number of children in a group, the other part, i.e. 36.2% are not satisfied with the number of children, and 14.6% of these respondents are partially satisfied. The major part, i.e. 80.8% of respondents think that planning the education process the children physiology in a preschool educational institution is considered. According to the opinion of 34.6% and 29.2% of a preschool educational institution pedagogues the group area and space correspond to the individual needs of children, however more than a third part, i.e. 36.2% of respondents tell that the group space and area do not correspond to the individual needs of children.

The attitude of preschool educational institution pedagogues towards psychosocial climate in a preschool educational institution is provided in Table 6.

With reference to the above provided data we can state that according to the opinion of the majority, i.e. 72.3% respondents an acceptable emotional atmosphere prevails in an educational institution, 20.8% of respondents

Question	Yes	Partly	No
Do you think the number of children in groups is optimum?	49.2%	14.6%	36.2%
Is physiology of children considered while planning the education process?	80.8%	18.5%	0.8%
Do the space and area of the group correspond to the individual needs of a child?	34.6%	29.2%	36.2%

Table 5. Attitude of pedagogues towards children education quality

Question	Yes	Partly	No
Do you think the emotional atmosphere prevailing in the institution is acceptable?	72.3%	20.8%	6.9%
Are children friendly?	94.6%	3.8%	1.6%

Table 6. Attitude of pedagogues towards the psychosocial climate in a preschool educational institution



indicate that emotional atmosphere is only partially acceptable in a preschool educational institution, 6.9% of respondents indicate that emotional atmosphere is not acceptable to them. The major part of the questioned preschool educational institution pedagogues, i.e. 94.6% of respondents, declares that children are friendly.

### **Assessment of safe environment creation in a preschool educational institution: attitude of parents**

Attitude of different preschool educational institution parents towards safe environment in preschool educational institutions was researched. It was attempted during the research to determine the level of conception of safe environment assessment of parents of preschool educational institution children. Results are provided in Table 7.

Table 7 shows that the major part of parents of preschool educational institution children (56%) do not know how the environment safety is assessed, however the bigger part of them (64.8%) think that safe environment for children is ensured in the institution. Only 38.4% of parents think that they are partly included to the creation of safe environment in preschool educational institutions and 29.6% of parents think that they are not included at all. Quite a big part of parents (79.2%) think that children feel safe in a preschool educational institution.

It was attempted by the research to know what the attitude of parents towards sanitary-hygiene conditions is in a preschool educational institution. The data of the analysis carried out on this question is provided in Table 8.

As shown from the data provided (in the Table 8) bathrooms are of satisfactory condition. 40.8% of parents declare so. With reference to the data provided we can notice that the

Question	Yes	Partly	No	No opinion
Do you know how the environment safety of preschool institutions is assessed?	10.4%	23.2%	56%	10.4%
Are parents included in the creation of safe environment in the preschool institution?	64.8%	27.2%	1.6%	6.4%
Are parents included in the creation of safe environment in the preschool institution?	14.4%	38.4%	29.6%	17.6%
Does a child feel safe?	79.2%	15.2%	2.4%	3.2%

**Table 7. Attitude of parents towards the insurance of safe environment creation in a preschool educational institution.**

Question	Yes	Partly	No	No opinion
Are you satisfied with the bathrooms of this institution?	40.8%	24.8%	8.8%	25.6%
Is lighting sufficient in this institution?	59.2%	27.2%	3.2%	10.4%
Is normal work noise prevailing in this institution?	67.2%	9.6%	0	23.2%
Is the temperature of the rooms in this institution sufficient?	72.8%	17.6%	4.8%	4.8%
Are hygiene norms adhered to in this institution?	78.4%	6.4%	0	15.2%

**Table 8. Attitude of parents towards hygiene conditions in a preschool educational institution.**

major part of parents questioned, i.e. 59.2% of respondents assess that the lighting in a preschool educational institution is sufficiently proper. 27.2% of parents think that it is partly suitable and 10.4% think that it is improper. 67.2% of parents think that working noise prevailing in the institution is normal, only a small part, i.e. 9.6% of parents think that only partly normal working noise prevails in the institution; almost a fourth of respondents do not know how to answer this question. The major part of parents, i.e. 72.8%, are satisfied with current room temperature in preschool institutions, 17.6% of them are partly satisfied and 4.8% tell that the temperature is not satisfactory and the same number of respondents indicate that they do not know. 78.4% of parents indicate that hygiene norms are adhered to in the institution, 6.4% indicate that they are only partly adhered to and more than 15% of parents do not have opinion about this question.

The results of parents' attitude towards material provision of a preschool educational institution are provided in Table 9.

It is shown from the data provided above that almost half of respondents, i.e. 47.2% indicate that the quality of furniture

Question	Yes	Partly	No	No opinion
Are you satisfied with the quality of furniture located in groups?	31.2%	47.2%	19.2%	2.4%
Are you satisfied with the quality of flooring in groups?	41.6%	27.2%	3.2%	4.8%
Is the inventory located in the institution premises well fastened?	48%	8%	1.6%	42.4%
Are you satisfied with the condition of pitches and territory of the institution?	36%	31.2%	25.6%	7.2%
Is material provision of the institution sufficient?	14.4%	28.8%	38.4%	18.4%
Do you think the inventory and equipment in groups are renewed or supplemented sufficiently enough?	16%	44%	21.6%	18.4%

**Table 9. Attitude of parents towards material provision of a preschool educational institution**

in preschool educational institutions is satisfactory, 42.4% and 41.6% of parents indicate that they are satisfied and partly satisfied with the flooring quality and almost half, i.e. 48% of respondents indicate that the inventory is well fastened. A similar number of parents do not know the answer. 36% of respondents are satisfied with the condition of territories and pitches in preschool educational institutions, 25.6% indicate that they are not satisfied and a third part is partly satisfied. It is to be noted that parents critically assess the material provision of the institution - 38.4% of parents indicate it as unsatisfactory, 14.4% are satisfied with this position, 28.8% are partly satisfied and almost a fifth of parents do not have opinion. Almost a half, i.e. 44% of respondents indicate that inventory and equipment in groups are renewed and supplemented only partly, 21.6% state that that they are renewed insufficiently, the fifth part do not know and only 16% of the parents who expressed their opinion are satisfied with this process.

The results of respondent parents' attitude towards health education quality are provided in Table 10.

