



E-Learning and the iNtegrating Technology for inQuiry (NTeQ) Model Lesson Design

Lee Hatch Flake¹ 

¹Nagasaki University Japan



Abstract

The author reflects on the history of technology in education and e-learning and introduces the iNtegrating Technology for inQuiry (NTeQ) model of lesson design authored by Morrison and Lowther (2005). The NTeQ model lesson design is a new pedagogy for academic instruction in response to the growth of the Internet and technological advancements in education. The author explains the philosophy of the NTeQ model lesson design and its practical applications for e-learning. The author also introduces the NHK designed software Native World® that provides auditory modeling and assesses the student's pronunciation and progress. Both the NTeQ design and the Native World® program are effective methods for supplementing EFL instruction in Asian classrooms. The author introduces sample collaborative e-learning lesson plans including the NTeQ model for reference.

Keywords: NTeQ, Native World®, E-Learning, Instruction.

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Contents

1. Introduction	73
2. Technology Types and the History of Technology in Education.....	73
3. Technology Introduced: <i>Native World@</i> Computer Interactive Program (CIP)	74
4. Analysis of E-Learning and NTeQ Model Lesson Plans	75
5. NTeQ Philosophy Constructs, Benefits, and Disadvantages.....	77
6. Analysis of Student, Teacher, and Computer Roles in NTeQ and Traditional Classrooms	78
7. Implementation of NTeQ.....	79
8. Conclusion	79
References.....	80
Bibliography	80

1. Introduction

Education has always been important to the author. The author enjoys teaching and being an educator holds prodigious personal value. Learning new skills by continuing his education helped to further his own potential and effectiveness as an educator. The author found that he enjoyed the work and developed an interest in pursuing a career in education. The author has taught English as a Foreign Language (EFL) at different public and private academic institutes throughout South Korea and Japan for the past three decades.

Perusing new skills and knowledge is part of the author's professional growth plan. Skills and knowledge include improving and applying technological proficiency. Such goals have become an asset that strengthens his identity and skills as an educator. The author continues his learning and stays current on educational issues as well as technology trends in order to remain an effective instructor.

2. Technology Types and the History of Technology in Education

After the Soviet Union launched Sputnik into orbit on October 4, 1957, there was a sudden profound interest in the United States to focus on improving science and mathematics achievement in public schools. The United States Congress quickly passed the National Defense Education Act with interest in using technology for enhanced and programmed instruction, and educational programs in the classrooms. Most all classrooms throughout the United States were soon equipped with screens for projectors and slides as Over-Head Projectors (OHPs) became standard for K-12 classrooms in the 1960s. This trend was soon followed by school media rooms equipped with TV monitors in the 1970s. Morrison and Lowther (2005) labeled this movement as Technology Type I and further explain technology introduction into classrooms from the 1960s until present as Technology Types I, II and III. Both Types I & II are delivery-based and focus on instructional strategies.

Type I view of technology is that technology is used to *enhance* the role of the teacher as educators typically viewed technology as a more efficient means to deliver instruction to students (Morrison and Lowther, 2005). Slide projectors enabled teachers to instruct classes more efficiently and with greater ease than writing on blackboards. Type I view of technology was an extension of the teacher—a way to amplify instruction. In short, it helped the teacher become a better instructor. The government authored and endorsed the new technology trend beyond the classroom to promote education through public television and educational programs. The Public Broadcasting Service (PBS) was founded in June 1970 in the United States. Educational programs were soon introduced in the United States. Mr. Rogers Neighborhood (televised from 1966); Sesame Street (televised from 1969); Curiosity Show (televised from 1972) soon renamed 321 Contact, all shared in popularity and also became cultural icons. Public television, which was already a standard in many countries, such as the British Broadcasting Company (BBC) and the *Nippon Hōsō Kyōkai*, (NHK) known in English as the Japan Broadcasting Corporation also followed suit with various education programs.

Technology Types, are generational and reflect paradigm shifts in learning philosophies. During the 1980s and 1990s, technology was viewed as a way to deliver instruction. Programmed or *pre*-programmed instruction became the norm for Technology Type II as technology was used to *replace* teachers instead of amplifying or enhancing the teacher's instructions (Morrison and Lowther, 2005). The author, as a child of the 1980s can remember vividly being in science or history classes that instruction was merely a matter of having students watch a documentary on Beta-max, VHS, or film strips for entire class periods with very little instruction from the teacher. Moreover, this was before the standards movement in education, making "bad science" and biased information, and wrong facts an occasional blight on one's schooling. Many who grew up in the 1980s can remember viewing documentaries such as the 1958 Walt Disney documentary titled "White Wilderness" in which claimed that lemmings commit mass suicide. Many who grew up watching such reports and documentaries believed this to be true since it was being taught in a classroom.

