# A Descriptive Study of Applied Pedagogy Employed Within the Rice Lake High School CTE Program

by

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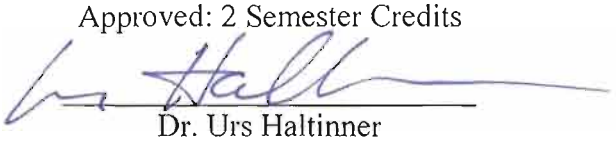

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## Abstract

This descriptive study sought to understand to what extent Career and Technical Education (CTE) teachers in a midsized Midwestern rural high school employ applied pedagogy and what they perceive to be its barriers. Data was collected during the fall of 2010. Findings highlight that respondents report employing simulation and laboratory settings at higher rates than traditional lecture and discussion teaching strategies. When asked about student evaluation, respondents reported the use of skill observation and task completion most frequently. Additionally, respondents indicated planning time and student motivation as the greatest barriers in furthering the implementation of applied pedagogy.

While the study supports applied teaching pedagogy it points to an opportunity to broaden faculty understanding and interpretation of what teaching methods and assessment strategies constitute applied learning. This broader interpretation may push CTE teachers to

employ a wider range of of teaching and assessment strategies across the CTE program areas that help students successfully acquire advanced vocationally relevant and academically rigorous knowledge, skills and dispositions.

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# Chapter I: Introduction

## Background

Educational research is continually growing as educators are being challenged to improve the effectiveness of teaching. Many studies are currently being done on skills necessary for the twenty-first century. These skills have been identified by Umphrey (2009) to include: "critical thinking, problem solving, the ability to identify, synthesize and analyze information, and to work collaboratively with others" (p. 48). Rotherham and Willingham (2009) argue to that in order to work "the 21st century skills movement will require keen attention to curriculum, teacher quality, and assessment" (p. 16). They also state that the 21st century skills are not new, but must be taught more intentionally and effectively by all educators. A study by Silvia (2009) suggests the essence of 21st-century skills is "an emphasis on what students can do with knowledge, rather than what units of knowledge they have" (p. 630).

"The Project Approach has emerged as one promising practice for meeting the varying needs and interests of today's young students (Katz & Chard, 2000, p. 339)." Society expects students acquire 21st century skills, requiring educators to respond with pedagogy that allows them to teach those skills in an ever-changing social, political, and one-world economic context. According to Bell (2010), "Project-Based Learning (PBL) is an innovative approach to learning that teaches a magnitude of strategies critical for success in the twenty-first century" (p. 39). Instead of the traditional teacher driven curriculum, students are responsible for their own learning through inquiry, as well as working collaboratively to research and create projects that reflect their interest area.

"All of the research on Project-Based Learning has taken place in the past ten years and most of it in just the last few years" (Thomas, 2000, p. 1). Empirical evidence is required to

develop new theories about learning. As we continue to learn more and more about the way humans learn, scientific principles can be a guide to further improvement. Educators at the secondary level are challenged to implement these principles and methods to enhance the overall learning environment.

According to Boudria (2002), a key component of project-based learning is to research and work with qualified businesses to develop partnerships to assist with development and completion of the project. "The goal of project-based learning is to investigate real-world, standards-based problems that are of interest, relevance, value, and worth to students and teachers over a sustained period of time" (Tooling, 2004, p. 179). "Projects" are defined by inquiry or problems that are collaboratively investigated by the learner and teachers utilizing technology and resulting in a series of artifacts or products that address the questions or problem proposed over a period of time (Krajcik *et al.*, 1999).

The implementation of Project-Based Learning requires an extensive review of practices and procedures. "Project Based Learning designs emphasize student autonomy, collaborative learning, and assessments based on authentic performances" (Thomas, 2000, p. 6). To maximize a student's learning and mastery, many new teaching interventions will be required. The need to develop a new method of instruction has been increasingly evident to meet the needs of alternative learners. Schools are faced with the challenge to motivate students and create programs that will teach students skills required for the 21st century yet keep them engaged.

**Statement of the Problem**

There are many theories and recommendations for applied learning and its effectiveness for learners. Therefore, the purpose of this study is to compare the educational research of how Applied Learning is to be utilized, to the data collected through surveying stakeholders in the

Career and Technical program at Rice Lake High School (RLHS). More specifically, it will strive to address the following questions.

1. To what extent are Career and Technical Education teachers at Rice lake High School using applied teaching strategies?
2. What do the Career and Technical Education teachers at Rice Lake High School view as barriers in furthering the implementation of relevancy in the curriculum?

**Purpose of the Study**

The purpose of this study is to better understand to what extent CTE faculty at RLHS embraces pedagogy that facilitates 21st century skills. While RLHS has the core CTE content areas within its comprehensive high school it is not known to what extent the curriculum is based inn contemporary applied learning contexts. The findings of this study have the potential to influence the way CTE courses are taught by RLHS faculty and experienced by the intended learners.

**Definition of Terms**

**Alternative Education.** An alternative education program is defined under §115.28 (7) (e), Wis. Stats., as "an instructional program, approved by the school board, that utilizes successful alternative or adaptive school structures and teaching techniques and that is incorporated into existing, traditional classrooms or regularly scheduled curricular programs or that is offered in place of regularly scheduled curricular programs" (Wisconsin Department of Public Instruction, n. d.).

**Career and Technical Education.** "Provide students with skills necessary for a successful transition to postsecondary education or work and a desire for life-long learning in a global society" (Wisconsin Department of Public Instruction, n.d.a).

**Framework.** "A model for planning, developing, and evaluating; identifies essential knowledge and skills to prepare students" (Wisconsin Department of Public Instruction, n.d.a).

**Project-Based Learning (PBL).** "Is a model that organizes learning around projects. Projects are complex tasks, based on challenging questions or problems, that involve students to design, problem-solve, decision make, or investigative activities; give students the opportunity to work relatively autonomously over extended periods of time; and culminate in realistic products or presentations" (Jones, Rasmussen, &Moffit, 1997; Thomas, Mergendoller, & Michaelson, 1999).

**Project Based Learning (PBL).** The following items are identified to be what is required to model a PBL learning environment and will be used to analyze program features.

1. PBL projects are central, not peripheral to the curriculum.
2. PBL projects are focused on questions or problems that "drive" students to encounter the central concepts and principles of the discipline.
3. Projects involve students in a constructive investigation.
4. Projects are student-driven.
5. Projects are realistic, not school-like (Thomas, 2000).

**State Standards.** "What students should know and be able to do, what they might be asked to do to give evidence of standards, and how well they must perform. They include content, performance, and proficiency standards" (Wisconsin Department of Public Instruction, n.d.a).

**21st Century Skills.** "Include critical thinking, problem solving and the ability to identify, synthesize and analyze information, to develop resources and use them in novel situations, to work collaboratively with others" (Umphrey, 2010, p. 48).

## Chapter II: Literature Review

The purpose of this study is to better understand to what extent CTE faculty at RLHS embraces pedagogy that facilitates 21st century skills. The research that follows includes the following elements: the theory of learning, skills demanded in the 21st century, advancing learning through CTE, advancing rigor through relevance, strategies to advance rigor academically and vocationally, and proving student learning.

### Theory of Learning

Empirical evidence is required to develop a new theory about learning. According to Huitt (2003), the Information Processing Model is how information is stored in one's memory. The model proposes that information is processed and stored in three stages. In this theory, information is thought to be processed in a serial, discontinuous manner as it moves from one stage to the next. In the examples that I have found, a computer has been used as an analogy. Information is encoded, processed, and then stored allowing one the ability to retrieve it at a later time. The human brain performs a multi-store approach to memory consisting of sensory memory, working memory and long-term memory. Like the computer, the mind also has a limit of how much information it can process at one time. The cognitive information processing theory also emphasizes the use of graphic organizers and emphasizes words that are important in texts (Reiser & Dempsey, 2007).