Almost a half, i.e. 46.6% of parents cannot say anything about the condition and quality of sports inventory in a preschool educational institution, 33.6% indicate that they are satisfied with this condition and 14.4% state that they are partly satisfied. Only a small part, i.e. 5.6% of respondents think that the condition of this inventory is not satisfactory. 56.8% declare that health strengthening programmes are carried out in a preschool educational institution, almost a third, i.e. 29.6% declare that they do not have opinion and 12.0% of parents participating in the research think they are partly organized and a small part,

Question	Yes	Partly	No	No opinion
Are you satisfied with the condition and quality of sports inventory?	33.6%	14.4%	5.6%	46.6%
Are health strengthening programmes carried out in the institution?	56.8%	12.0%	1.6%	29.6%
Do you think the current load of physical training activities is sufficient?	56.0%	17.6%	7.2%	19.2%
Is the number of different sports festivals, matches and meetings sufficient?	48.0%	22.4%	15.2%	14.4%
Are you satisfied with the service quality of the medical room?	56.8%	7.2%	2.4%	33.6%
Does the child like sports?	87.2%	10.4%	2.4%	0
Is the health condition of children attending groups sufficient?	46.4%	38.4%	4.8%	10.4%
Do the children get tired?	12.0%	32.8%	53.6%	1.6%

Table 10. Attitude of parents towards health education quality

i.e. 1.6% state that they are not organized. The major part of respondents, i.e. 56% state that the weekly load of physical training activities for children in preschool educational institutions is not sufficient, 17.6% of parents participating in the research are partly satisfied, 7.2% are not satisfied with the load of physical training activities organized in preschool educational institutions and 19.2% do not have opinion about this issue (Table 10). According to the statement of preschool educational institution parents a sufficient number of different festivals, matches, meetings promoting health strengthening is organized in institutions. Almost half, i.e. 48% of parents state so, 22.4% state that it is partly satisfactory, 15.2% state that not a sufficient number of sports festivals, matches, and meetings is organized and 14.4% do not have opinion about this question. Medical room and service quality has much influence on safe environment creation in preschool educational institutions. Parents of a preschool educational institution were asked if they were satisfied with the service quality of medical rooms. More than a half, i.e. 56.8% of respondent parents are satisfied with the service of medical rooms and medical service, 7.2% of parents are partly satisfied, 2.4% are not satisfied and 33.6% do not have opinion. Almost all respondent parents, i.e. 87.2% and 10.4% state that children like sports and partly like it. When they were asked about the health condition of children attending a preschool educational institution, almost a half of respondent parents, i.e. 46.4% state that in their opinion it is satisfactory, 38.4% are partly satisfied and 4.8% state that it is not satisfactory. Other 10.4% do not have opinion about this question. 53.6% of parents state that children do not get tired in a preschool educational institution, 32.8% indicate that they are partly tired, 12.0% think that preschool age children attending preschool educational institutions get tired.

The results of data on the parents' attitude towards the children nutrition quality are provided in Table 11.

The data provided in Table 11 shows that the major part,

Question	Yes	Partly	No	No opinion
Is the quality of products and meals offered for nutrition satisfactory?	2.4%	15.2%	67.2%	15.2%
Is the variety of meals offered for children satisfactory?	5.6%	19.2%	67.2%	8.0%

Table 11. Attitude of parents towards the children nutrition quality in a preschool educational institution

even 67.2% of respondents are not satisfied with the quality of products and meals offered for nutrition and the variety of meals offered for children in a preschool educational institution, only 15.2% and 19.2% are partly satisfied, 15.2% and 8% do not have opinion about this question.

With reference to the data of the analysis carried out the authors provide the assessment of parents' attitude towards children education quality in Table 12.

The major part of parents, i.e. 60.8% of parents are satisfied with the number of children in a group, almost half of it, 49.6% indicate that while planning educational process the children physiology is considered in a preschool educational institution and more than a third, 38.4%, do not have opinion about this question. 44.8% think that the group space and area correspond to individual needs of a child, 37.6% of respondents indicate that they partly correspond to these needs.

The results of parents' attitude towards the psychosocial climate in a preschool educational institution are provided in Table 13.

75.2% of respondents indicate that emotional atmosphere prevailing in a preschool educational institution is satisfactory and 93.6% of respondents state that a child has friends.

***A comparative analysis of results of pedagogue and parent attitude towards safe environment insurance in a preschool educational education institution***

Pedagogues of preschool educational institutions think that they know how the environment safety of preschool educational institutions is assessed (average rating -

172.79), parents know significantly less (average rating - 81.42). This difference between pedagogue and parent opinions is statistically significant ( $p=0.000$ ). Pedagogues are satisfied with the parent inclusion to the creation of safe environment for children in a preschool educational institution (average rating - 150.11), parents are less satisfied (average rating - 104.17). This difference between pedagogue and parent opinions is statistically significant ( $p=0.000$ ). Applying the Whitney 'U' Test the statistically significant differences between opinions of preschool education institution parents and pedagogues were made clear assessing the hygiene insurance in a preschool institution according to the condition of bathrooms in the institution (average rating - 139.92 of pedagogues and 114.69 of parents,  $p=0.003$ ), lighting (average rating - 140.31 of pedagogues and 115.20 of parents,  $p=0.001$ ), working noise prevailing in the institution (average rating -138.47 of pedagogues and 116.18 of parents,  $p=0.002$ ), adherence to hygiene norms in the institution (average rating -137.83 of pedagogues and 117.78 of parents,  $p=0.000$ ). In other cases the differences between pedagogue and parent opinions are not statistically significant.

It was defined comparing the difference between attitudes of pedagogues and parents of preschool educational institutions according to the flooring quality in groups, fastening of inventory, material provision of the institution, renewal and supplementation of inventory and equipment, material that pedagogues are more satisfied with this condition that parents (average ratings - from 153.76 to 141.64 of pedagogues and from 113.81 to 106.32 of parents,  $p=0.000 - 0.001$ ). This difference between pedagogue and parent opinions is statistically significant. Pedagogues are more satisfied than parents with health education quality, health strengthening programmes implemented in the institution, physical training activities, organization of sports festivals, matches, meetings and quality of medical services in a preschool educational institution (average ratings - from 152.52 to 144.80 of pedagogues and from 110.53 to 100.45 of parents, in all cases  $p=0.000$ ). Differences of pedagogue and parent attitude towards tiredness of children were made clear. Pedagogues indicate that children in a

Question	Yes	Partly	No	No opinion
Do you think the number of children in groups is optimum?	60.8%	12.8%	7.2%	19.2%
Is physiology of children considered while planning the education process?	49.6%	12%	0	38.4%
Do the space and area of the group correspond to the individual needs of a child?	44.8%	37.6%	8%	9.6%

**Table 12. Attitude of parents towards children education quality**

Question	Yes	Partly	No	No opinion
Do you think the emotional atmosphere prevailing in the institution is acceptable?	75.2%	11.2%	0	13.6%
Does the child have friends?	93.6%	4.8%	0	1.6%

**Table 13. Attitude of parents towards the psychosocial climate in a preschool educational institution**

preschool educational institution get tired (average rating – 153.00), parents less notice the tiredness of parents (average rating – 102.00). This difference between the opinion of pedagogues and parents is statistically significant ( $p=0.000$ ). However there are no statistically significant differences between the answers of parents and pedagogues on the questions of children nutrition quality and psychosocial climate in the institution.

Statistically significant differences were made clear analysing the attitude of parents and pedagogues towards planning of education process taking into consideration the child's physiology and correspondence of group space and area with individual needs of a child. Pedagogues are more satisfied than parents with the planning of educational process taking into consideration physiology of a child (average rating – 152.04 and 137.86 of pedagogues and 103.00 and 118.52 of parents,  $p=0.000$  and  $p=0.027$ ).

### Conclusions

- Having carried out the analysis of documents and scientific literature we can state that during the period of Lithuanian Independence essential education regulating documents were adopted and the system for supervision of educational institution activity was formed. The status of family and a preschool educational system were defined in each of programmes and a possibility for their implementation is indicated. The following children education tendencies are made clear in all preschool education regulating documents: to know a child and respond to his needs; it is attempted to convey cultural, national values which would serve as a foundation on which the layers of social skills, new experiences would grow; a supporting, encouraging, stimulating and safe environment must be formed for natural maturation of children.