In the 2000s and 2010s, technology came to be viewed as a *tool*. This view of technology is what uniquely separates Type III from previous views on technology. The role of students and teachers were changed as the teacher becomes a facilitator and students take on the active role of a researcher (Morrison and Lowther, 2005). Schools, institutes and teachers no longer have a monopoly on knowledge, information, and skills. Standards and accountability in education on both regional and international levels. As examples of the standards movement, in the United States, the No Child Left Behind (NCLB) legislation was introduced followed by the National Educational Technology Standards for Teachers (NETS-T), the American Council on the Teaching of Foreign Languages (ACTFL), and the National Center of Assessing General Curriculum (NLAGC). On a national level, the Programme for International Student Assessment (PISA) continues to provide a standard for assessing student academic performance.

While studying as a graduate student, the author began to consider that a Technology Type IV movement, which is characterized by the use of the technology to bypass schools, universities and other educational institutes, is the perhaps the next technology type in the continued evolution of e-learning. Continuing the theories of technology Type I-III that Morrison and Lowther introduced, the author believes that a new Type IV movement is also worth considering. Online education is merely one example of Type IV technology. Type IV is emerging as students and others seeking professional development have discovered that through motivation and available resources, one does not need an institute in order to succeed at employment or to gain qualifications. Technology empowers the individual. E-texts are available making it possible, based on the motivation of the individual, to receive licensure or credentials and acknowledgment for learning skills. Type IV has emerged through published e-texts and the availability of information through the Internet and through the advancement of mobile devices such as smartphones and tablet devices. These and other advancements in emerging technology give instant skills to the user. Engineers seeking apprenticeship, lawyers studying for the bar exam, and teachers looking for lateral entry into teaching licensure are all aided by online courses and e-texts over traditional courses and programs at brick and mortar institutes. Type IV technology challenges traditional educational institutes. It is possible to pass skills and knowledge assessments without formally attending an institute. Ascribed status given to institutes is potentially a social construct. Although the author is not entirely convinced that online education and e-texts will

quickly replace brick and mortar institutes as the “human element” has intrinsic value for learning, he believes that Type IV technology movement is challenging the traditional mindset of education standards.

Technology Types I and II are delivery-based. It is only when computers and technology are viewed as a cognitive tool that the use of technology becomes interactive as in Types III and IV. To effectively use technology as a tool is to use technology to determine, identify, summarize, and organize information. Please refer to the following table for an overview of the Type I-IV technology.

Table-1. History of E-Learning and Technology in Education

Designation / Era	Philosophy Concerning Technology	Technology/Teacher Relation
Type I	1960s-1970s	provides efficient instruction
Type II	1980s-1990s	enhances teacher's role
Type III	2000s-2010s	provides programmed instruction
Type IV	2010s-present	a tool or artifact for knowledge
		redirects role to facilitator
		empowers students to bypass institutes
		limits teacher's role

Source: Morrison and Lowther (2005).

3. Technology Introduced: *Native World®* Computer Interactive Program (CIP)

The high school where the author is tenured purchased new computers through donations and stipends received during their 80th commemoration. Computers are all Fujitsu Biblio FMV series, digital cable ready with Pentium 4 CPUs. Purchased computers have been used in an experimental Language Lab for grade 12 high school students. Through the Computer Interactive Program (CIP) for EFL instruction written by Nippon Hoso Kyokai 日本放送協会 (NHK) or the Japan Broadcasting Corporation titled *Native World® 3.0*, students are introduced to the latest technology for EFL study. The program is simple and effective in application. The computer plays different scenes from daily life such as ordering food at a restaurant or taking a taxi. The students have to converse with the native English speaking characters on the screen. Each student sits at a computer with a head set and speak into a microphone that “reads” what they say. Acceptable responses are predetermined by the program. When the response is close enough in dialect that the computer recognizes it, the student proceeds to the next “level.” As the dialogs become progressively more difficult and responses become more scrutinized, students are encouraged to put their skills to the test. Students tend to remember vocabulary and new expressions quickly compared to standard lecture-style instruction of the material. Although students are only talking to a computer, the “characters” on the screen are live people creating a feeling of conversing with a native speaker. The dialogs and pronunciation are checked by the computer and a grade is given according to their work. Students must complete a determined level to have a passing grade for each day.

The *Native World®* program incorporates speech-to-text technology similar to Siri on smartphones. In recent years, speech-to-text and text-to-speech technology has advanced greatly. Tech writer Kevin Parrish (2012) introduces a new Microsoft speech translation program demonstrated by TED presenter and chief Microsoft® researcher Richard Rashid. The demonstrated speech-to-text technology is capable of not only converting spoken English into spoken Mandarin Chinese in real time, but keeps the user's voice intact as well through voice sampling technology (Parrish, 2012). This new technology fast and accurate and has great potential for aiding global conferences and facilitating communication in personal, political, and business environments.