According to Bruning et al. (2004), "documents outlining national standards for science education, supported by much of the educational research, stress the need for inquiry-based instruction to develop the broad understanding and critical-thinking and problem-solving skills necessary for science literacy" (p. 350). Bruning et al. explains that the process of inquiry-based

learning encourages students to develop new knowledge. Hands-on activities, collecting and gathering evidence to problems, as well as reading, writing, and discussion can achieve this.

Higher-order thinking has been defined as the teaching skills that include critical thinking, analysis, and problem solving. These skills teach reasoning and processes and assist one to become better lifelong learners. According to Angelo (1995), "Most formal definitions characterize critical thinking as the intentional application of rational, higher order thinking skills, such as analysis, synthesis, problem recognition and problem solving, interference, and evaluation" (p. 6).

**Skills Demanded in the 21st Century**

The question posed by McCain (2005) in Teaching for Tomorrow, "What skills are needed to be successful in the 21st century?" (p. 2). The information he explores describes teaching content and problem solving skills for independent and higher learning. The distinction is made between "school skills" and "real world skills," worrying that, in the past his teaching may have been producing "highly educated useless people." McCain states that problem solving and project-based instruction is difficult and poses challenges, but uses the success of how architectural education has been successful using this technique since the 19th century. The school integrates skills required by using projects modeled on those form the real world. Students still take the core conventional subjects, but integrate what they learn to their studio work. They are required to present the product and defend their solution to their peers, instructors and clients. Their progress is documented in a portfolio and can be carried with them to demonstrate their capabilities to prospective employers. McCain (2005) answers, "What is a complete Education of a 21st learner?" with two major components (p. 2). First is the acculturation of knowledge, which involves the knowledge and wisdom of our society and

generation. Some examples of these wide varieties of basic skills include: skills in mathematic calculation, an understanding of history, reading material for reflection, appreciation for geography, and expressing ideas in written and spoken form and the concepts of healthy living and lifelong physical activity. These examples have been the focus of traditional education and McCain believes these skills are still vital in the role of the 21st century learner. In addition of equal importance, is the acquisition of practical problem solving skills. These enable students to successfully apply their learning to real-life situations. This is the valuable skill required by their future success and employer. With teacher and parent goals of creating a contributing member of society, McCain lists four skills: an understanding of how businesses operate, an awareness of the various roles of workers within and organization, knowledge how to perform the basic skills of running a company and lastly the skill in solving real-world problems. He states that the skills actually being taught in school today are creating even a larger gap between the practical skills required for a student to succeed.

**Advancing Learning Through CTE**

Schools are scrambling to comply with the requirements of the federal No Child Left Behind (NCLB) Act, and educators are seeking strategies to boost achievement and move more students into higher education or promising career (Visher, Bhandari, & Medrich 2004). Visher, Bahnadari and Medrich also state that the increase in academic standards is the right move, but standards-based school reform sometimes seems to ignore that academic study is not engaging all students sufficiently. If a method is not found and these students remain unengaged and unmotivated, the outcome is failing courses in high school dropping out; therefore, defeating the purpose of graduating more students and encouraging them to go on to postsecondary education and preparing them for future career success. In the study conducted by Visher, Rajika and

Medrich, they explore seven types of career exploration programs to determine if it is an effective approach for increasing graduation success rates, post secondary education, and career readiness. Their study found that when students with diverse backgrounds participated in these career exploration programs in CTE, students were more likely to participate in college entrance and Advanced Placement exams than non-participants. Students who participated were more likely to graduate from high school and were more likely to go onto to postsecondary education. The study showed that the participant were also more likely to attend a two-year college rather than a four-year institution.

**Advancing Rigor Through Relevance**

Willard R. Daggett EdD is the CEO of the International Center for Leadership in Education. Dagget (2005) is also the creator of the Application Model and Rigor and Relevance Framework, a practical planning and instructional tool for determining the relevance of curriculum and assessment to real-world situations. The Rigor and Relevance Framework has been the base of many school reform efforts nationwide.

Dagget (2005) believes there are many flaws in the current education system by not providing students of today with proper skills and the ability to compete globally for jobs. He states that what is important is that students enter the global economy with the ability to apply what they learned in school to a variety of ever-changing situations that that wouldn't have realized before commencement of the program. He states that this is a better measure of quality education and a better indicator of academic excellence. According to Dagget, the emphasis on scoring well on state assessments is a starting point, but shouldn't be the ending point. Dagget's framework concentrates on the student's ability to apply high rigor knowledge in a relevant, real-world setting which should be the true finish line and assessment of learning. In addition,

Dagget explains that globalization and rapid technological advancements are having dramatic effects on the way we conduct business and communicate. Furthermore, education should increase students' understanding of the world around them. The true problem Dagget observes is that current education practices are not linking subjects or grades and as they move from class to class and progress to the next grade, they are exposed to isolated bits of content-specific knowledge. This poses a problem that they are not being taught how what they learned in one class relates to another or its application in the world outside of school.

A well known classification of learning objectives within education is known as Bloom's Taxonomy. This was based on six levels of knowledge. They are listed in order as Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation. This knowledge model is one of the continuums of the Rigor and Relevance Framework. Dagget describes that the low end of this continuum is recalling and locating knowledge in a simple manner. He compared this process similarly to how a computer scans for information and can retrieve bits of information. As one moves up the list, knowledge is fully integrated into one's mind, and individuals can do much more than locate the information. According to Dagget (2005), these skills often require higher order thinking skills and this level is where students can solve multi-step problems and create unique work and solutions. The second continuum on the Rigor and Relevance Framework is referred to as Application. This continuum for the model includes five varying levels of application. Dagget (2005) lists them as, "1) Knowledge in one discipline, 2) Apply knowledge in discipline, 3) Apply knowledge across disciplines, 4) Apply knowledge to real-world predictable situations, and lastly 5) Apply knowledge to real – world unpredictable situations" (p. 2-3).

The Application Model Framework that Dagget refers to was developed by the International Center for Leadership in Education. He states that studies show that students understand and retain knowledge best when they have applied it in a practical, relevant setting. The integration of subjects engages students and prepares students for life, not just for the state test or for more school according to Dagget.

Dagget (2005) describes below of how to utilize the Rigor/Relevance Framework:

> The Rigor/Relevance Framework, illustrated below, uses four quadrants that represent levels of learning. On the Knowledge axis, the framework defines low rigor as Quadrants A and B and high rigor as Quadrants C and D.
>
> On the Knowledge axis, Quadrant A represents simple recall and basic understanding of knowledge for its own sake. Quadrant Ais labeled"Acquisition" because students gather and store bits of knowledge and information.
>
> Quadrant C, "Assimilation," represents more complex thinking, but still knowledge for its own sake. In Quadrant C, students extend and refine their acquired knowledge to be able to use it automatically and routinely to analyze and solve problems and to create unique solutions.
>
> Quadrants B and D represent actions or high degrees of application. In Quadrant B. "Application," students use acquired knowledge to solve problems, design solutions, and complete work.
>
> In Quadrant D, "Adaptation," students have the competence to think in complex ways as they apply knowledge and skills they have acquired to new and unpredictable situations. Students create solutions and take actions that further develop their skills and knowledge.