- Having analysed the scientific literature a conclusion can be made that the safety of a preschool educational institutions consists of the following: environment hospitality, safety and aesthetics microclimate of the institution quality of community member communication and collaboration correspondence of learning environment and measures with the age of children, needs and interests

of learning; satisfaction of individual safety, emotional, physical and social needs of a child; psychological and social help; strengthening of a child's health; space of activity and its condition in an institution; learning encouraging environment; structure and content of a strategic plan and annual activity programme.

- The data of an empirical research carried out shows that according to the opinion of pedagogues a social environment in a preschool educational institution is not safe enough: insufficient material provision, average inclusion of parents into the management process of a preschool educational have reached manhood, they have much pedagogical experience, however they lack theoretical safe environment creation knowledge. According to their opinion, a big number of children in groups, group space and area insufficiently correspond to the individual needs of a child; health education quality is only partly satisfactory. Therefore it is important to assess the situation, strategies of safe environment creation for children and to distinguish the areas to be improved in order to ensure safety.

- The research data shows that parents rely on pedagogues working in preschool educational institutions and safe environment for children in being created in the institution, however based on the data of research results we can state what parents do not know or insufficiently know about the methods of safe social environment creation in a preschool educational institution, they know less the safe environment creation components; they are not sufficiently included to the creation of safe environment, do not have opinion about the safe environment creation in a preschool educational institution; they are not satisfied with material provision, nutrition quality, condition of territories and pitches of the institution;

- The research disclosed that pedagogues and parents differently assess the environment of a preschool educational institution. We can state that parents more demandingly and critically assess the environment of a preschool educational institution.

A theoretical and empirical analysis of a safe environment creation allowed determining the following development



perspectives: possibilities of safe environment creation in a preschool educational institution depend on analysis of the activity condition in the institution, formation of organisation mission and targets, strategy formation, its implementation and control; collaboration of directors, pedagogues and parents, their constant interrelation and humanisation of educational process. Pedagogues should more clearly distinguish the activity priorities, form conditions for decision making and include parents to the implementation of the institution's objects. Different assessments of directors, pedagogues and parents on safe environment creation also have influence on prospects of strategic development of a preschool educational institution. Therefore pedagogues should attempt to create a common and solid strategy in preschool educational institutions in order to sufficiently ensure a safe social environment of children.

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# EFFECTS OF EXTENSIVE ENGAGEMENT WITH COMPUTER-BASED READING AND LANGUAGE ARTS INSTRUCTIONAL SOFTWARE ON READING ACHIEVEMENT FOR SIXTH GRADERS.

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## **ABSTRACT**

*K-12 school practitioners and schools administrators need reliable results about the effects of instructional technology products as they strive to meet achievement compliance levels in politically accountable local and national contexts in the U.S. This study presents evidence regarding the effects of extensive engagement with computer-based instructional software on the reading achievement of 86 6th graders, within a backdrop of two previous similar investigations at the same middle school between AY 2003-2007. A treatment group received computer-based, reading instruction for 24 weeks x 90 minutes weekly in addition to four, 90 minute blocks of conventional instruction. Control peers received conventional instruction in five, 90 minute blocks per week. Comparisons of achievement scores on year-end, standardized reading tests yielded substantial gains for treatment subjects compared to controls, with an effect size of .92. Girls significantly outperformed boys and those not receiving lunch funding did significantly better than those receiving lunch funding. The conclusion is that extensive software engagement combined with in class instruction is an effective instructional context for enhancing reading achievement. Recommendations for further research suggest a "repeated trials" model in the same settings to give fidelity to curriculum, research methodology and the socio-cultural context for students and school.*

*Key Words: Reading Achievement, Computer-Assisted Interventions, Scientifically Based Reading Research, Reading and Language Arts Research and Computer-Based Instruction.*

## **INTRODUCTION**

With the passage of the No Child Left Behind Act [NCLB] in 2001, public school systems in the United States became heightened to "Twenty-First Century Learning Skills" and technically based instruction. Schools, school leaders and teachers increasingly turned to technology to help meet the compliance standards of the new federal mandates, particularly in reading and mathematics achievement (No Child Left Behind, 2001). Computer-based instruction progressively became the means in schools for enhancing reading and literacy achievement and the tools for correcting and remediating reading deficiencies. Likewise, educational software manufacturers found their products in great demand and heralded in a vast assortment of reading and language arts instructional software.

Whether school districts paid attention beforehand to the available research regarding the overall effects of instructional technology products and resources is an important question. There is an enormous amount of research literature examining the effects of instructional technology interventions and related products on student achievement, albeit invariant. Regardless, school districts in the United States are subjected to the political pressures of NCLB and the need to substantiate school/student compliance levels in math and reading achievement. Consequently, schools have invested greatly in the promise of commercial instructional technology. Kinnaman (1990) foreshadowed the issue in a summary of microcomputers and schools noting then that the educational use of computer technology would grow far beyond expectation, resulting in considerable expense and investment. Parents

and educational stakeholders needed assurance about the educational effectiveness of using computers in schools and desired evidence that such learning is enhanced in an accountable manner.

Moran et al. (2008) cautioned about the relatively modest effects of commercial technology products on literacy outcomes and for consumers to carefully scrutinize related claims. Moreover, in the age of fast forward computer technology and continuous development of instructional software products and systems, research on student achievement should be continually up-dated and the effects of emerging programs evaluated and presented. The authors contend that little empirical research has been conducted with such products at the middle school level, and in general, there are not enough experimental studies to reliably substantiate the claims about the efficacy of instructional technology on student achievement.

Some of what Moran contends is backed up with recent research conducted for the U.S Department of Education (USDE) by Dynarski et al. (2007). These researchers examined the effectiveness of instructional software products on reading achievement for first and fourth graders. Over 100 schools were selected and 350 teachers, who volunteered to participate. Teachers were randomly assigned to teach either in classrooms with instructional technology products or to teach in control classrooms with conventional instructional resources. Results for first grade reading achievement showed that test scores were not distinguished statistically by classrooms that did or did not use technology products, although larger effect sizes were found between schools. The authors noted the latter effect was most likely a matter of sampling variances associated with teacher assignment to groupings within schools. The results for fourth graders, likewise, were not statistically significant between the groupings.

A second year study for the USDE, conducted by Campusano, Dynarski, Agodini and Rall (2009), followed up the teachers who participated in the first year. The focus was to determine if reading achievement scores were increased by an additional year of experience for teachers using technology products. The effect on first grade test

scores when using the software for the additional year was nil—overall statistically insignificant. Similarly, the effect of the second year of experience on fourth grade reading test scores was non-significant. Overall, nine of the ten products tested (6 reading; 4 math) had insignificant effects for the full sample. One reading product had a statistically significant effect on test scores, but with an effect size of .09.

Differences in school contexts and instructional abilities may have influenced these outcomes. Notwithstanding, as schools rely greatly on instructional software resources to help meet NCLB and district compliance criteria, research on these products needs to be continually conducted and updated.

Merit Software, a publisher of K-12 instructional software for the past 25 years, commissioned independent, quantitative investigations of an integrated learning system in elementary and middle schools in southern West Virginian between 2002 and 2007. The purpose was to determine the effects of instructional software on content achievement test scores, particularly in reading and language arts and mathematics.