3.1. Standards for *Native World®* CIP as an NTeQ Model

NativeWorld® CIP is openly endorsed by the Japanese Ministry of Education and conforms to English language education standards, NETS-T standards for the design and development of a digital-age learning experience and assessment (National Educational Technology Standards for Teachers (NETS-T), 2008). *NativeWorld®* also supports professional standards according to the American Council on the Teaching of Foreign Language, which includes standards concerning Language Acquisition Theories and Instructional Practices (American Council on the Teaching of Foreign Language (ACTFL), 2013).

Collaborative role-play and differentiated instruction are supported through the use of computer-interactive EFL instruction program *Native World®*. Differentiated instructional approaches adapt in relation to individual and diverse students in classrooms providing multiple options for students to take information and make sense of ideas (National Center of Accessing the General Curriculum (NCAGC), 2002). Students will learn new English vocabulary and expressions through a method which conforms to the individual learning styles of the students whether visual, auditory, or kinesthetic. Addressing the diverse needs of all students by using learner-centered strategies is recognized by NETS-T standards 4.b. and 2.b.

3.2. Thoughts on Technological Proficiency

Educators should have an understanding of technology and have a variety of technical skills. Teaching will always require the “human touch” of the instructor and overuse of technology can isolate the student; however, when effectively used in conjunction to the teacher's lesson, technology can enhance the material being learned. Although technical skills are important, teachers should have a variety of skills besides technical skills in order to be an effective educator. The most effective teachers are those who truly enjoy the work and have deep concern for their students. Highly skilled instructors often possess an innate aptitude for teaching. These are characteristics which the author hopes to foster as he continues his studies and my work as an educator.

Technology skills now include a variety of electronic instructional strategies. The NTeQ Model, WebQuests, and other Computer Assisted Language Learning (CALL) models are introduced through the advent of technology. Although not all educators are knowledgeable about the latest computer and electronic technology, teachers should have confidence to learn new skills and take pride in one's ability to adapt.

Engineering knowledge has a half-life of five years which means that information and concepts that a student learns as a freshman may become obsolete by the time they are seniors. By having computer and electronic media skills and an understanding of programs, even if the format and media becomes outdated, the basic concepts can be used in a limited sense in newer versions. During the author's lifetime, the world has changed from analog to

digital. Changes continue to happen daily and keeping up with the latest technology is a challenge, but educators should not feel intimidated about learning new things.

Technology is kryptonite to educators who prefer more traditional methods of instruction. There is an ability gap among educators since everyone is product of their environment and/or personal dispositions. Perennial Type I or Type II educators can be found in many classrooms. Some educators might feel that technology downplays their skills or do not want to relinquish power of instruction. Other educators only view technology as a method to enhance classroom instruction. However, it is how the technology is managed that determines its success in the classroom. Interaction or the “human element” is important. Reflection, debate, exploring information collectively and sharing is what creates learning moments.

Technology is merely a tool—an artifact to aide human cognition. Throughout the history of humanity, artifacts have been used to help us improve our thinking process. Mnemonic or mental artifacts helps one remember, file and process information (Morrison and Lowther, 2005). Physical artifacts used for cognition include watches, pencils, paper, calculators, computers and, of course, smartphones. We invent new artifacts to help us improve our thinking process. With modern technology, mobile devices such as iPads, PDAs and smartphones, with their wide range of built in functions make traditional methods seem ancient. However, from an anthropological perspective, it is merely the artifact that has been updated and the perennial need to process information has remained the same.

Technology supports higher-order thinking. This merit alone has made the author an avid supporter of e-learning. Higher-order thinking includes Bloom’s Taxonomy, Critical Thinking, Creative Thinking, and Metacognition. Each of these theories should be considered when debating the value of technology in education. Higher-order thinking is described as any activity which requires students to process information in meaningful ways (Morrison and Lowther, 2005). Higher-order thinking is described by hypothesizing, planning, classifying, synthesizing, elaborating, evaluating, analyzing, contrasting, modifying, and finding sequences. This higher-order thinking is the backstory for the NTeQ lesson design.

NTeQ lesson design model was developed in response to the Internet and technology advancements in education. NTeQ is a morph word meaning iNtegrating Technology for inQuiry. In order by design, this 10-step approach includes *Specify Objectives, Computer Functions, Specify Problem, Data Manipulation, Results Presentation, Activities During, Before and After Computer Use, Supporting Activities, and Assessment* (Morrison and Lowther, 2005). Through the NTeQ Model, the roles of the teacher and student are altered. The instruction design is student-oriented meaning that students are empowered and take on the role of a researcher whereas teachers assume the roles of designer, manager, and facilitator (Morrison and Lowther, 2005).

