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1.1 In a general discussion, differentiate between research problems, questions, and hypothesis.

Problem vs. research problem
A problem is a state of difficulty that needs to be resolved, a discrepancy between existing and a desired state of affairs. A research problem requires gathering data in order to help make informed decisions related to closing the gap between existing and desired states.

Question vs. research question
A question is an interrogative sentence that is designed get information in response. A research problem leads to the formation of questions, or things to be considered, answered or solved. Research questions are directly aligned with the research problem and provide the focus for the study. Research questions should be unbiased and stated objectively in context to the problem and be directly aligned with the research problem in order to provide the focus for the study.

Hypothesis: Quantitative vs. Qualitative—
Princeton's Wordnet defines a hypothesis as "a proposal intended to explain certain facts or observations, a tentative theory about the natural world; a concept that is not yet verified but that if true would explain certain facts or phenomena; a scientific hypothesis that survives experimental testing becomes a scientific theory." These assumptions are handled differently in different types of research methodologies. Quantitative research is scientific, concrete, and predictable. In quantitative research, the hypothesis is formed up front and tested using numerical (hard) data that can be statistically analyzed. Qualitative research on the other hand, involves detailed, verbal descriptions of characteristics, cases, and settings. Qualitative research typically uses observation, interviewing, and document review to collect data. Since the analysis of data is interpretative, subjective, impressionistic and diagnostic, the hypothesis evolves and changes throughout the study as data is collected and analyzed.

1.2 Detail the research problem, questions, and/or hypothesis for your study.

PROBLEM:
As part of a Classrooms of the Future grant, 10 professionals in Upper Merion School District were provided with laptops for use in their classrooms. The goal for the teachers is to achieve at "Innovation" level when assessed using Apple's Evolution of Teacher Thought and Practice scale (ETaP). However, when using ETaP to assess these teachers, many teachers are not progressing through the various ETaP stages and on to Innovation level.

QUESTIONS:
Why aren't the professionals moving through the ETaP stages?
What are the roadblocks to achieving at the innovator level?
What are the advantages and disadvantages of working through the various ETaP stages?
What are the advantages and disadvantages of achieving at Innovator level?
What does effective use look like at the innovator level?

HYPOTHESIS
Professionals' attitudes values and beliefs related to teaching and learning with laptops effects progress or lack of progress within the ETaP stages.

1.3 Define the words that you use in your questions or hypothesis.

PROFESSIONALS: The professionals in this study are the teachers and administrators in 2 school districts: Upper Merion Area School District as defined in the problem statement and Kutztown Area School District. It is worth noting that Kutztown Area School has been working in a 1:1 environment with laptops for three years.

ATTITUDE: a mental position with regard to a fact or state or a feeling or emotion toward a fact or state

VALUE: an ideal accepted by some individual or group or beliefs of a person or social group in which they have an emotional investment

BELIEF: a state or habit of mind in which trust or confidence is placed in some person or thing

ETaP SCALE: was developed during research of Apple's Classrooms of Tomorrow (ACOT) as a way to measure the development stages through which a teacher moves teacher how a teacher moves through stages of technology growth and integration.