Researchers at Marshall University Graduate Center designed and conducted these investigations independent of Merit involvement, other than providing the appropriate software and initial training for school personnel. Of interest are three such investigations conducted at the same middle school in a rural school district between 2002 and 2007. In each case, groupings for computer-based and conventional instruction were compared on year-end, state mandated content assessments, albeit with variations in intervention periods and time. The current investigation is the third of these interventions at that same middle school.

The initial study, Jones et al. (2004), was conducted in the 2002-2003 school year with 116 subjects placed in computer-based groupings distributed in three, sixth-grade and three, eighth-grade settings. These subjects received reading and language instruction in a computer software lab for four weeks in two, 45 periods per week, plus in-class conventional instruction for the remainder of the week. There were 70 subjects in control groupings distributed in

one sixth- grade and one eighth grade classroom. Controls received all of their instruction in class with five, 90 minute blocks per week.

SAT-9 test scores from the previous school year were compared to the next years test scores to determine growth in the nine content areas. A regression model was employed to determine the level of growth predicted for the groupings. Seven of the nine sub-tests on the SAT-9 had significant coefficients favoring the intervention, including math problem solving (.003), math procedures (.014), language expression (.042), reading vocabulary (.003), comprehension (.040), science (.020) and social studies (.028). Language mechanics (.147) and spelling (.084) were below significance. Overall  $R^2$  values ranged between 19 and 22 percent. The authors concluded that computer-based instruction, on average, yielded greater pre to post-test standardized test scores.

Based on a recommendation for an "experimental" design from the previous Investigation, a second study at the same middle school extended the computer-based instruction to an 8-week period, with two, 45 minute blocks per week of intervention (O'Byrne, Securo, Jones & Cadle (2006). There were 172 students in computer-based groupings of which 72 were in three, sixth grade settings and 50 each in a seventh and eighth grade setting. A control group of 66 subjects included 19 sixth graders; 22 seventh graders and 25 eighth graders. Control subjects received conventional reading and language instruction in class for five, 90 minute blocks per week.

Subjects were pretested with the Grade Achievement Test which included sub-tests in language, sentence construction, vocabulary and comprehension. There were no statistical differences measured between the computer-based and conventional groupings, thus assuring homogeneity. The Westest (West Virginia's mandated, year-end content assessment) was given to assess the impact of the groupings. It reports standardized scaled scores in four content areas: (i) reading and language arts, (ii) social studies, (iii) science and (iv) mathematics. These results showed, on average, moderate differences in mean test scores favoring computer-based instruction with 4.38 in reading and

language arts, 8.23 for social studies, 2.14 for science and 3.82 for mathematics.

Although not significant statistically, a trend occurred for greater test scores across all computer-based groupings. Additionally, post-hoc quartile comparisons were made by ranking the frequencies for Westest raw scaled scores in four quartiles distributed equitably at the 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup> percentiles. Independent Samples *t* tests were obtained for each quartile comparing computer-based and control groupings, with homogeneity of variance corrections. Those in the bottom quartile for computer-based outscored their peers in control groupings on all four measures, with statistical significance for reading and language arts ( $p=.035$ ) and social studies ( $p=.000$ ). Consequently, in this study, the computer-based intervention had the greatest impact on lower achieving students.

The third (current) investigation, conducted in the 2006-2007 school year, focused specifically on reading/language achievement of 6<sup>th</sup> graders who had no previous experience with the integrated learning system in the school. Again, students were grouped into computer-based and control conditions except in this design, the intervention was extended to 24 weeks (90 minutes per week) to test the effects of extensive engagement with instructional software. The outcome measure was scaled scores in reading and language arts on the state-mandated Westest.

Computer-based instruction was effected by the series of intermediate reading and language arts instructional software for middle schools from Merit (Merit Corporation, 2006). The details and results of that investigation follow.

### Purpose

The study aimed to determine the differences in reading achievement test scores among 6<sup>th</sup> graders given instruction with computer-based, reading and language arts software and conventional in-class reading instruction compared to their peers who were given only conventional, in-class reading and language arts instruction.

*Null Ho:* There are no differences in Westest reading and language arts scaled test scores among 6<sup>th</sup> graders given

instruction with computer-based, reading and language arts software and conventional, in-class instruction compared to their peers who are given only conventional in-class reading and language arts software instruction.

Further, the study determined if significant differences resulted in the numbers of subjects in these groupings who placed in compliance or noncompliance levels of the West Virginia performance rubric for Westest reading and language arts scaled scores for sixth grade (West Virginia Department of Education, 2005-2008).

*Null Ho:* There are no differences in the frequencies of experimental and control subjects who placed in compliance and noncompliance levels on the West Virginia rubric for Westest reading and language arts scaled scores for sixth grade.

## **Westest**

Reading achievement was measured by the West Virginia Test (Westest), a state mandated, year-end standardized test given to students in grades 3-10 in four content areas: Reading/Language Arts, Mathematics, Science, and Social Studies. It is a criterion-referenced measure aligned with West Virginia Department of Education [WVDOE] standards and objectives per content area and grade level. Standards' reviews were conducted in 2003, 2004 and 2005. In a supplemental technical report from CTB/McGraw-Hill, internal consistency coefficients (stratified alpha) for reading and language arts were .95 for grade 6 (McGraw-Hill, 2005).

Raw Westest scaled scores are reported to students and scaled score ranges per grade level are reported to schools for reading and mathematics. Test data are then keyed to ranges in the state-wide performance rubric as: Distinguished, Above Mastery, Mastery, Partial Mastery and Novice. The latter two levels do not meet NCLB and district compliance in West Virginia (West Virginia Department of Education, 2005-2008).

## **Method**

### **Subjects**

Subjects were 86 middle school students in the sixth grade, assigned to two reading/ language arts teachers in a rural public school district in southeastern West Virginia.

Demographics were: (i) 99% Caucasian, (ii) 58% participation in free/reduced lunch program and (iii) a gender distribution of 43 females and 42 males. There was missing data for one male subject. Where socio-economic status (SES) is noted, it is operationally defined as "those students who did (58) or did not (28) receive Free/Reduced Lunch".

Before the school year began, subjects were randomly assigned to either computer-based or conventional groupings for instruction, which resulted in 43 subjects in each grouping, in two classes each. Each teacher was randomly assigned to a computer-based or control grouping

### **Instructional Software**

Merit software solutions for middle school is an integrated computer-based learning system with tutorial and content modules arranged to deliver, on demand, basic and intermediate individualized reading and language arts instruction for grades 5-8. Programs include a curriculum of various skill and sub-skill reading comprehension sets, e.g., main idea, sequence and inference, factual recall, fact-opinion and vocabulary comprehension and enhancement. These lessons advance to critical thinking skills for improving comprehension and for mastering specific reading skills within core content such as social studies and science. Interactive grammar exercises provide more difficult points of English grammar. The management component provides performance feedback to students and teachers on respective lessons and maintains related records. Teachers can access student progress through the Teacher Manager Program, monitor areas of concern and access lessons to address individual needs (Merit Corporation, 2010).