For students to become lifelong learners, problem-solvers, and decision-makers, Quadrant B and D skills are required. In effect, our students need to *know what to do when they do not know what to do.* The Rigor/Relevance Framework provides a structure to enable schools to move all students toward that level. (p. 2-3)

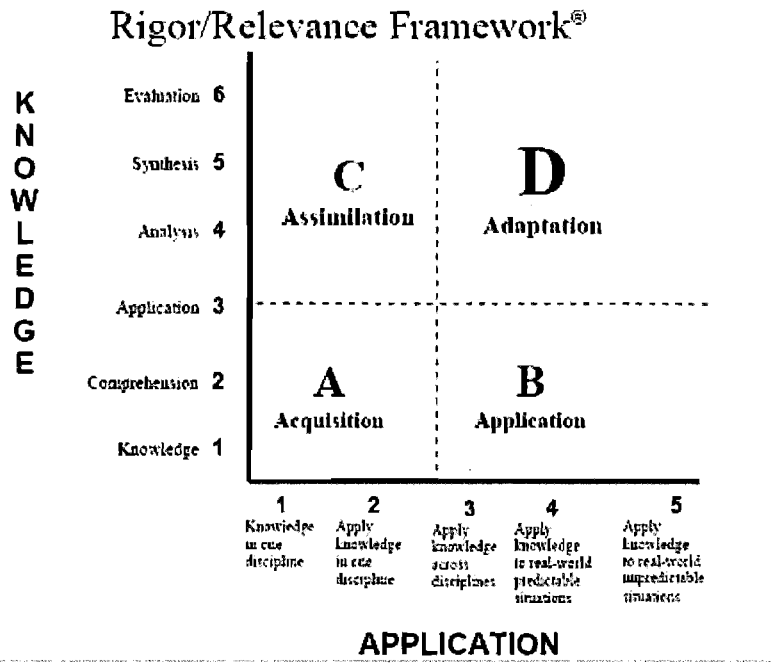


*Figure 1.* Rigor and Relevance Framework

In the framework outline referenced above, Dagget expresses the importance that the goal is to reach Quadrant D. When assessing these learners he emphasizes the importance of creating assessments to match the level of skills that you are trying to develop. Teaching Quadrant D skills and assessing using Quadrant A methods would yield negative learning results. Assessing higher order thinking skills and real world application with multiple choice or simple testing methods would be an example. He also states that when one develops curriculum that will meet these guidelines it is just as important that the assessments match the rigor. If one would test

these skills using Quadrant A skills it is unlikely the learner will reach the outcome or the assessment will not accurately measure what the students have learned.

The International Center for Leadership in Education explains that there can be many combinations of knowledge and application. They also list many strategies to reach this goal using the Rigor and Relevance framework. Some of these strategies include: cooperative learning, inquiry, problem-based learning, project-based learning, work-based learning, guided practice, brainstorming, demonstration, lecture, and presentations.

According to Brand (2003), she believes that

> ...every student leaving high school should possess interdisciplinary knowledge consisting of academic, technical, occupational, employability, civic, and social skills. These skills should enable him or her to pursue and advance in postsecondary education or a career and participate meaningfully in the workplace, society, and as a family member. (p. 6)

She feels that a CTE program of study is defined as a multi-year sequence of courses that integrate core academic knowledge with technical and occupational knowledge leading to higher levels of skill attainment over time with unifying career themes around which to organize the curriculum. In addition these programs of study, would allow a high school to organize itself into smaller autonomous units that would have the benefit of providing a more personal learning environment. Connecting employers and community would be a key role as a means to strengthen and ensure the quality of the programs. Employers as partners would provide additional opportunities such as internships and work-based learning experiences for the students. The teacher would serve as mentors and provide input and guidance on curriculum.

The role of the employer would continue as industry input into the curriculum becomes more relevant as the student moves through the program into post-secondary education.

**Strategies to Advance Rigor Academically and Vocationally**

Dr. Gene Bottoms (2006) shares similar viewpoints on how Career and Technical Education is a necessity. He states that one cannot achieve rigor and relevance in high school for most students without modern career and technical education. Bottoms (2006) "envisions a portfolio of strategies in which CTE is one part of an overall strategy to ensure that students are adequately prepared for the dual goals of work and postsecondary education" (p. 15). Bottoms explains that teaching in the 21st century should integrate academic and CTE courses and identify themes that tie the curricula together. Organizing high schools to have common prep time will increase the emphasis on linking high-level academic content to real-world problems. The value of having CTE staff being masters of their content will be necessary to integrate academic and technical studies. The model of High Schools that Work (HSTW) is being used across the country and is a design that advocates a solid academic core blended with high-quality career and technical studies and link. Bottoms feels that in the future high schools will need to adopt a similar plan to make students successful in high school. According to Kazis et al. (2005) staying the course is not good enough. Together they also explain that high school technology education must make better links to academic instructors within high schools, to postsecondary institutions that offer valued degrees and credentials, and to employers and the labor market that are demanding more and more complex skills.

Cooperative Learning was one strategy listed for the rigor and relevance by Daggett. According to Cooper (1995) "putting students in cooperative learning groups is the best way to foster critical thinking. In properly structured cooperative learning environments, students

perform more of the active, critical thinking with continuous support and feedback from other students and the teacher" (p. 7-8). Giving students a voice and roles for discussion improves their processing of the material and sense of accountability.

One effective learning strategy to promote higher-order learning is the divergent thinking method. As Bruning et al. (2004) states one can use using problem solving to encourage the learner to think divergently. Activities such as *What If* or *Just Suppose* encourage students to see how things might be used differently and how there are multiple solutions to any given problem. Activities such as brainstorming and reverse brainstorming to build on concepts, KWL exercises which encourage students to think about their previous knowledge, what they want to learn from the unit, and then reflect upon their experience, free writing or personal journaling exercises encourage reflection on the part of the student, and simulations and role plays help students to hypothetically act and react to situations within the classroom that can't otherwise be created. These simulations help students improve their general problem solving abilities. They require the student to select essential information, evaluate the vast array of potential solutions, examine their options (while understanding that there will be personal biases), and then draw conclusions based on the information that they have at hand. In order to teach higher-order thinking, one strategy is to utilize a five step approach, as outlined by John Dewey (Bruning et al, 2004, p.163). These steps include presentation of the problem, defining the problem, developing hypotheses, testing the hypotheses, and selecting the best hypothesis. It is essential that the instructor guide the students through the process and also allow for sufficient time for the students to adequately be able to work through the problem. In order for students to determine a solution using skilled, reflective problem solving they need to be able to analyze the possible solutions, considering the strengths and weaknesses of each scenario.

In order for students to be actively involved in the learning process, students need to participate in the analysis, synthesis, and evaluation through instructional activities. According to studies published by Bonwell et al (1991), "students prefer strategies promoting active learning to traditional lectures" (p. 2). It is for this reason that instructors need to become knowledgeable about the various strategies promoting active learning as they have been proven to be successful in most all disciplines.