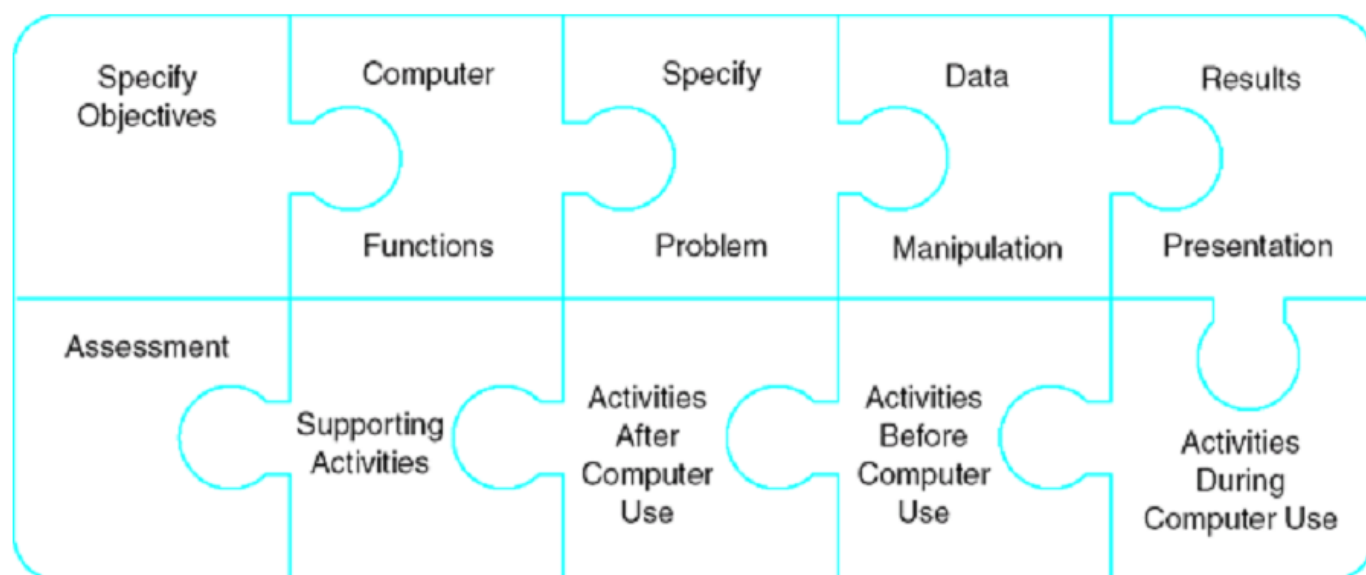


Figure-1. NTeQ Lesson Plan Model Ten-Step Approach.

Source: Morrison and Lowther (2005).

4. Analysis of E-Learning and NTeQ Model Lesson Plans

The following three lesson plans are examples of problem-based, project-based, or inquiry-based learning that implements technology and e-learning including the NTeQ model lesson design.

4.1. Lesson Plan Sample I

Lesson Plan: Evaluating Sources of Information: American History 1945-present: Grades 5-8:

http://www.swiftriverschool.org/write_path/write_pathWatrous.html

Source URL: Swift River School Lesson Plans: Authored by Sheila Hunter

http://www.swiftriverschool.org/write_path/write_pathlessons.html

Principal Sheila Hunter of Swift River School in New Salem, Massachusetts provides three sample NTeQ Model lesson plans which can be accessed from the school’s webpage. All three examples provided are appropriate samples of the NTeQ Model. The lesson on American history titled *Evaluating Sources of Information* was chosen for this summary and to provide perspective by including a lesson on history. The lesson was designed for grades five through eight; however, after reviewing the lesson, the material presented might also be appropriate for high school students as well. The lesson is designed to encourage students to think critically and discern what is recorded as history. Students are introduced to the concept of political and personal bias. Such a study conforms to MA History Learning Standard 3 for research on evidence to prove a point of view. Activities include

researching historical facts mentioned in classroom text and referencing stated facts and confirm information with history sites on the Internet.

This lesson plan represents problem-based learning as the students are required to research and study to find the problem. The task includes problems which require students to research answers. Problems are open-ended requiring students to solve by finding their own examples of distorted historical information. Student ownership of the problem is important (Morrison and Lowther, 2005). Encouraging students to think critically of the text material they are studying is a problem which students can easily claim ownership as the relevance to the student is immediate.

Activities before, during and after computer use are determined. A *Think Sheet* is also provided in the lesson to promote brainstorming. Assessment Rubric was complete with details on seven categories for evaluation. Casual observation suggests that the potential negative point of this lesson is that students might find subject matter to research limited as discovering particular questionable points in history might not be readily known by the students. The concept of this lesson plan is somewhat subjective. Considering the requirements, one might also question if the designated grades five through eight is appropriate.