The major focus of the software is to help students achieve critical, intermediate reading skills, such as to identify vocabulary words in context and then reinforce meanings through interactive practice. The validity of Merit's vocabulary lists are based on several research sources including the Chall-Dale List of Easy Words (Chall & Dell, 1995); Basic Reading Vocabularies (Harris & Jacobson, 1982); and the EDL Core Vocabularies, (Taylor, et al.1989). Content validity for 6<sup>th</sup> grade reading and language arts



occurred by correlating the related WV standards with the modules for Intermediate Reading Solutions. An example of these is found in Appendix A.

Additionally, O'Byrne, Securro, Jones & Cadle (2006) described the reading content of the middle school software program to be significantly aligned to the West Virginia standards and objectives for reading and language arts in middle school grades. Moreover, practitioners (users) have informally evaluated these modules and have provided qualitative feedback about "best practices". For example, it is recommended that "program usage should be paced to allow students sufficient time between sessions to absorb the material". Additional examples are found in Appendix B.

### Design and Procedure

The design is a two-group, quasi-experimental, post-test only, with random assignment to control and computer-based groupings. The latter groupings (two classes) received computer-based reading instruction for 90 minutes each week in two-45 minute periods, for 24 weeks in addition to conventional in-class instruction for four, 90 minute blocks per week. Only those in computer-Based groupings had password access to the software program in a computer lab. The design is only one of three investigations over the past ten years that extended the treatment period to 24 weeks. That length coincided with the delivery of the instructional content up to the month of standardized testing (late April).

Controls received conventional instruction in class for five, 90 minute blocks per week, including a variety of supplemental activities such as Writing Roadmap and Compass Learning. All students, whether in conventional or treatment groupings, were given content instruction germane to the West Virginia Department of Education [WVDOE] standards and objectives for reading and language arts at grade level.

The intervention began in early October, 2006. Beforehand, all students were given relevant, conventional content instruction, including several weeks of review of essential reading and language content and skills from the previous year. Random assignment somewhat assured that subjects in the groupings were on equal footing in

reading achievement before the intervention. Additionally, Stanford-9, Reading Total test scores from the previous year were compared for homogeneity. Results indicated equivalency (Levene's .894; Computer-based,  $M=73.2$ ,  $s.d., 10.93$ ; Control,  $M = 76.1$ ,  $s.d ,10.47$ ;  $t(81)=1.24$ ,  $p .217$ ), with three cases of missing data.

The investigation concluded in mid-April, 2007 when the Westest was administered to all subjects under state-directed testing procedures and security. Subjects in the database were identified by case number, instructional methodology, gender, grade level and receiving "free/reduced lunch or not".

### Descriptive Results

Various descriptive data were obtained for Westest Reading/Language Arts scaled scores, including "trimmed" and overall means, variance, standard deviation and skew values. Histograms were obtained for the dependent variable to examine the distribution of test scores. The histogram for 6<sup>th</sup> grade was symmetrical and approximated normal distribution and variability, with a skew value of  $-1.083$ . A test of significance for normality (Smolgorov/ Smirnov) was not significant ( $p.20$ ). Differences in trimmed ( $654.8$ ) and overall ( $653.2$ ) mean scores were minimal and indicated no extreme or outlier effects.

### Computer-Based and Control

Table 1 shows the Westest mean scores and standard deviations of 6<sup>th</sup> graders for reading/language arts in computer-based and control groupings across gender and SES.

Mean scaled scores for computer-based exceeded the control group by approximately 29 points, with a  $s.d.$  of 26.5 compared to 35. Statewide, standard deviations average approximately 39 on the Westest. A 16 point, mean score

N	Grouping	Mean	Standard Deviation
43	Computer-Based	667	27
42	Conventional	639	35
43	Female	661	29
42	Male	645	37
28	No Free/Reduced L.	664	29
57	Free/Reduced L	648	35

Table 1. Sixth-Grade Westest Reading and Language Arts Mean Scaled Scores and Standard Deviations for Computer-Based, Control, SES\* and Gender.

difference favored females. Not unexpected, a difference of 16 favored those not receiving Free/Reduced L. Although standard deviations are within expected ranges, the disproportionate sample sizes (58/27) may have skewed that result. But the outcome is likely related to socio-economic differences negatively affecting standardized test scores for those from low income groups.

Scaled scores have subsequent implications for placement of students (and schools) in the statewide performance rubric noted earlier. (West Virginia, Scaled Scores/Cut Score Ranges, 2005-2008). Table 2 shows the resulting frequencies in the rubric for Westest reading and language arts scaled scores noted by grade level and rubric category.

Approximately 19% in computer-based groupings placed in Novice and Partial Mastery levels (8/25) compared to 60% of those in control groups (25 of 42). The aforementioned levels do not meet compliance standards in annual yearly progress (AYP) school reporting. Conversely, 35 of 43 computer-based subjects (80%) placed in compliance levels while 17 of 42 (40%) did so in control groupings.

## Inferential Analysis and Results

### Computer-Based and Control

Scaled scores for computer-based and control groupings were analyzed with an Independent Samples t-test. With equal variances assumed, (F, .660, p .419), a significant difference in scores resulted between Computer-based (M= 667.4, Sd., 28) and Control M= 638.8, Sd., 35)  $t(83) = 4.254, p .000, CI 95\% - 41.99$  to  $-15.23$ . These data resulted in an effect size measure of .92 (Cohen's d, with pooled  $\sigma$ ). Given the differences in scaled scores between boys and girls, an Independent Samples t-test was obtained for

comparison. Gender balance across the groupings was equivalent, (43 and 42) and equal variances were assumed (Levene's, F, .877, p .352). Significance occurred for Girls, (M= 661.4, Sd., 29) over Boys (M = 644.9 sd., 37),  $t(83) = 2.294, p .024$ , with a moderate effect size of .47.

Socio-economic circumstances are factors to consider when standardized test scores are used as dependent measures, particularly in a language-laden content area. As expected there was a significance for Not Free Reduced/L (M =663.6, Sd. 29.3) compared to Free-Reduced/L (M =648.1, Sd.35.2),  $t(83) = 1.998, p .049$ , with a moderate effect size of .48. Although standard deviations were within expected ranges, the disproportionate sample sizes (58/27) may have skewed the result. But the outcome could just as likely have been a valid socio-economic difference which often impacts standardized test scores negatively for those from low income groups.

Based upon the results, the hypothesis of no differences in Westest Reading/Language Arts scaled scores among 6<sup>th</sup> graders given Computer-based and Conventional instruction is rejected.

A Chi Square Test of Independence (with Yates Correction) was obtained to compare the proportions of scaled scores in compliance and noncompliance categories per the groupings. These results indicated a significant association between compliance status and method of instruction,  $\chi^2(1, n = 85) = 11.4, p = .000, \phi = .39$ . Approximately 19 % of those in the computer-based groupings did not meet compliance compared to nearly 60 % of those in the control groups.

Based upon the results, the hypothesis that there are no differences in the numbers of subjects in the groupings who placed in compliance and non-compliance levels on the West Virginia rubric for Westest reading and language arts scaled scores in sixth grade is rejected.