Huitt (2003) describes a model associated with the social interaction family focusing on developing the concepts and skills needed to work in groups. Cooperative learning has positively affected standard achievement measures as well as group interaction. By definition, the focus of cooperative learning is working in groups. "Collaborative learning is an umbrella term for a variety of education approaches involving joint intellectual effort by students, or students and teacher together" (Smith & MacGregor, 1992, p. 1). Smith and MacGregor (1992) tell us that in collaborative learning students usually "work in groups of two or more, mutually searching for understanding, solutions, or creating a product" (p. 1). They also note that this learning style centers on students' exploration or application of the course material, not simply the teacher's presentation or explanation of it. Through this learning process, there are many assumptions about the learner. The four that are listed by Smith and MacGregor (1992) include: "learning is an active constructive process, learning depends on rich contexts, learners are diverse, and learning is inherently social" (p. 3). When these four guidelines are facilitated by the instructor there are many benefits for the learner. Several of the skills that are developed include: listening, writing, explaining, paraphrasing, and interactions. The learner must take on an active approach to learning instead of a passive one, students are less reluctant to ask questions and receive feedback in small group dynamics and also teaching others reinforces a student's learning. The

delivery of the content is very different than what the Information Processing Model suggests. The main difference between these models is ability for students to socially interact with their peers. Computers lack the ability to think and feel and this component is important to continue to emphasize in the traditional classroom. Computers will continue to be used as a great tool to improve instruction and make our jobs more efficient, but in the classroom the ability to interact, discuss, debate, analyze and solve complex problems are skills that need to be emphasized for many jobs and for students to be competitive in our global society. However there are many arguments about the effectiveness of cooperative learning and the proper implementation by the facilitator. According to Slavin (1995) the research on cooperative learning has been proven to be effective for student learning. The focus is now on when using cooperative learning what conditions will make it optimally effective and improve student learning.

An additional strategy for the rigor and relevance framework is project-based and problem-based learning. Project-Based Learning dates back as far as the early 1900's when John Dewey supported "learning by doing." This thought is also reflected in the early theory of constructivism generally attributed to Jean Piaget. He articulated mechanisms by which knowledge is internalized by learners. Piaget also suggested that individuals construct new knowledge from their experience and active participation of students (Frank, Lavy, & Elata, 2003). There are many additional methodologies for learning by doing. Similarly to the strategies listed by Dagget, these examples include experiential learning, problem based learning, school enterprise learning, and inquiry-based.

Project-Based Learning is a change in how one learns and is an instructional method centered on the learner. "Instead of using a rigid lesson plan that directs a learner down a specific path of learning outcomes or objectives, project-based learning allows in-depth

investigation of a topic worth learning more about" (Harris & Katz, 2001, p. 145). Project-Based Learning is a relatively new title to this method of learning. Taking a look at the idea of assigning projects to students is not a new one. "There is a longstanding tradition in schools for "doing projects," incorporating "hands on" activities, developing interdisciplinary themes, conducting field trips, and implementing laboratory investigations" (Thomas, 2000, p. 2). According to research, PBL also has similar features as Inquiry-based, Expeditionary, Problem-Based, and Challenge-Based Learning. However, there seems to be some prevailing differences in the recent research and practices in Project-Based Learning. Thomas (2000) concluded that in order for a project to be called Project-Based Learning it must meet a set of criteria. One of the criteria listed for Project-Based Learning projects are that they are central, not peripheral to the curriculum. Projects are the curriculum; they are not simply applications or enrichment activities of the curriculum. In addition, the PBL projects are focused on questions or problems that drive students to encounter central concepts of a discipline and involve them in a constructive investigation. The investigation, according to Thomas (2000), is a goal-directed process that involves inquiry, knowledge building, and resolution. He also states that this process may be design, decision-making, problem finding, problem-solving, discovery, or model-building processes. Through these projects, they must incorporate a transformation and construction of knowledge on the part of the students (Bereiter & Scardamalia, 1999). New information is expected to be learned, not just simply a review of an exercise. In addition, the projects will be student-driven and realistic. The focus should be on real-life challenges that are authentic problems or questions and where solutions have the potential to be implemented (Thomas, 2000).

Thomas (2000) reports there were a positive impact on students' basic skills, which may be a result of increased motivation on the student's behalf or possibly because of the change in the whole school reform. He also stated that further research and a more in-depth analysis would be required to generate a conclusion. When Project Based Learning is implemented properly, problem solving becomes a part of the expectations. If one is presenting the proper methods, the assessment would show an increase in proficiency according to the study conducted by using a Problem-Based Learning Model (Thomas, 2000). When conducting a risk-value analysis, the pros for Project Based Learning included the student's active involvement, it mirrors the workplace, they receive greater exposure to career skills, and it provides realistic appraisal. The cons were listed as having to surrender control as an instructor, a need for facilitator training, and the process and results are unpredictable (Ellis & Hafner, 2008).

**Proving Student Learning**

As with any educational method there are many challenges. They can be separated into three categories. They are challenges encountered by the students, challenges by the teachers and challenges associated with school factors (Thomas, 2000.) In regard to the research on student challenges, summaries were developed from how each student participated in several aspects of inquiry. Areas that showed students having difficulty include: generating meaningful scientific questions, managing complexity and time, transforming data, and developing a logical argument to support claims (Thomas, 2000). The results prove that there is a need to create multiple supports for the learner as they conduct inquiry. Observations of those facilitating the learning environment also create challenges. Some of them include that projects often take longer than anticipated, the teacher role changes to let the learner have control, and the difficulty of how to assess the student's understanding. The traditional school facility proves to be too

structured for this method of learning. Issues with the physical organization of the school and the perceived need to structure time for each individual subject inhibit the suggested method to satisfy the true definition of Project-Based Learning.

When evaluating the effectiveness of learning, an increase of knowledge and skills must be evaluated. "Standardized testing is one measure of achievement. When measuring basic academic subject proficiency, standardized testing shows that students engaged in PBL outscore their traditionally educated peers" (Geier et al., 2008, p. 924). However, Bell (2010) states that "standardized testing does not measure critical twenty-first-century skills" are integral to student success (p. 39). Research on project-based learning scores on standardized tests of academic achievement are commonly used to show a gain or decline. In addition, Thomas (2000) stated that researchers also used problem-based learning models to assess the effectiveness for developing general problem-solving strategies and measures of mathematical reasoning. Lastly, studies were also used to survey the participants. Testing one's knowledge before and after the method is a convincing way to prove the effectiveness. One must be careful when analyzing and interpreting data from an organization's publication to be sure they lack bias. Also, attendance records can also be analyzed to evaluate the influence on student's motivation and participation.

The direct experience allows for the learner to modify existing beliefs. The PBL approach also encourages group discussion and when examining cooperative learning strategies used in high school. According to Baumgartner and Zabin (2004), "the emphasis on authenticity through the project required student assessment through authentic tasks" (p. 101). The PBL process required many authentic tasks. The students were functioning as a scientific community and engaged in peer review of their work. The presentation of the work to an audience outside the classroom emphasized the authenticity of the activity and provided accountability beyond the

classroom environment. These skills were assessed in many ways to monitor learning. The findings stated that the students did gain content knowledge from PBL. However the study explained that they did not examine explicit differences in content gained between this project and a more traditionally taught unit of study. Other assessments made were qualitative observations that would indicate a positive impact on student learning (Baumgartner & Zabin, 2004). The findings of the case study by Baumgartner and Zabin (2004) that are most interesting is the increase of sophistication or the misconception correction in the individual's interpretation of the material. Several concepts were listed about organisms studied and in every case there was a gain in sophistication or a correction of a misconception as a result of the project-based component of the curriculum. Additional findings concluded that authentic tasks can and should be used for student assessment in PBL. Baumgartner and Zabin stated that if traditional assessments such as written tests were used as a sole assessment of learning, they would not have seen any difference in learning compared to tests from traditionally taught units. The observation of student's projects and how the students communicated the results of their projects are some examples. Unlike traditional tests, Baungartner and Zabin (2004) also state that these assessment tools are themselves learning experiences from which students gain skills, experience, and confidence. At the same time the students demonstrate higher-level thinking by writing about and explaining their work. This requires the more advanced thinking skills, synthesizing and the application of information, rather than lower levels on Bloom's Taxonomy of learning such as identification and organization, found on traditional tests. Baumgartner and Zabin (2004) stated that the biggest challenge to establishing a project based method is the intimidation factor. It requires the departure from traditional professional development for teachers by emphasizing the process and the students are responsible for the content. In many

cases the teacher is learning along side the learner which is uncomfortable for the traditional teacher who is use to be the holder of knowledge. The summary of the study stated that this constructivist model requires time for students to build knowledge and skills.