4.2. Lesson Plan Sample II

Lesson Plan: Let's Plan a Trip! ESL Education: Grades 9-12

<http://teachersnetwork.org/teachnetnyc/chuck/trip.htm>

Lesson Plan: Creating Your Own Trip: ESL Education: Grades 9-12

<http://www.teachnet-lab.org/unhs/huck3.htm>

Source URL: Teachers Network: TeachNet ESL

<http://www.teachersnetwork.org/TeachNet/esl.htm>

With interests and career set in ESL/EFL education, this lesson plan struck this author's personal interest. The lesson plan is published at two different URLs. The first site is in conjunction to the Teacher Network NYC webpage, the second is the author, Carla Huck's personal URL link for the lesson plan. The later is titled *Creating Your Own Trip* and provides greater detail than the Teachers Network threaded lesson plan. *Let's Plan a Trip* is included since this webpage provides a source URL which is required for this assignment.

Project-based learning is represented by this lesson plan as students are encouraged to create their *trip* and produce the evidence of their research. Through project-based learning, students are encouraged to create and find answers on their own. The teacher is merely a facilitator who provides direction and evaluation of the projects. Students are kept actively engaged on their projects.

The detail provided in this lesson plan was impressive. The author included details such as researching visa requirements, currency conversion, local weather, travel advisories, and language study as requirements for planning the trip. Using Internet-based resources, activities include keeping a travel journal as if you were on the trip, create a postcard messages, and to design a brochure about the destination. Think Sheet questions encourage students to consider carefully the details of their cyber trip abroad.

4.3. Lesson Plan Sample III

Lesson Plan: Let's Be Aware and Do Our Part!: Recycling: Grades 4-6:

<http://www.education.umd.edu/Depts/EDCI/edci385/Projects101/Rutkowski/WBI.html>

Source URL: Instructional Projects: EDCI 385 Section 101, Fall 1998

<http://www.education.umd.edu/Depts/EDCI/edci385/Projects101/projects101.html>

This example comes from a student site. While lacking in some professional qualities, as an example, this lesson provides balance for the remaining lesson plan samples. Environmental education has also become an education trend as students are being encouraged to consider the future of the environment. This lesson plan is focused around the story *The Lorax* by Dr. Seuss.

Problem-based learning is represented in this lesson plan. Morrison and Lowther (2005) regard problem-based learning as a way of creating an open-ended learning environment (p. 27). Students are encouraged to seek out answers to environmental issues and to formulate ideas through guidance and encouragement. Students are empowered to take ownership of knowledge gained. Learners are required to discuss problems with the environment and hypothesize on points made while seeking possible solutions. Problem-based learning reflects a constructivist perspective as the role of the instructor is to guide students as a facilitator.

The task portion encourages collaborative learning. Groups are to come up with a list of three or four problems that were learned from the web assignment. Individual learning is also promoted as students are encouraged to take what they learn outside of the classroom. While simple in design, the lesson plan in appearance would be effective to hold student attention and the content promotes thought for the environment. Objectives were specified and technology/computer function and objectives were properly matched conforming to NTeQ Model requirements. Activities before, during and after computer use were specified. Large font, illustrations, easy navigation, and appropriateness of web site links makes this project suitable for grades four through six as described by the source URL.

The author incorporated Lev Vygotsky's Cultural-Historical Activity Theory into the intentions of the project while the computer takes on the role of a conceptual tool. Vygotsky encourages group learning and promoting individual action through collective activities. Author hopes to instill a consciousness upon the students to consider environmental issues. Negative points include that the lesson plan activity appeared manipulative. Moreover, although legible in size on most of the pages the choice of font color and size on the activity page might be changed for better legibility.

This lesson is simple in design and relies heavily on *The Lorax* book by Dr. Seuss; however, the possibilities of adding to design and encourage the students to create their own solutions and express new ideas for improving environmental conditions has merit. In the case of this author's classroom, due to being limited to ESL/EFL instruction, selected focus would be on the story of *The Lorax*. For ESL/EFL students struggling with English

language acquisition, the English used in *The Lorax* might present some challenges. Perhaps a summary and a translation of the story would expedite the reading.

Considering the grade level differences, one might consider altering some tasks to make the lesson plan suitable for high school students. This educator would target grade 10 students. One way to create more challenging tasks is to introduce a debate on the effectiveness of recycling. Does it take more energy to recycle certain products? How energy-efficient is recycling or reusing products compared to initial manufacturing costs? How effective is separating burnable garbage? Although challenging to find answers, through author's personal experience of teaching environmental education, multiple sources which provide evidence that both supports and opposes recycling have been found through research articles published on the Internet. Reusing resources and reducing waste is the common argument for promoting recycling. However, energy costs and labor requirements should also be considered. Both sides of any issue need to be presented for students to make an informed opinion; otherwise, educators are merely promoting an agenda.

The role of the computer could be improved through revamping activities to include more tasks and objectives. Reading the story *The Lorax* is an introduction to promote further thought, perhaps other questions could be presented to the student based on concepts learned in the story. Rutkowski used the question "If you were the Lorax, what would you have to say to the Once-Ler?" The elicited response would most likely be "I told you so" abruptly ending a possible learning moment discussion. The author could include several other choices of questions for further thought. Educators should find out how the students interpret the story, background, and characters in *The Lorax*. Through the story, students are encouraged to research the definition and necessity of recycling as well as an explanation of what recycling incorporates. Students could also be asked to write a continuation to the story using word processing technology applications and incorporating illustrations in their document to determine the outcome of the boy and the Truffula Seed. Future scenario should include the characters such as the Once-Ler and the Lorax as well.