ETAP SCALE

	Entry	Adoption	Adaptation	Appropriation	Innovation
Summary	I use basic computer and network tools when it is absolutely necessary to get my work done. I accept my students' work from computer sources, but I neither encourage nor assign such work on a regular basis. I am not convinced of the value of technology in learning, but I'll use it if I must.	I apply the basic technical tools – word processor, email, and the internet – to my teaching of the traditional subjects. Technology is here to stay, and important for my students to use. I'll use it when it works, and when it's under my control.	Technology allows students to employ multiple forms of expression in my classes, and I assign many projects that call for them to employ different media to help them learn a variety of topics. I want my students to have the opportunity to learn with today's tools	I look forward to learning new technologies as they appear, and then quickly applying them to my teaching. Technology has enabled me to invent new ways of engaging my students with the content they need to learn.	Technology has helped me to transform the learning environment in my classroom. I want to try new technologies as they appear. Technology is central to all that we do in class; it's the way we do business.
Curriculum	I stick to tried and true approaches in my teaching, using standard textbooks, whole-group instruction, and set schedules for the most part. If my students use technology at all, it's for acquiring basic knowledge and skills.	I assign computer work occasionally in my class, requiring the use of basic computer productivity tools such as word processing.	I often design new lessons that take advantage of the capabilities of the new technologies to develop key concepts in the standard subject areas. Most of the activities in my class involve computers in one way or another, including a online learning.	Most of my curriculum materials are posted online, and student use them to develop key concepts and higher-level thinking skills. More and more of their assignments involve the application of cognitive and digital tools to skills to the solution of real-world problems.	My students apply the skills they have learned to real-world problems, using tools that are used in business and research. All materials are online, and available in many media forms to support a variety of learning styles. Students work on their own in cooperative groups for most of the class time.
Teaching	Most of my assignments involve paper and pencil tools, as do my tests and quizzes. I direct my lessons carefully, and ensure that all students proceed at a standard pace with the rest of the class. Any use of the computer or the network is incidental to the traditional teaching in my class.	Students work on traditional academic tasks with the technology, for the most part all working at the same assignment. The technology is under my careful supervision at all times, and sometimes includes a slide show that I deliver. Once in a while, I let small groups of students work at the computer, and I sometimes evaluate their projects with a simple rubric.	My students often initiate projects that use technology, and many of my assignments expect them to employ computers in their work. Though multimedia projects are not easy to assess, I have developed criteria to judge the academic value of this kind of work, some of which is accomplished by cooperative group activity.	I encourage my students to take the lead in finding new problems to solve and topics to explore. They often locate useful online learning resources of which I was unaware. The results of their investigations become part of an online digital portfolio that is assessed by peers and teachers.	Students in my class initiate their own investigations into the subjects of the curriculum, and use a variety of technical tools in this work. In large part they manage their own learning, designing and publishing their own portfolios and publishing web sites and podcasts that are often consulted as learning resources by other students.
Communication	Since most of the world seems to be using email, I use it as well when it's the only way to communicate, at home and for certain required tasks at school. But most of my communication employs the standard modes of telephone, face-to-face meetings, and written notes.	Many of my parents and a few students communicate with me by email, and I find this useful. I've even tried instant messaging with a few of them. Our class newsletter and some assignments are now published online.	Many of the assignments and materials for my classes are posted online, and I often find myself using email and instant messaging to communicate with my students and their parents. I have also found it valuable to use email, IM, and other online forums and chats to share ideas with other teachers and professionals.	My web site has become a comprehensive resource-bank for me and my students, with most assignments posted online. Students develop collaborative projects that are published on the web, and they often use instant messaging (including audio and video) to get this work done.	Using instant messaging, videoconferencing, podcasts, and blogging, my students extend their learning across the globe, and often collaborate across cultural and language barriers. They have begun to develop learning communities that are in constant touch with one another for the accomplishment of academic objectives.

	Entry	Adoption	Adaptation	Appropriation	Innovation
Media	If students include digital images in their work I accept them, but do not expect such work as a matter of course. I use a digital camera at home for family photos, but seldom in school. I know how to make a simple slide show on the computer, but I don't do so very often.	Some of this year's assignments require students to develop simple projects on the computer that include images from the web, and get into what's called digital storytelling. My presentations to the class often include simple slide shows to illustrate key points.	My students are improving in their development of multimedia projects to explore key concepts in the standard subject areas. They have learned to use audio and video editing software, and can produce simple podcasts of their reports. The complexity of their digital storytelling is increasing.	Students in my classes produce original multimedia works in all of the standard subject areas, and publish these on the web, on DVD, and as enhanced podcasts.	The projects my students produce are aimed at a broad audience, and contain mostly original material developed from primary sources, in whatever media is most appropriate to communication and understanding.
Productivity	Writing assignments that are done on the computer are acceptable to me, and I am known to type things up with a word processor when necessary. I know how to save my files to the disk, and get the documents I need from the school server.	I prefer that students do their writing on a word-processor, and I welcome their questions over email. It's common for me and my students to use word processing, spreadsheets, and computer slide shows in our standard curriculum work. I know how to store these files on the school's server.	In class, we often analyze quantitative information with a spreadsheet or database to help us understand key concepts in science and social studies and use the equation editor in math. Students have learned to edit each other's writing using word processors, so the amount of peer editing has increased.	We build simulations of natural and historical phenomena with a spreadsheet, and students are able to design and carry out their own analyses of complex data. They frequently use the school network for collaboration, and for organizing their research materials.	My students and I often devise new ways to use word processors, spreadsheets and databases to explore the information in the curriculum. We jump at the chance to learn a new software or hardware tool as soon as it appears.
Information	Most of the information in my class comes from print sources, but I allow internet research, and sometimes print out web pages for my lessons. I can find what I need on the internet some of the time, but would rather work in the library.	As a complement to their library research, students often find information on the Web, usually through sites that I identify for them. We have done Web scavenger hunts as part of certain curriculum units.	To help develop higher-order thinking skills, I construct webquests and other strategies that send students to a wide range of information resources. Online research has supplanted the books we used to use. We've begun to create an online archive of the most valuable sources.	My students are good at locating and evaluating new sources of academic information online, and use these sources to raise issues and solve new problems. Internet research is replacing book research in my class, and the web has become the chief method for students to publish their findings.	The students and I publish our work in a variety of formats, including web sites, podcasts, and video documentaries. These works are often consulted by other students, parents, and the community because of their educational value.