## Chapter III: Methodology

The purpose of this study is to better understand to what extent CTE faculty at RLHS embraces pedagogy that facilitates 21st century skills. The study seeks to utilize a descriptive research paradigm to describe findings for to describe the extent that Career and Technical Education teachers'employ applied teaching strategies. Additionally, it describes perceived barriers of facilitating applied learning experiences.

### Methodology

The study is guided by qualitative descriptive paradigm approach. This approach is consistent with the desired outcomes and guided by the study's research questions seek answers for. According to Bogdan and Bilken (2003), the data takes the form of words or pictures rather than numbers. Additionally Bogdan and Bilken (2003) write, "Descriptive data often contains quotations expressed by informants to illustrate and substantiate the presented findings" (p. 110-120). The researcher becomes involved with the data and sometime requires one to be submersed in the setting to observe and record data to better understand the subject's environment. According to Patton (2002), "open ended questions yield in-depth responses about people's experiences, perceptions, opinions, feelings and knowledge" (p. 4-5). The data consists of verbatim quotations with sufficient context to be interpretable. In this study, the survey will be distributed as a hard copy. The list of questions will include both close ended and open-ended questions. When open-ended responses are expected, a space will be provided for the subject to explain in detail to support their response and retrieve the verbatim responses and rich content. This will achieve a similar result as open-ended questioning since the respondent will be able to elaborate through their response. The respondents' time commitment will potentially be reduced. An added benefit to the respondent will be the ability to flexibly allocate time to

complete the survey. According to Sax, Gilmartin and Byant (2003), their study concluded that surveys administered using a paper copy yielded higher results than by electronic versions. Two web based options proved to produce the least amount of responses in comparison to paper surveys with the same questions. They contributed the findings to be the result to the length of the study, the access to email accounts and computers, as well as the over abundance of electronic survey distributed. While the researcher also considered a web-based or an email-distributed survey, it was determined that the subjects of this study may have e-communications skills gaps. In addition, the extreme amount of emails to user's accounts has required email triage or sorting (Neustaedter, Brush, Smith, & Fisher, 2005). The emails that are not priority and part of expectations are then deleted or not opened. As a result the determination was made to distribute a paper-based survey.

The challenge of qualitative research is minimizing researcher opinion, prejudice, and bias. Data collected in qualitative research is also subject to questions about the reliability and subjectivity. As Bogdam and Bilken (2003) write, "the data collected in qualitative research is thick, rich and deep, which often override the preconceived attitudes of the researcher" (p. 110-120). The role of the researcher is meant to be more reflective and conscious. This can be achieved when the researcher being aware how they themself shape or enrich the study with accurate interpretation. Bogdam and Bilken (2003) though their study on Qualitative Research for Education recommend the following guidelines.

1. Avoid research sites where informants may feel coerced to participate in the research.
2. Honor your informants' privacy.
3. Always let your participants know what is expected of them and what they expect of you and the process.

4. Unless otherwise agreed to, the informant's identity should be protected so that the information that you collect does not embarrass or in other ways harm him/her.
5. Treat informants with respect and seek cooperation with them throughout the research process.
6. In negotiating permission to do a study, you should make the terms and agreement clear. The agreement goes both ways and all parties should abide by the contract.
7. Tell the truth when you write up and report your findings.

**Subject Selection**

According to Golafshani (2003), the study's research objectives and the characteristics determine the study population, such as size and diversity. In qualitative research, a sample population is generally selected. "Unlike quantitative researchers who seek casual determination, prediction, and generalization of findings, qualitative researchers seek instead illumination, understanding, and extrapolation to similar situations" (Hoepfl, 1997, p. 48). Since this study is purely descriptive the subject selection presented is appropriate. Two sampling strategies presented by Hoepfl (2003) are probability and purposeful sampling. In probability sampling, the sample is selected randomly from a large population with a purpose to produce information that is a generalization for a population. In contrast, purposeful sampling is the dominant strategy used in qualitative research. Purposeful sampling seeks information-rich cases which can be studied n depth (Patton, 1990). Those selected in this study are the current stakeholders and faculty members in the CTE department at Rice Lake High School. These subjects are directly related to the objectives of the study, to identify to what extent the Rice Lake Career and Technical Education Department embraces applied learning. Therefore, the sampling method chosen for this study was purposeful. All potential stakeholders of this study

are members of five Career and Technical Education (CTE) content area departments. The current departments are Agriculture, Business, Family and Consumer Sciences, Marketing, and Technology Education. There will be a total of eight CTE teachers invited into the subject pool.

Subjects will be invited to take part of research through an invitation by email. They will then receive a hard copy of the survey instrument along with the consent form in their inter school mailboxes.

**Instrumentation**

The development of the survey began by taking into consideration what information will be needed to satisfy the objectives of the study and the time requirement of the subjects. Semi-structured interviews were considered as an option to gain the information and rich content. Hoepfl (2003) states the two prevailing forms of data collection associated with qualitative inquiry are interviews and observation.

The major restraints of utilizing an interview was the time required of the subjects and scheduling complexity of bringing individuals and the researcher together. The subjects of this study are all full-time teachers with time scarcity during the school day. According to Bogdan and Biklen (1982), data collection for qualitative studies may use observation and document analysis. In addition, they state that qualitative descriptive data contains quotations said by the informants, which will be collected through their written responses in this study. The rich content required form the participant will need to include detailed explanations to understand fully how the subject feels about the content of the survey and answer the studies objectives. The objectives of the study rely on the perceptions of the stakeholders. Therefore a paper based research design was developed since it could yield the same types of information.

The paper-based survey will ask questions that will require the respondent to explain or justify their response. A mix closed and open ended questions were developed. The open-ended questions were designed to allow respondents to share added detail and or explanation required to fully answer the questions (see Appendix C). The open-ended questions will obtain the rich content and data that is strength of qualitative research methodology.

When developing a test or survey it is best practice to organize them from general to specific. Therefore, the yes and no questions were listed at the top of the survey and the questions that would require more specific and critical thinking toward the bottom. Only questions that will provide information to be included in the study were listed. The time of the participant was taken into consideration whenever possible instead of subjective questions.

**Validity**

Due to the specific desired outcomes of this research project, the researcher developed instrument, and the small subject pool claims of reliability cannot be made. However validity that the data collection tool seeks responses consistent with the studies research questions was maximized through the following process. According to Johnson (1997), qualitative research involves four types of validity; descriptive, interpretive, theoretical and internal validity.

Johnson explains that descriptive validity refers to the factual accuracy of how the researcher reports what they saw, read, and observed. This form of validity is important in qualitative research due to the reliance that the major objective of this type of research is descriptions of events, objects, behaviors, and settings. In this study I will be identifying the perceptions of the stakeholder's views on applied learning and the data presented will be received directly from the participant increasing the validity and misinterpretation. He describes interpretive validity as the researcher's ability to look through the participant's eyes and

understand things form the participants' perspective and providing an accurate account of these perspectives.