The author, Ginny Rutkowski, made clear mention of incorporating Lev Vygotsky's Cultural-Historical Activity Theory into the intentions of the project. Rutkowski's intentions with the lesson are well expressed—to promote environmental awareness. One might argue that the quality of this lesson relies heavily on the Dr. Seuss story *The Lorax*. Lesson design would be effective depending upon student interest in the story and the tasks presented.

The NTeQ Model is unique in that the traditional roles of teacher and student are altered with the computer taking the role of a conceptual tool that bonds the method of the model with the intentions of the lesson design. Student-oriented instruction is a practice which is new to many educators and may require the actual implementation of a lesson to visualize properly the possible advantages to such a lesson plan paradigm.

5. NTeQ Philosophy Constructs, Benefits, and Disadvantages

The NTeQ Model is perhaps unfamiliar to many traditional educators and seeking to understand this model, which is unique in that the traditional roles of teacher and student are altered with the computer taking the role of a conceptual tool that bonds the method of the model with the intentions of the lesson design. Student-oriented instruction is a practice which is new to many educators and may require the actual implementation of a lesson to visualize properly the possible advantages to such a lesson plan paradigm.

Several differences exist between the traditional teacher's classroom and the NTeQ Model classroom. When looking at the NTeQ Model, the observer notices that the students actively participate in their learning. The opposite occurs in the traditional classroom where the teacher directs the students' learning. This paper reviews five main components of the NTeQ Model: (a) the teacher, (b) the student, (c) the lesson, (d) the environment, and (e) the computer.

In the traditional classroom the teacher imparts information to the students. The teacher lectures to the students, distributes papers for practice and assessment, instructs students to read various chapters in the books. The instructor bases tests and quizzes on the book's information and the lectured material. The students' learning in the traditional classroom can be minimal and the students experience little interaction with one another. In essence, the teacher assumes the larger role while the students remain inactive for most of the class time. Students generally sit and listen for the entire period.

The computer applications function to maintain student test results, to offer activities and tasks that drill students in math, science, spelling, and other educational reinforcement. The traditional classroom rarely uses the computers for integrated student learning. The teacher's lessons address all students in the classroom without any modifications or adjustments for various learning styles. Finally, in the traditional classroom, the learning environment consists of rows of desks, one behind the other, with supportive material placed on the outside edge of the classroom (University of Phoenix, 2008).

The NTeQ Model of the classroom has a more open approach to teaching the students. The teacher acts as a facilitator, designer, and organizer rather than directing the lesson as the main attraction. The teacher takes a backseat approach and has a good deal of knowledge in the world of technology. When observing a student in the NTeQ classroom, the observer sees students energetically involved in their work. The students become more inquisitive and use technology as their means to gain knowledge. The students create a number of tasks that they present individually or in groups to communicate what they learn. The NTeQ Model classroom is an entirely different scenario than the traditional classroom.

The computer and the NTeQ Model work together well. All lessons incorporate the use of the computer and it provides the main learning tool during the entire unit. By using the computer, students review, analyze, and manipulate data by incorporating a variety of programs which include databases and spreadsheets. Morrison and Lowther (2005) believe that the teachers "need to go beyond computer literacy to become technologically competent" (p. 12). Along with the use of the computers, the NTeQ Model develops lessons that require the students to think at a higher level, base lessons on real-life experiences, and require all students to be dynamically involved. Students who actively participate in their learning and relate the information to real-life scenarios, have a higher success rate with their learning. Finally, the environmental aspect of learning requires the teacher to be

aware of the many types of learning styles of the students in the classroom environment. If teachers teach to a variety of learning styles, more students experience success, thus, engaging more students in all activities (University of Phoenix, 2008).

6. Analysis of Student, Teacher, and Computer Roles in NTeQ and Traditional Classrooms

NTeQ lesson design model addresses the growth in the Internet and technological advancements in education. Through the NTeQ Model, the role of the teacher and student drastically alters. When making an analysis of the NTeQ Model, instructors need to understand the differences in the roles of the teacher, student, and computer in both the traditional classroom and an NTeQ philosophy-based classroom.

6.1. Analysis on Students

The instruction design of the NTeQ Model delivers student-oriented lessons to empower students and to assist them in taking on the role of a researcher. Teachers assume the roles of designer, manager, and facilitator (Morrison and Lowther, 2005). Students' encouragement builds through tasks and activities that use technology. Learning comes from participation and the active engagement of students as students become an investigator of knowledge. Technology and computers exist as a tool for student investigation. Instructors use projects and presentations to provide students with an opportunity to demonstrate acquired knowledge (University of Phoenix, 2005). In contrast to traditional classrooms, student learning does not follow entirely from the instructions of the teacher and students do not maintain a passive role in their studies. The NTeQ Model supports individual and collaborative learning. The student-oriented design of the NTeQ Model makes this model and the NTeQ philosophy of instruction unique.