## Conclusion and Discussion

The initial purpose of the investigation was to determine if reading comprehension test scores are benefitted by a computer-based, instructional learning system, complemented with in-class instruction. Consequently, youngsters using the system for an extended period of time

Performance Level	Scaled Score Ranges	Frequency in Range for Merit / Control	
* Novice	505-606	1	8
* Partial Mastery	607-643	7	17
Mastery	644-680	17	15
Above Mastery	681-704	15	2
Distinguished	705-810	3	0

\* Does not meet state/district compliance standards

**Table 2. Frequencies of Sixth-Grade Westest Scaled Score Ranges on the West Virginia Rubric for Reading and Language Arts.**

had significantly greater tests scores than did their control peers given only conventional, in-class reading instruction. The effect size evidence, .92, further supported the benefit of computer-based instruction. Others have described similar systems resulting in gains for reading attainment, although the effect sizes of the magnitude found in the present study rarely have been reported. Pearson, Ferdig, Blomeyer & Moran (2005) meta-analyzed 20 investigations (with 89 effect sizes), concerning the effects of instructional technology on reading performance in the middle grades. The authors reported a weighted effect size of .489, and of the 89 effect sizes obtained, six met or exceeded the .90 level.

The instructional implications are evident. Compared to conventional classroom teaching methods, achievement in content learning (with the initial thrust at the middle school level) can be enhanced with technically supported instruction, assuming that software content is aligned to local course content and to the expected assessments. Year-end standardized tests measure a range of content that represent a year-long curriculum. Consequently, supplemental technical instruction should extend accordingly. The current intervention (24 weeks) extended from early October to mid-April, when the Westest was given statewide. Moreover, the 24-week intervention exceeded the great majority of similar computer-based interventions found in the literature.

Of practical (and "political") importance to local educators and policy-makers are differences among the groupings for placement in school compliance performance levels. Nearly a 4 to 1 ratio of computer-based to control subjects placed above sub-standard levels (Novice and Partial Mastery). This was a significant event for a small rural school under pressure to meet NCLB and district compliance measures. It will be seen if such proportions can be replicated in future investigations and the risks reduced for students (and schools) ending up in noncompliance levels. The use of emerging instructional curricular software systems is likely to be an important mode for achieving these outcomes.

The current study had a "one shot" dependent variable—a year-end, state sponsored, standardized test. To better

understand the various effects of extensive curricula engagement within technological contexts, more frequent and finer curriculum-based assessments are warranted along with standard, year-end assessments, as well as concomitant "affective" measures. Moran et al. (2009) argue that a good deal of the research on instructional technology and literacy achievement has narrowly focused on content achievement. A greater emphasis needs to be given to the interaction effects of affective measures including student motivation, meta-cognition and self-efficacy.

The evolution of computer-based instructional systems and products to effect school achievement is evident. There are more and better things to come. For sure, the expectations are that such tools will continue to be used by educators to help students learn—particularly for struggling students. The effects of these tools and programs are important items on a continuing research agenda for enabling literacy achievement of all youngsters. How that research will be conducted and represented is an important issue. Single studies cannot validate results with certainty. The investigations described here necessarily cannot be claimed as "replications" since replication was not the purpose at the outset. Also, there were differences in sample sizes, the length of the interventions and data analyses. But there were common elements. The research occurred in the same school, essentially at the same grade levels, with the same instructional software and system, with students who shared the same similar socio-cultural backgrounds, with a consistent cadre of classroom teachers and with essentially the same kinds of measures. An important common outcome of these interventions was that student performance improved, particularly for a significant number with a history of sub-standard achievement.

The results of these studies suggest a model for research based upon "repeated trials". By repeating research within the same schools, fidelity is given to curriculum, instructional resources and products, delivery systems, assessments, the social-cultural context of the students and the school community and to a cadre of experienced teachers. Too often, isolated single studies cannot validate

results with enough certainty or confidence for teachers and administrators who are investing time and money in selecting instructional technology resources. The accumulation of repeated results and know-how can lead to greater certainty and validity for the effects of instructional technology tools and products on student achievement, whatever the outcomes.

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## Appendix A

### Examples of Sixth Grade Reading and Language Arts Content Standards for West Virginia Schools Correlated to Merit Software Reading Comprehension Intermediate Modules

#### Standard 1: Reading (RLA.S.1)

Students will use skills to read for literacy experiences, read to inform and read to perform a task by: identifying and using the dimensions of reading (phonemic awareness, phonics, background knowledge/vocabulary, high frequency words/fluency, comprehension, writing and motivation to read)

#### Reading Objectives

Students will:

RLA.6.1.3 determine theme and locate supporting details in a literary passage and across the curriculum.

RLA.6.1.4 analyze text to determine transitional words/language.

RLA.6.1.5 use comprehension skills (e.g., draw conclusions; interpret meaning).

RLA.6.1.8 explain text connections for understanding a literary passage.

RLA.6.1.12 use root words, prefixes and suffixes to spell words, change word meanings and generate new words appropriate to grade level.

[ Merit Modules]

Accu-Reading Sets 1 - 2,

Reading Shape Up Set 2

Reading 1.1. Learning to

Read Independently

Critical Thinking Skills, 1-2

## Appendix B

### Teacher Practices to Enhance Software Effects Reading Comprehension Intermediate

For best results the authors recommend that students can use these programs 20 to 30 minutes a session - two to three times a week - for six to eight weeks in conjunction with other methods of instruction.

Program usage should be paced to allow students sufficient time between sessions to absorb the material.

Some programs will offer both a Warm-up section and a Workout section. If a Warm-up section is offered, go here first. The Warm-up section will give students in-depth practice with individual skills. The Workout section will give students more difficult practice with mixed skills.

Follow up each software Workout session. Ask students to name something from software texts that was already familiar to them before their session. Can they name something they read about for the first time? What new questions do they have?

Look at a sample text from a book. Ask students to find the key words that tell the main idea. Can they list 2 - 3 details? Find a fact and/or an opinion? Explain text sequence? What can they infer from the text?

Give students short texts from social studies, science, or language arts classes. Have students work in pairs to create additional sentences that could be inserted into each text.



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Have students imagine they are making up reading/vocabulary questions for the Merit program being used. Give students a short text.

Have them work in pairs to create and write their own skill-related questions and answers.

Return to the software and let students try Merit's Finals. Discuss scores with students. In what areas are they making the most progress since the Tryout section?

Have students print scores for completing the Tryout section. Discuss problem areas with students

Follow up each software Workout session. Ask students to name something from software texts that was already familiar to them before their session. Can they name something they read about for the first time? What new questions do they have?

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## PERFORMANCE IN PHYSICAL SCIENCE EDUCATION BY DINT OF ADVANCE ORGANISER MODEL OF TEACHING

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### ABSTRACT

*Education should be made painless and the teaching must be made effective. Teaching is an activity, which is designed and performed for multiple objectives, in terms of changes in student behaviours. Models of teaching is just a blue print designed in advance for providing necessary structure and direction to the teacher for realizing the stipulated objectives. Ausubel in his theory of meaningful verbal learning, the most important ideas, phenomena and other difficult words are presented in the beginning of instruction, so that the learner can easily understand each and every concept and learning becomes meaningful. According to Ausubel's Advance Organizer Model of Teaching (AOMT), the concepts are hierarchically organized from simple to very abstract and all the concepts are linked together. Ausubel believes that structural concepts of each discipline can be identified and taught to the students and the students can become an information processing system to solve problems. The objective of the study is to find out the effect of AOMT on the achievement, gain and retention of the secondary prospective teachers in physical science. The investigator adopted Pre-test - Post-test Equivalent Group Design for the study. Sixty prospective teachers, 30 for experimental group and 30 for control group, were selected as sample. Statistical techniques used were standard deviation and t- test for independent variables. Findings of the study reveal that performance and retaining capacity of the experimental group are significantly higher than that of the control group.*

*Key words: Models of Teaching, Information Processing System, Advance Organiser Model of Teaching, metacognitive skills, meaningful learning, subsumption.*

### INTRODUCTION

Education is the fundamental right of all human beings and it is considered to be a national responsibility. The development of a nation is determined by the quality of its human races, which depends on the level of knowledge, higher education plays a crucial role in the development of knowledge. In recent years, the Indian higher education system has become fully aware of the need for quality but it cannot be attained overnight. Quality based education depends on education process, where teacher is a vital component to achieve quantitative and qualitative enhancement of education.