Block (1998) performed a feasibility study on Project Based Learning. This study can be used to show how interpretive and descriptive validity were implemented. A pilot study was conducted and several results indicated areas for questions and improvement. The list below will verify the need to be clear and precise. The areas for questions and interviewer improvement to include:

1. The need to explain the PBL process more clearly to respondents.
2. The need to eliminate double questions so that the researcher was not asking more than one thing at a time.
3. Clarification of wording to clearly communicate researcher intent.
4. The need to use paraphrasing techniques more carefully.
5. Better placement of the tape recorder.
6. To improve the validity of the study.

The final draft of the survey questions for the CTE departmental members incorporated the findings from Block's pilot interview findings. Paraphrasing and clarification of wording to clearly communicate the data as well as asking additional questions and sharing the researcher interpretation to be sure that is it accurately represents the participant's viewpoint. Appendix C contains a copy of the questions provided to for the CTE department members at Rice Lake High School.

**Data Collection**

The survey will be presented to all subjects realizing that it is their option to opt out. The data collection process involved two phases. During phase one all identified subjects were

contacted by email to inform them of the purpose of the research and to ask if they were willing to participate in responding to a list of questions to understand to what extent the Rice Lake CTE department embraces applied learning. An email was sent and a paper invitation was inserted into all subject inter school mailboxes to invite them into the research (see Appendix A). The communication explains the research objective and the expectations of the subject. It also communicates their voluntary participation and the consent process (see Appendix B).

Phase two included data collection and analysis. Completed surveys were transcribed into a word-processed document organized by questions and all responses were provided. A support person completed this process in an effort to minimize respondent harm and researcher bias (Bogdam & Bilken, 2003). This method also removed the subject's name and the relationship to the information and increased the confidentiality. The original response surveys are securely stored and later disposed of in accordance to IRB protocols.

**Data Analysis**

The dates that the surveys were received were from December 9, 2010 to December 13, 2010. After the first survey was conducted, the qualitative data collected was analyzed using a list of techniques listed by Miles and Haberman (1994). The analysis list was as follows:

1. Completion of a contact summary sheet.
2. First level coding.
3. Second-level or pattern coding.
4. Interpretation and formulation of hypothesis.

Miles and Huberman (1994) explain that coding is the analysis. Reviewing a set of field notes or respondents' data has to be done meaningfully. Careful dissection of the data is important to keep the relation between the parts in tact. For our purpose, it is not the words themselves but

the meaning, which matters. This part of the analysis involves how one differentiates and combines the data retrieved and the reflection made about this information (Miles & Huberman 1994). Codes are tags or labels for assigning units of meaning to the descriptive by carefully dissecting the information. First level coding is a device for summarizing segments of data. Miles and Huberman (1994) state "pattern coding is a way of grouping those summaries into a smaller number of sets, themes, or constructs" (p. 69). After all subjects have completed the survey, the data will be coded and analyzed to develop salient themes and perceptions in response to the questions asked. A different color highlighter will be used to pair similar responses. In addition, differences will also be noted and highlighted in a different color for further review. Tags will be created to organize the data and identify salient themes from the recorded responses.

**Presentation of Data**

Due to the size of the population of the study and the details of the consent form to protect the confidentiality of the subjects, the details about the subjects will remain generalized. The description of the subjects will be listed and the findings will be presented. The responses to the survey questions will be organized in the order of the research questions listed for the study.

# Chapter IV: Results

The purpose of this study is to better understand to what extent CTE faculty at RLHS embraces pedagogy that facilitates 21st century skills. Findings will highlight the demographic profile of the respondents; pedagogy that is employed will follow. Additionally, respondent perceptions of barriers to implementing applied pedagogy will conclude the findings.

## Demographic Findings

The CTE department at Rice Lake High School consists of eight faculty members. They were all invited to participate in the study. The subjects included eight members of five Career and Technical Education (CTE) content area programs. All of the subjects participated in the study resulting in the 100 percent response rate. Respondents represented Agriculture, Business, Family and Consumer Sciences, Marketing, and Technology Education. There were a total of eight CTE teachers invited into the subject pool.

## Research Question 1 Findings

Table 1 illustrates respondents employing a range of assessments to understand student learning. Use of selected response test items presented itself as the strategy used least on average (3.5/5.0). Task completion produced the highest mean rating at 4.0 on a five point rating scale. It is important to note that no one assessment strategy was reported as *always used* by the respondents.

Table 1

*Assessment Methods Reported by Respondents*

| Method | Mean |
|---|---|
| Selected response | 3.5 |
| Constructed response | 3.13 |
| Observation of a skill | 3.88 |
| Completion of a task | 4.0 |
| Mean by Respondent | 3.65 |

Table 2 illustrates the response resulting from the question; *As a Teacher, rate how often you* employ the methods listed. Simulation and lab setting were reported with respective mean ratings of 3.75 and 3.38 out of a possible 5.0. Respondents reportedrole-playas the least used strategy (0.5/5.0). It is important to note that no one teaching method was reported as *always used* by the respondents.

Table 2

*Teaching Methods Reported by Respondents*

| Method | Mean |
|---|---|
| Lecture | 3.25 |
| Discussion | 3.0 |
| Use of Lab Setting | 3.38 |
| Use Case Studies | 2.13 |
| Apply Real Industry Problems | 2.88 |
| Use Role Play | 0.5 |
| Use a Simulation | 3.75 |
| Mean by Respondent | 2.7 |

Each of the seven methods questions also asked the question; *provide an example of how you encourage relevance through...* Respondents shared descriptive responses for each. Responses were transformed through a thematic analysis process (see appendix D). Table 3 provides a listing of the enduring themes. It became apparent that *Contextually relevant lecture-discussion is perceived as a valued teaching strategy.* This theme is supported by the following respondent quote, "Real life examples and what if situations." Another stated, "I use modern day examples or demonstrations." A third respondent stated, "Lecture is a very relevant to students as it teaches how to listen, which I believe is the most important communication skill."

The responses received for the discussion method suggest that it is used in combination with lecturing. In support of this themeone respondent stated, "I encourage discussion among

students when designing projects and when they are involved in problem solving situations. Proper communication such as speaking, listening, calculations, writing, and reading are vital to success in the real world."

Respondents surfaced the following theme; *Lab experiences are used primarily within industrial trades context*. One subject responded by stating, "I believe this is the most important learning setting. Kids learn by completing projects in a lab and failing at times." Similarly another wrote, "I use labs and can provide feedback on the successes and failure." However, one respondent stated that a lab setting was not applicable to their teaching practices and content.

In regard to case studies, the consensusis that *Case-study is employed primarily to help learners understand and solve real-world problems*. One respondent wrote, "Environmental issues and site case studies" as examples. Another listed, "Real life business examples." The application of real industry problems was also listed on the survey. It was reported to be used *sometimes* by the majority of the department members. From the data availableProblem-based Learning was perceived interchangeably with case-study examples.

It is important to note that role-playing was the lowest frequency of used. The available responses suggest *Role-play is either not well understood or not generally used as a teaching strategy* among the participants of survey. One respondent indicated that they never use it and wrote, "I'm not strong in using this method." Five of the respondents of the eight selected that they never use role-playing as a presentation method to encourage relevance.

The most popular method selected on the survey by the department members was using a simulation. *Virtual and real simulations are used to help students experience contextually relevant learning* was the theme from the responses provided. Two respondents indicated that they use computer software to do so. One stated that they used, "Marketing and

entrepreneurship computer simulation," and the other states, "simulation from computer modeling." Another shared the following use of simulation, "bakery experience and using a checkbook simulation."