6.2. Analysis on Teachers

The role of the teacher in traditional classrooms promotes that of the teacher as the central figure for knowledge and support. This instructional design often relies on direct instruction models. The University of Phoenix (2005) describe the teacher's role in the traditional classroom as the "sage on the stage" (p. 3) and the teacher in the NTeQ philosophy-based classroom assumes the role of the "guide on the side" (p. 3). Study of both traditional and NTeQ Modeled classrooms determines this description to be fitting. Technology skills of the educator are less demanding in traditional classrooms although the instruction supports differentiation. Morrison and Lowther (2005) describe the teacher's role in the NTeQ Model as that of designer, manager, and facilitator. The role of facilitator implies that the students are somewhat self-governing over their academic studies.

6.3. Analysis on Computers

When considering the role of computers and technology in the NTeQ student-oriented classroom and traditional teacher-oriented classroom, instructors consider that the lesson materials influence the mode of instruction. Availability often restricts computer usage in the traditional classroom setting. Although teachers may incorporate basic computer skills might be taught in traditional classrooms, intentional integration of computer learning closely ties to the NTeQ Model of instruction. Integration of computers occurs throughout the curriculum in NTeQ philosophy classrooms. The NTeQ Model also incorporates Bloom's Taxonomy in lesson design. Both traditional and NTeQ classrooms seek to encourage students' basic skills with word processing, databases, and spreadsheets. Teachers encourage students to learn manipulation of the internet through research and protocol skills.

The NTeQ Model requires teachers who are unfamiliar with the model to seek understanding and to rethink their educational philosophy. The NTeQ Model is unique in that the traditional roles of teacher and student reverse with the computer, taking the role of a conceptual tool that bonds the method of the model with the intentions of the lesson's design. Student-oriented instruction remains new to many educators and requires the actual implementation of a lesson to visualize the possible advantages to such a lesson plan paradigm.

6.4. Lesson and Environment Analysis

The NTeQ Model consists of 10 components. The planner analyzes each step of the lesson to insure that the instructor implements each component. However, Morrison and Lowther (2005) state, "The NTeQ Model is not intended for use with every lesson taught. It takes a careful analysis of what the students are going to learn to determine if technology can be integrated" (p. 41). The planner determines each lesson that will incorporate technology before following through with the NTeQ Model. Lessons that apply the NTeQ Model deliver student-centered instruction. Lessons engage students in various activities where the students participate rather than mimic learning. Problems in these lessons relate to students' everyday lives, problems the students face, or will face, in the real world both in and out of school. Instruction focuses on computer usage in all lessons using the NTeQ Model. The use of the computer in the classroom for learning, rather than playing, stresses the understanding that the computer is used as a tool to solve real-life problems. As students become more involved in the learning process, the teacher begins to guide, rather than enforce, student learning. The students take on more responsibility in each lesson and are involved in all aspects of learning and research (Morrison and Lowther, 2005).

The environment of the NTeQ lesson differs from a typical classroom lesson. Because the lessons are student-centered the students dynamically participate in learning development. The students are learning through discovery rather than mimicking the process modeled by the teacher. The environment includes several types of resources and types of technology use within the classroom. The students work collaboratively through the learning process by gathering the data, researching information and analyzing the results of different tests they perform. With the teacher as the facilitator, the students make decisions on how to manipulate information, review data and apply research. The lesson and environment work together. The set-up of a lesson includes

preparing for the type of environment that promotes learning through student-centered activity (Morrison and Lowther, 2005).

6.5. Strengths of NTeQ

Investigations through technology afford important benefits to the classroom situation. Several strengths accompany the NTeQ Model. The most obvious strength surfaces in the skills which the model develops for the students. NTeQ instruction increases a student's ability to "answer inquiries, solve problems, or share ideas and results" (Lowther and Morrison, 1998). Students require each of these skills when they enter the workforce of the future. The NTeQ Model promotes continued use of spreadsheets, databases, calculators, presentation tools, and quick, efficient communication (Lowther and Morrison, 1998).

The NTeQ Model also supports the change from computers as drill and practice solutions to computers as viable tools (Clark, 1998). The deliverance of meaning and communication through a variety of electronic media lie in wait as a necessary skill for the future workforce. The NTeQ Model promotes this development and assures the model's role as a strong strategy in the classroom. The internet challenges the young learners also. The students' skills for navigating the enormous amount of information and world-wide resources need development and support (Ikpeze, 2006).