Teaching and learning are transformations. The environment of the classroom is of course is not uniquely determined by the teacher, but a teacher has to adapt his/her teaching to the social and regional environment.

The student-teachers are prospective teachers with the onus of creating environment for learning. Teaching models provide the learning experiences by creating appropriate environment for real behaviour outcome, for which that, teaching should be effective. Lecture should be effective based on an outline rather than a complete text. Advanced Organizer Model (AOM) is an effective lecture method (Townsend, 1969, Barrow, 1973, Mahajan, 1983, Bharambe, 1999, Chen & Baiyun, 2007) by which teaching can be made from an outline of content.

### Significance of The Study

Ausubel's AOM is an innovative teaching model aimed at developing meaningful verbal learning. Based on this theory, the most important ideas, phenomena and other difficult words are present in the beginning of instruction, so that the learner can easily understand each and every

concept and the learning becomes meaningful. According to AOM, the concepts are hierarchically organized from simple to very abstract and all concepts are linked together. Ausubel believes that structural concepts of each discipline can be identified and taught to the students and the students can become an information processing system to solve problems.

In our modern scientific world, the concept of mastering the subject has changed especially in learning science and generally discovery approach is being followed in the teaching of science. The new curriculum developments in science emphasize the teaching of science in various approaches and models. Ausubel's theory of learning can be effectively followed in the colleges of education. If the student-teachers practice what they learned during the pre-service period in the actual field, the school wards of them will certainly experience variety of teaching which will enhance the quality of teaching and hence the learning. Keeping this in mind, the investigator took an attempt to know the effectiveness of Advance Organiser Model of Teaching over the conventional method of teaching on the performance of student-teachers in physical science education and hence the present study.

## Objectives

- To establish the homogeneity of the sample groups.
- To find the effect of Advance Organiser Model of Teaching (AOMT) on the performance of student-teachers in physical science education.
- To find the effect of AOMT on the retaining capacity of the student-teachers in physical science education.

## Null Hypotheses

- There is no significant difference between the control and experimental groups in the performance of physical science education before giving treatment.
- There is no significant difference between the control and experimental groups in the performance of physical science education after giving treatment.
- There is no significant difference between the control and experimental groups in the performance of physical science education in the gain scores.
- There is no significant difference between the control and

experimental groups in the retaining capacity of physical science education.

## Design Of The Study

The investigator adopted Pretest and Posttest Equivalent-Groups Design (Best & Kahn, 2003: 176) for the present study.

## Sample

Sample consisted of 60 prospective teachers of physical science education studying in two rurally located colleges, thirty from each constituted the control group and experimental group.

## Tool Used

The investigator constructed and validated a performance test in physical science education consisting of 41 objective type questions. Weightage was given to three learning objectives - knowledge, understanding and application. The investigator then showed the performance test to teacher educators of science education to verify the suitability of the items to the target students. After inclusion and deletion of certain items, 61 items were retained. The draft tool was administered to 100 physical science prospective teachers working in the Colleges affiliated to Tamilnadu Teachers Education University. The responses were scored and the item analysis was carried out by finding out the discriminative index and difficulty level of each item. The items having discriminative index above 0.20 and the items having difficulty level between 40 % and 80% were selected. Here the reliability coefficient of the half test was found to be 0.76 and the reliability coefficient of the whole test using the Spearman - Brown prophecy formula was found to be 0.86. Thus the validity and reliability of the tool were established.

## Statistical Techniques Used

Standard deviation and t- test for two independent means (Best & Kahn, 2003: 392) were the statistical techniques employed in this study.

## Treatment

To analyse the effect of AOMT on the performance in physical science education, sixty prospective teachers of physical science education were divided into two groups - experimental group (N = 30) and control group (N = 30).

The homogeneity of the two groups was established in terms of Attitude towards Teaching Profession and pretest scores. The experimental group was treated with AOMT and the control group was treated with conventional method of teaching. The major topic selected for the experimentation was microteaching which covers skill of introduction, skill of explaining, skill of stimulus variation, skill of reinforcement, skill of questioning, skill of using blackboard, skill of demonstration and skill of achieving closure. Before taking classes for the experimental group, the topics were brought into eight lesson plans and a sample is given in the Appendix. The experiment lasted for eight days, an hour per day. Before and after the treatments, a performance test developed and validated by the investigators was administered to find out the effectiveness of AOMT in terms of elevation in performance of the target groups. In addition to these two tests, a delayed post-test has also been conducted after twenty days to the post-test to know their retaining capacity.

### Data Analysis

The collected data were analysed using SPSS package and the results are tabulated below.

In Table 1, since p-value is greater than 0.05, the null hypothesis is accepted at 0.05 level of significance. Hence it is concluded that there is no significant difference between the pre-test scores obtained by the control and experimental groups.

In Table 2, since p-value is less than 0.01, the null hypothesis is rejected at 1% level of significance and it implies that there is significant difference between the posttest scores obtained by the control and experimental groups. The mean scores reveal that experimental group performed better than the control group in the post-test.

Table 3 shows that the p-value is less than 0.01. Hence the null hypothesis is rejected at 1% level of significance and it is concluded that there is significant difference between the gain scores of control and experimental groups. The mean scores reveal that the gain scores of the experimental group was higher than that of the control group.

Table 4 shows that since p-value is less than 0.01, the null hypothesis is rejected at 1% level of significance and it is

Category	Group	N	Mean	S.D	Calculated value of 't'	p-value
Achievement	Control	30	13.23	3.37	1.08	0.28
	Experimental	30	12.30	3.31		

**Table 1. 't' test for the performance scores of control and experimental groups in the pre-test**

Group	N	Mean	S.D	Calculated value of 't'	p-value
Control	30	16.57	3.12	9.88	0.00**
Experimental	30	24.53	3.11		

\*\* Significant at 1% level

**Table 2. 't' test for the performance scores of control and experimental groups in the post-test**

Group	N	Mean	S.D	Calculated value of 't'	p-value
Control	30	3.33	3.17	9.83	0.00**
Experimental	30	12.23	3.80		

\*\* Significant at 1% level

**Table 3. 't' test for the gain scores of control and experimental groups**

Group	N	Mean	S.D	Calculated value of 't'	p-value
Control	30	19.47	3.45	8.25	0.00**
Experimental	30	27.50	4.06		

\*\* Significant at 1% level

**Table 4. 't' test for the retaining capacity of control and experimental groups**

concluded that there is significant difference between the scores obtained by the control and experimental groups in the delayed post-test. The mean scores show that the experimental group scored more than the control group in the delayed post-test.