Table 3

*Themes from Open-Ended Response Items*

1. Contextually relevant lecture-discussion is perceived as a valued teaching strategy.
2. Lab experiences are used primarily within industrial trades context.
3. Case-study is employed primarily to help learners understand and solve real-world problems.
4. Role-play is either not well understood or not generally used as a teaching strategy.
5. Virtual and real simulations are used to help students' experience contextually relevant learning.
6. Teachers need support to further improve and implement teaching methods.

**Research Question 2 Findings**

Included in the survey was a question providing a list of ten barriers that the teacher was asked to rank with 1 *representing the greatest barrier* and ten *the smallest barrier* in using methods and strategies that engage students in relevant and rigorous learning. Table 4 illustrates respondent barrier perceptions. Planning time surfaced the lowest mean (3.38) out of a possible ten highlighting that it is perceived as a minor barrier. In contrast the greatest barriers were reported as equipment (6.75/10) and instructional technology (7.25/10.0). Additionally, in Table

4 the following theme emerged, *teachers need support to further improve and implement teaching methods.*

Table 4

*Barriers for Engaging Students in Rigorous Learning*

| Method | Mean |
|---|---|
| Planning Time | 3.38 |
| Funding | 5.63 |
| Class Size | 5.5 |
| Instructional Technology | 7.25 |
| Teacher In-service | 6.5 |
| Teacher Training | 6.13 |
| Equipment | 6.75 |
| Facilities | 6.5 |
| Student Motivation | 3.63 |
| Student Ability | 4.38 |

## Chapter V: Discussion

The purpose of this study is to better understand to what extent CTE faculty at RLHS embraces pedagogy that facilitates 21st century skills. This chapter provides conclusions and recommendations on the findings of this study. The chapter also highlights recommendations to career and technical educators specific to rigor and relevance opportunities through applied pedagogy. Additionally, recommendations will be made relative to further research opportunities that became apparent through this study.

### Research Question 1 Conclusions

In reviewing the findings of teaching strategies and assessment methods it becomes apparent that respondents are supportive of the historical vocational learning by doing pedagogy. While not conclusively, respondents perceived simulation and laboratory as the dominant applied pedagogy. This does raise the question about respondent understanding of what constitutes teaching and assessment strategies that are consistent with applied learning as they reported role-play as the lowest used applied strategy.

In order to meet the needs of 21st century skills CTE teachers will increasingly need to employ a wider range of teaching strategies conducive to evolving more complex thinkers that can navigate and solve complex real-world problems (Silvia, 2009). It is therefore a secondary conclusion that an opportunity exists to help CTE teachers, the subjects of the study, expand their understanding of and skills in utilizing a broader range of applied teaching and assessment strategies. According to Dagget (2005), in order to achieve higher order thinking, the learner must be able to apply knowledge to solve complex real-world problems and solutions to be applied in real-world situations.

**Research Question 2 Conclusions**

In regard to the findings of perceived barriers, respondents reported planning time concerning. It can reasonably be concluded that faculty are willing to employ applied learning strategies and do so as evidenced in the findings. In order to engage students in relevant and rigorous learning, collaboration between interdisciplinary departments and individual planning time needs to be increased. A recommendation from a similar study done by Block (1998) found integration of curriculum promoted sharing multiple ideas, development of teamwork and participation, discovery of new information resources and reflection of information they had learned from other courses.

Student motivation and student ability were also reported as significant barriers. While not conclusively, the student interest level of the current curriculum is perceived as being low. A review of the current presentation and learning methods may be necessary to engage students in the learning process. In order to truly promote and reach rigor and relevance for all students, students need to become more involved in the learning process and demonstrate the application of knowledge through solving problems that are "real life" and require higher order thinking. As an instructor uses application within the curriculum, the rigor and relevance framework needs to be taken into consideration to ensure that the learner is being challenged to use the higher order thinking skills that support 21st century learning.

**Limitations of Findings and Conclusion**

The following are the limitations of the findings and the resultant conclusions. Findings are limited to one high school CTE program. Furthermore, findings represent the perceptions of eight respondents that represent five CTE content areas. Some of the respondents represented multi-teacher content areas, thereby impacting the findings through a content teaching and

learning philosophical and practice perspective. Finally, this is a descriptive study, its findings and the ensuing conclusions, while informative, cannot be generalized.

**Recommendations**

Recommendations for teachers of the study's CTE program are to meet as a department and discuss what strategies and methods yield the best results for development of 21st century skills. In addition, professional development opportunities should be explored to broaden the awareness of effective strategies. This may include attending non-traditional charter schools and observe Project-Based Learning in action.

Recommendations for content area program teachers are to review their curricula specific teaching and assessment strategies. Methods should be analyzed to promote 21st century skills and learning strategies serving to increase curricular rigor.

An added recommendation is for the district Coordinator of CTE to allocate time and resources for collaboration between CTE and academic faculty to explore curricula, methods and assessment consistent with advancing project-based learning.

**Recommendation for Further Study**

This study produced valuable information specific to the RLHS CTE department. A recommendation for further study is to perform observations to compare the actual presentation and assessment methods being used in the classroom with the findings of the study. Actual classroom observation data can then be compared to this study's findings. Additionally, this study can be refined and replicated to include a broader subject population across multiple school districts.

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## Appendix A: Email to Participate

Dear Rice Lake High School CTE Faculty Member,

You are receiving this email as an invitation to participate in a survey for a research project that I am completing as part of my masters at UW-Stout. The study will inventory stakeholder perceptions of the Rice Lake High School Career and Technical Education programs specific to applied learning. I have placed a consent form in your school mailbox. If you wish to participate, please sign and return in the envelope provided and place it in my mailbox. After I receive your consent form, I will place in your mailbox a survey in a similar envelope to complete and return. Thank you in advance for your consideration in participating in the study.

Sincerely,

Curt Pacholke
Technology Education Teacher
Rice Lake High School
(715) 234-2181 Ext. 5282
pacholkec@ricelake.k12.wi.us

## Appendix B: Consent to Participate

### Consent to Participate In UW-Stout Approved Research

**Title:** A descriptive study of applied pedagogy employed within the Rice Lake High School CTE program.

**Investigator:**
Curt Pacholke (715) 296-7911, pacholkec@my.uwstout.edu

**Description:**
The purpose of this study is to inventory stakeholder perceptions of the Rice Lake High School Career and Technical Education programs specific to applied learning. In addition, understanding to what extent the Rice Lake Career and Technical Education Department embraces applied learning and its benefits for students to demonstrate their knowledge and skills.

**Risks and Benefits:**
Knowing how others in our Career and Technology Education department feels about applied learning will be a benefit to you. The information collected will be analyzed to provide a snapshot of our instructor's views. You may feel that a risk is that by stating what you feel or what you do will affect how other instructors and administrators may view your teaching style. The risks involved of being singled out will be eliminated as the data will be presented as a summary of all the findings.

**Time Commitment:**
Writing responses to the questions of the survey will take approximately 20 minutes to complete.

**Confidentiality:**
"Your name will not be included on any documents. Names and the specific department you teach will not be part of the data shared via written or verbal communications. The findings will be presented in a manner that does not point to any respondent or program that the respondent is part of. Collected date will be stored securely and only reviewed by the researcher. This informed consent will not be kept with any of the other documents completed with this project."

**Right to Withdraw:**
"Your participation in this study is entirely voluntary. You may choose not to participate without any adverse consequences to you. Should you choose to participate and later wish to withdraw from the study, you may discontinue your participation at this time without incurring adverse consequences."