1.4 Rationale for this study

The Upper Merion School District applied for a Classroom of the Future Grant and received the money in the fall of 2006. The Classroom of the Future grant spans over three years and has the goal of achieving an innovative 1:1 computing environment within the awarded school district. The Upper Merion School Districts' goal is for every teacher to achieve at "Innovator" level when assessed using Apple's Evolution of Teacher Thought and Practice scale (ETaP).

Year one of this grant was used as a springboard and during this time, 10 teachers' classrooms were equipped with a SMART Board, projector and speaker, scanner, printer, and 30 macbooks. In addition, carts were made available for teacher use in the library. While technologies are have been available, an innovative 1:1 computing environment has yet to be achieved.

Currently, 10 teachers have laptops available to both themselves and their students. While teachers are making use of the laptops, the belief is that teachers are not tapping into the full potential of the laptops as teaching and learning tools. Even with technologies readily available in 10 classrooms, a change in the teaching practices and learning environments of these classrooms has not yet occurred.

Thornberg provided one possible reason to explain the lack of change in educators teaching and learning practices when he stated that "The main thing that's holding technology back is ... a fear--a well-placed fear, I might add--that if technology becomes ubiquitous, it will totally transform the practice of education. There are a lot of people who don't want the practice of education transformed, because they're very comfortable with it" (Brumfeld, 2007). Implied in this statement is that there is a reluctance to change. One belief is that a reluctance to change has the potential to effect progress when working to achieve Innovation level. A reluctance to change also has the potential to effect progress in working through the various ETaP stages.

Why people do and do not change has been investigated for many years. Diffusion of Innovations has been the focus of Everett Rogers's extensive research and Rogers's theories have been widely cited in instructional technology literature. According to Rogers's (1995) Innovation Diffusion

Process theory, diffusion is a process that occurs over time and has five distinct stages: Knowledge, Persuasion, Decision, Implementation, and Confirmation. This theory explains that people expected to use something new must first learn about the innovation, be persuaded as to the merits of the innovation, decide to adopt and implement the innovation, and then confirm (reaffirm or reject) the decision to adopt the innovation.

Researchers, administrators, and teachers have also found that training in using computers is essential when attempting to infuse technology into the curriculum. According to Becker, "Teachers who have a reasonable amount of technical skill and who use computers to address their own professional needs use computers in broader and more sophisticated ways with students than teachers who have limited technical skills and no personal investment in using computers themselves" (Becker, 2000). The instructor who has learned to integrate technology into existing curricula may teach differently than the instructor who has received no such training. The difference in classroom technique and the greater extent of technology use should have a positive effect on teacher and student attitudes toward information technology. Todman and Dick (1993) emphasized that an important factor affecting the quality of a child's experience with computers in school may be the teacher's attitude toward computers. Therefore it is necessary to consider the teacher's attitudes, values, and beliefs when talking about teaching and learning with laptops. Pelgrum and Plomp (as cited in Collis et al., 1996) also found that the "degree of classroom computer use was closely tied to extent of training in integration techniques" (p. 32).

Since the ultimate goal is innovation through a 1:1 computing environment, it is important to look at individual teacher attitudes and beliefs in planning the future of professional development and distribution of equipment. While there are many factors that affect the will to change, this study will focus on adoption and implementation and consider in what order these 2 must occur in order to best accomplish the goal of moving teachers toward innovation. This study is about people and the environment in which they are using technology. A qualitative study is needed in order to determine whether Upper Merion Area HS teachers should be given the technology and work with them to adopt it, or do we work with them to adopt the technology first before giving it to the

students. We will also look at what types of training opportunities and support are necessary to institute the greatest rate of change.