### Findings

The findings are as follows:-

- There is no significant difference between the control and experimental groups in the performance in physical science education before giving treatment.
- There is significant difference between the control and experimental groups in the performance in physical science education after giving treatment. The experimental group performed better in physical science education than the control group.
- There is significant difference between the control and experimental groups in the Gain scores of teaching physical science education. The experimental group

earned more gain scores in physical science education than the control group.

- There is significant difference between the control and experimental groups in the delayed post-test scores in physical science education. The experimental group retained more than the control group.

## Discussion

In this study, no significant difference in the pre-test scores indicate that both the control and experimental groups were equal in their subject knowledge prior to experimentation. This shows that the two groups were homogeneous, which is the prerequisite for the proper experimentation.

The experimental group scored higher than the control group in the post-test. This is obvious that the AOMT is more effective than the traditional method of teaching. This finding is in harmony with the reviewed studies (Townsend, 1969, Barrow, 1973, Mahajan, 1983, Bharambe, 1999, Chen & Baiyun, 2007) also.

The gain scores of experimental group were significantly higher than that of the control group. It also confirms the effectiveness of AOMT over the traditional method of teaching.

The delayed post-test scores imply that the retention ability of students belonging to experimental group was better than the control group. This shows that the treatment helped for more retaining capacity of the prospective teachers in physical science education.

## Educational Implications

The study implies that the AOMT is significantly effective comparing the conventional method of teaching physical science education. This result shows the positive impact of AOMT on performance in physical science education. So teachers at all the levels can be given orientation on various models of teaching in their respective subject and employ them effectively in the classroom teaching. Prospective teachers must be made acquainted with good lesson plans prepared by the experts for teaching of science by this new approach. The authorities may give due considerations to teach science as well as other subjects through AOMT. Well-prepared lesson plans based

on AOMT and handbook for teachers consisting guidelines of models of teaching should be provided to the in-service teachers. Teachers must have experience in preparing lesson plans based on the various models of teaching like AOMT.

When presenting the Advance organizer, inner speech of the learner is reinforced to think and link with previous knowledge. Executive process of organization is possible by AOMT. The enhancement of the metacognitive skills of the learners is made possible in general, and specifically organisation of information into an integrated system helps the low performing students. So seminars and symposia on models of teaching may be conducted for teacher educators to have interaction and innovative exposure with the experts who make use of those in their own teaching. AOMT bridges the gap between what is already known and what is to be learned; higher level of abstraction is also possible by AOMT. So demo sessions on AOMT may be arranged for the pre-service and in-service teachers. As it strengthens the cognitive structure and facilitates meaningful learning and retention, prospective teachers may be trained to integrate AOMT in regular classroom teaching. Higher order tasks can also be performed well by AOMT. So empirical studies on effectiveness of different models of teaching carried out by the in-service teacher educators in colleges have to publish in educational journals and popularize it to their colleagues and wards. AOMT provides clear and well-organized cognitive structure, which is better anchorage for new learning and retention. The teacher educators who have been practicing AOMT-like models in their classrooms may be encouraged so that the prospective teachers can make use of them in their routine teaching being the slow learners are benefited and the exceptional ability students' mental world is easily organized by AOMT.

## Conclusion

An advance organizer, a cognitive strategy, allows the learner to recall and transfer prior knowledge to the new information being presented. Learning is facilitated, if the learner can find meaning in the new information. If a connection can be made between the new information and previous knowledge, the learning experience will



become more meaningful to the learner and hence the new information will be learned. So all the universities must add models of teaching in the teacher education curriculum and it must be made mandatory for practicing teaching also.

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## Appendix

### AOMT - LESSON PLAN (A sample)

Name of the investigator : XXX  
Name of the College : XXX  
Subject : Physical Science  
Class : B.Ed.  
Duration : 1 hour  
Strength : 30  
Topic : Skill of stimulus variation

### Curriculum Objectives

- To understand the skill of stimulus variation.
- To understand the components of skill of stimulus variation.
- To appreciate the use of the components of skill of stimulus variation.
- To know the components of the skill of stimulus variation.
- To know about the demonstration of skill of stimulus variation.

### Process Objectives

- Prospective teachers construct the knowledge of skill of stimulus variation.
- Prospective teachers collaborate the various components of skill of stimulus variation in their classroom teaching.

### Syntax

Investigator clarifies the aim of the lesson.

### Phase I: Presentation of Advance Organizer

#### Overview

Today I will teach you the skill of stimulus variation, one of the microteaching skills and its components. At the end of this

lesson, you will be able to define and demonstrate the skill and its components.

## Important Words

### *Teacher Movement*

Teacher movement is very important in the classroom. To secure student's attention movement should be meaningful. Habitual movements fail to attract their attention. The movement of the teacher helps pupil to change their posture, which provides physical relaxation to them and also contributes to the alertness, enthusiasm and variety of teacher behaviour.

### *Teacher gesture*

Actions are important and meaningful. Movement of head, hands and body to direct attention to emphasis, importance to explain and express emotion or to indicate shapes, sizes etc. come under this category.

The other important words included in the advance organiser are Changes in voice, Focusing, Changes in interaction pattern, Pause, Physical pupil participation and Switching.

## Phase II: Presentation of learning material

Skill of stimulus variation involves deliberate changing of various attentions producing behaviour by the teacher in order to keep pupils attentive at high level. When the teacher explains, he makes use of certain patterns of movement, patterns of speech, gestures, focusing etc. These variations make the students to stimulate. Then only the teaching is effective. This skill is very important for teachers. The components of the skill of stimulus variations are : Teacher movement, Teacher gesture, Changes in voice, Focusing, Changes in interaction pattern, Pause, Physical pupil participation, Switching.

Teacher movement secures students attention. Movement should be meaningful. Teacher gesture (actions) is also important and meaningful. A change in voice is to maintain pupil's attention. Focusing can be verbal, gesture, verbal cum gesture. Teacher should introduce variations in the interaction pattern. Pausing a temporary stop, is very important in teaching. Students writing on the blackboard can make physical pupil participation. By switching, a teacher can vary his medium from one to other; can enhance pupil's attention.

## Phase III: Strengthening cognitive structure

- |                      |   |  |
|----------------------|---|--|
| Teacher Educator     | : | What I have taught you?  |
| Prospective teachers | : | You have taught us the skill of stimulus variation and its components.   |
| Teacher Educator     | : | What is skill of stimulus variation ? What are its components?   |
| Prospective teachers | : | It is a skill which involves deliberate changing of various attentions producing behaviour by the teacher in order to keep pupils attentive at high level. The components are teacher movement, teacher gesture and changes in voice, focusing, changes in interaction pattern, pause, physical pupil participation and switching. |
| Teacher Educator     | : | In what way this skill will be useful for your teaching in real situation?   |
| Prospective teachers | : | We will make use of all the components of skill of stimulus variation in our classrooms to make the students attentive and learning effective.   |

Let a prospective teacher write the components of skill of stimulus variation on the blackboard. Let others ask doubts, point out mistakes, if any, and engage in active discuss. Finally they demonstrate the skill to the peer prospective teachers.

## ABOUT THE AUTHORS

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