Future thrusts of work production aim at the social process. The students' practice of social skills through collaboration and assistive group work aims to address these skills. The collaborative element of the NTeQ Model tackles the development of teamwork. The model also trains students to research and access internet sites and assess the sites for applicability to the problem at hand (Ikpeze, 2006). Another strength of the NTeQ Model surfaces in the development of these skills.

The strategies of NTeQ support a student centered environment. This shift leads the students from a receptive position to a position of active involvement and exploration (Ikpeze, 2006). The student centered aspect develops competence in higher level thinking and creative problem solving. Improving analysis, logic, and evaluation skills are vital to the 21st century developing student (Kim, 2006). With NTeQ active learning method, students become active, motivated learners working on cognition as it applies to real world perspectives. The NTeQ Model affords educators a strategy that promotes problem-based learning. Lessons that are structured around engaging projects aid the teacher in developing situations that increase students' motivation.

Ross *et al.* (2000) implemented the *Anytime, Anywhere Learning* program in grades five and six. The foundation of this implementation drives from the NTeQ Model. After the study the authors identify benefits of the plan and model. Students state that feelings of competence with computers and the internet increased (Ross *et al.*, 2000). Their skills with word processing, databases, research, and communication improved and the students also report an increase in computer usage for homework (Ross).

A benefit to educators, the NTeQ Model, supplies a skeleton to develop the collaboration, problem-based learning, and technological integration. The model includes 10 steps that improve teacher strategies for instruction. The identification of sequential steps for identifying standards, objectives, procedures, and assessment assures that the plan is of high caliber. Building before, during, and after technology constructs fosters the development of strong lesson plans and assures student development. Ross *et al.* (2000) "conclude that becoming effective integrative teachers require changes in teachers' epistemological beliefs and day to day practices of structuring their classrooms" (p. 6). The NTeQ Model answers the need for a method to promote these changes.

7. Implementation of NTeQ

In some schools educators do not have access to proper hardware and software for their lesson. Overcoming this difficulty is tiresome if the technology is not readily available to all teachers. A possible solution exists in a rotation schedule for teachers and the required technology pieces. Students are quick to pick up information if the knowledge is given in different ways and the model of NTeQ offers an effective way of implementing teacher instruction and technology. If a school or classroom does not have enough computers for the students to allow the classroom teacher to implement his or her lesson plans, teachers must find other ways to implement the activity. First, ask business partners to donation funds to purchase computers. Businesses receive a tax credit when they donate money to assist their community members. Using the computers within the school to create a computer lab presents another alternative. The development of a technology lab allows all students in classrooms to use the computers at one time. Of course, a rotating schedule needs to be implemented but an organized rotation permits many students to use the computers.

Some difficulties could arise if students do not know how to take care of technology in the classroom and school. Teachers must take their time during the first few weeks to be sure that the students understand their role as researcher during the activities. Along the same lines, when technology does not work properly, teachers must instruct students how to solve the problem. In some instances, the students are unable to work independently during the activity. Creating partners for the entire class alleviates this problem; as the school year continues, the students may have an opportunity to work alone on projects.

Ensuring that the school staff members agree with technology integration remains a crucial element for implementation of the NTeQ Model. Recruiting the school's administration and others to support this model and having in-services explaining both the positive and negative aspects effectively allows professionals to discuss integration of technology in the school setting.

8. Conclusion

Educators should have an understanding of technology and have a variety of technical skills. Teaching will always require the "human touch" of the instructor and overuse of technology can isolate the student; however, when effectively used in conjunction to the teacher's lesson, technology can enhance the material being learned. Although technical skills are important, teachers should have a variety of skills besides technical skills in order to be an effective educator. The most effective teachers are those who truly enjoy the work and have deep concern for

their students. Highly skilled instructors often possess an innate aptitude for teaching. These are characteristics which the author hopes to foster as he continues his studies and my work as an educator.

Technology skills now include a variety of electronic instructional strategies. The NTeQ Model, WebQuests, and Computer Assisted Language Learning (CALL) models are introduced through the advent of technology. Engineering knowledge has a half-life of five years which means that information and concepts that a student learns as a freshman may become obsolete by the time they are seniors. By having computer and electronic media skills and an understanding of programs, even if the format and media becomes outdated, the basic concepts can be used in a limited sense in newer versions.

The author feels that the NTeQ design is an effective method for supplementing instruction. E-Learning will continue to change as technology continues to advance. The author feels that it is important for educators to consider the benefits of adopting technology into their instruction strategies. E-Learning through CIP programs such as *NativeWorld*® and the NTeQ design serve to promote individualized learning through a method which conforms to the individual learning styles of the students whether visual, auditory, or kinesthetic. The NTeQ Model lesson design uses computers as a tool for obtaining information and promotes the human element of discussion and encourages higher-order thinking.

Knowledge of modern assessment practices and technology can help educators conform to the needs of their students. Technology provides effective assistance for instructing and assessing student academic performance. Effective educators are those who have skills, knowledge, and are well-versed on various educational theories and practices as well as possess an aptitude for teaching.

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