**IRB Approval:**
This study has been reviewed and approved by The University of Wisconsin-Stout's Institutional Review Board (IRB). The IRB has determined that this study meets the ethical obligations required by federal law and University policies. If you have questions or concerns regarding this study please contact the Investigator or Advisor. If you have any questions, concerns, or reports regarding your rights as a research subject, please contact the IRB Administrator.

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**Statement of Consent:**
"By signing this consent form you agree to participate in the project entitled, *(A descriptive study of applied pedagogy employed within the Rice Lake High School CTE program.)*"

Signature_____

## Appendix C: Survey Questions

*Directions: Please rate the following questions how they relate to your teaching. Please take advantage of the space that I have provided and give me some additional detail.*

**As a Teacher, rate how often you:**

| | | *Always* | | | | *Sometimes* | *Never* |
|---|---|---|---|---|---|---|---|
| 1 | assess students by using selected response methods<br>*(examples: true/false, multiple choice, ranking, matching)* | *5* | *4* | *3* | *2* | *1* | *0* |
| 2 | assess students by using a constructed response method<br>*(examples: short answer or essay)* | *5* | *4* | *3* | *2* | *1* | *0* |
| 3 | assess students through observation of a skill | *5* | *4* | *3* | *2* | *1* | *0* |
| 4 | assess students on the completion of a task | *5* | *4* | *3* | *2* | *1* | *0* |
| 5 | Lecture<br>*Provide an example of how you encourage relevance through #5* | *5* | *4* | *3* | *2* | *1* | *0* |
| 6 | Discuss<br>*Provide an example of how you encourage relevance through #6* | *5* | *4* | *3* | *2* | *1* | *0* |
| 7 | Use a lab setting<br>*Provide an example of how you encourage relevance through #7* | *5* | *4* | *3* | *2* | *1* | *0* |
| 8 | Use case studies<br>*Provide an example of how you encourage relevance through #8* | *5* | *4* | *3* | *2* | *1* | *0* |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9 | Apply real industry problems | *5* | *4* | *3* | *2* | *1* | *0* |
| | *Provide an example of how you encourage relevance through #9* | | | | | | |
| 10 | Use a role play | *5* | *4* | *3* | *2* | *1* | *0* |
| | *Provide an example of how you encourage relevance through #10* | | | | | | |
| 11 | Use a simulation | *5* | *4* | *3* | *2* | *1* | *0* |
| | *Provide an example of how you encourage relevance through #11* | | | | | | |

**As a Teacher,** which of the following do you perceive as barriers in using methods and strategies that engage students in relevant and rigorous learning.

Directions: Number the following sequentially with *1 representing the greatest barrier* and *11 the smallest barrier.*

_____ Planning time

_____ Funding

_____ Class size

_____ Instructional technology

_____ Teacher in-service

_____ Teacher training

_____ Equipment

_____ Facilities

_____ Student motivation

_____ Student ability

_____ Other? Please name it and explain:

## Appendix D

Open-ended Response for Item 5: Lecture Method

| Raw Responses | Step | Theme |
|---|---|---|
| • Real life examples<br>• What if" Situations<br>• Giving examples, analogy<br>• Mini lectures – safety lectures materials, power point presentations<br>• Telling students how 3 way switches often fail and guessing which wire goes where doesn't cut it<br>• Lecture is very relevant to students as it teaches students how to listen which I believe is the most important communication skill. Good listeners will be good employees in the game of life.<br>• I use modern day examples or demonstrations | • Real Situations<br>• Relevant examples and analogies<br>• Lecture/Discussion anchored in real situations with real examples that resonate with the learner | **Theme 1:**Contextually relevant lecture-discussion is perceived as a valued teaching strategy |

Open-ended Response for Item 6: Discussion Method

| Raw Responses | Step | Theme |
|---|---|---|
| • Same as #5<br>• Providing feedback on labs, successes/failures<br>• Seldom discuss but often in some computer classes | • Real Situations<br>• Feedback on labs, successes/failures<br>• | Supports theme 1 |

Open-ended Response for Item 7: Laboratory Method

| Raw Responses | Step | Theme |
|---|---|---|
| • n/a to my situation<br>• Using same labs, using different variables to see what the effects are…. Successes and failures<br>• Woods lab, computer lab, communications lab, electronics, screen printing<br>• Have students wire circuits and | • Apply and experiment with variables<br>• Experience successes/failures<br>• Real labs that mimic student prior experience | **Theme 2:**Lab experiences are used primarily within industrial trades contexts |

| | | |
|---|---|---|
| plumb fixtures they would find at home<br>• I believe this is the most important learning setting. Kids learn by completing projects in a lab and failing at times. The simple concept of squaring a board in woods lab can teach students how to use machines safely, measure accurately and build wood project is fundamentally sound.<br>• Use modern manufacturing methods | | |

Open-ended Response for Item 8: Case-Study Method

| Raw Responses | Step | Theme |
|---|---|---|
| • Real Life business examples<br>• Scenarios/problem solving<br>• Site case studies, environmental issues | • Real examples<br>• Real scenarios | **Theme 3:**Case-study is used primarily used to understand and solve real-world problems |

Open-ended Response for Item 9: Problem Based Learning

| Raw Responses | Step | Theme |
|---|---|---|
| • Evaluate situations that happen in business<br>• Jobs/careers in various areas<br>• Site examples, "china's government hacking google"<br>• Rebuild structures that were built poorly the first time. Fuel tank roof.<br>• Relate it to local industry, outsourcing, local, economy, Ect. | • Real examples<br>• Real scenarios | Problem-based Learning is perceived interchangeably with case-study (supports or is part of |

Open-ended Response for Item 10: Role-play Method

| Raw Responses | Step | Theme |
|---|---|---|
| I'm not strong in this area.<br><br>Use participation in labs | • Student participation | **Theme 4:**Role-play is either not well understood or not generally a valued strategy |

Open-ended Response for Item 10: Simulation Method

| Raw Responses | Step | Theme |
|---|---|---|
| • Marketing/Entrepreneurship computer simulation<br>• Bakery experience, checkbook simulation<br>• Simulation through software, models etc.<br>• Circuits have to work when power is applied.<br>• I will often simulate an accident in a vehicle when driving behind the wheel with a student. If a student doesn't not check a blind spot and starts moving the car into the other lane I will hit the brake and simulate the accident. Kids learn real fast to check their blind spot. | • Computer business simulation<br>• Real life task simulation<br>• Problem solving or avoidance simulation | **Theme 5:** Virtual and real simulations are used to help students experience contextually relevant learning |

Open-ended Response for Item 11: Other

| Raw Responses | Step | Theme |
|---|---|---|
| • Laptop cart doesn't well enough. Limited by computer lab availability and access to technology on a regular basis.<br>• Take in-service time and give it to individual teachers to prepare for instruction as they see would be important to student learning.<br>• In our district in service time has been a waste of time or teachers valuable time and tax payer dollars.<br>• # of special needs in classrooms | • Equipment problems or needs<br>• Lack of planning time<br>• In-service as potential opportunity for Training<br>• Student ability limitations on teaching strategies being used | **Theme 6:**Teachers need support to further improve and implement teaching methods |

| | | |
|---|---|---|
| with out assistance is a big issue to increase relevance | | |

**Themes from open-ended response items**

1. Contextually relevant lecture-discussion is perceived as a valued teaching strategy
2. Lab experiences are used primarily within industrial trades contexts
3. Case-study is employed primarily to help learners understand and solve real-world problems
4. Role-play is either not well understood or not generally used as a teaching strategy
5. Virtual and real simulations are used to help students experience contextually relevant learning
6. Teachers need support to further improve and implement teaching methods