2.1 Demonstrate your understanding of the differences between qualitative and quantitative research methods.

Types of Educational Research

"If research is seen primarily as a process of discovery, then the day-to-day work of a teacher comes under the term teachers as researchers. It cannot be said too often that effective teaching depends upon the concern of every teacher for the rationale by which he or she works. (James N. Britton) Therefore it is essential as teachers to have an understanding of the types of research that exist as well as the implications that conducting research has on the teaching and learning process.

There are 2 two major approaches to research methodology in social sciences: Quantitative and Qualitative. Each method is distinct in its nature, purpose and procedures. Quantitative and qualitative research methods are often associated with deductive and inductive approaches, respectively. Quantitative research begins with known theory and tests it, by providing evidence for or against a pre-specified hypothesis. Qualitative research involves an in depth understanding of human behavior and the reasons that govern these behaviors. Quantitative research on the other hand relies on the notion of science as objective truth or fact, whereas qualitative research is more often identified with the view that science is lived experience and therefore subjectively determined. The nature of the research question developed will determine the method of investigation that is most appropriate for the study.

Qualitative

The qualitative approach involves the collection of extensive narrative data in order to gain insights into the research questions. Qualitative researchers are concerned primarily with process, rather than outcomes. Qualitative research is primarily concerned with the quality or nature of human experiences. Qualitative research thus tends to start with 'what', 'how' and 'why' type questions rather than 'how much' or 'how many' questions. It is also concerned with examining these questions in relation to everyday life and each

individual's meanings and explanations. Qualitative research typically entails in-depth analysis of relatively few subjects for which a rich set of data is collected and organized. Data is mediated through the qualitative researcher, the human instrument, rather than through inventories, questionnaires, or machines. Instead, qualitative research involves fieldwork. The researcher physically goes to the people, setting, site, or institution to observe or record behavior in its natural setting. In this way, the research is able to study people or systems by interacting with and observing the subjects directly and regularly. Qualitative research is descriptive in that the researcher is interested in process, meaning, and understanding gained through words or pictures.

Some common qualitative research techniques include:

Experience survey: Any time a researcher or decision-maker needs to gain greater insight into a particular problem, he or she is likely to question knowledgeable individuals about it. This is usually done through an informal, free-flowing conversation with anyone who has experience. It is meant to help formulate the problem and clarify concepts, not develop conclusive evidence.

Case study: A case study is a comprehensive description and analysis of one or a few situations that are similar to the one being studied, with an emphasis on the entire organization. Great attention is paid to detail in order to understand and document the relationships among circumstances, events, individuals, processes, and decisions made. In order to obtain the necessary information, in depth interview with key individuals in the organization are conducted as well as consulting internal documents and records or searching press reports. Observation of actual meetings, sales calls or trips, negotiations, etc. which can prove insightful, since "actions speak louder than words", even when it comes to understanding how decisions are made in an organization or why some organizations are more successful than others.

Pilot study: When data is collected from a limited number of subjects selected from the population targeted by the research project, it is referred to as a pilot study or a trial run. There are four major qualitative research techniques that can be used as part of a pilot study. These are:

- In-depth interview: which last anywhere from 20 to 120 minutes making it possible to obtain a very detailed picture about the issues being researched.
- Focus group: which takes advantage of the interaction between a small group of people by creating a small group. Participants will respond to and build on what others in the group have said.
- Panels: A panel can be set up where individuals can be questioned or surveyed over an extended period of time. Common uses for panels include trend monitoring and future assessment, test marketing and impact assessment, and priority setting for planning and development
- Projective techniques: Often deeply held attitudes and motivations are not verbalized by respondents in direct questioning. Respondents may not even be aware that they hold these attitudes, or may feel that their motivations reflect badly on them. Projective techniques allow respondents to project their subjective values, opinions and beliefs onto other people or even objects. The respondent's true feelings can then be inferred from what s/he says about others. Projective techniques are normally used during individual or small group interviews.

Quantitative

Quantitative" is primary concerned with " Why". This approach involves the collection of numerical data in order to explain, predict, and/or control phenomena of interest. Data analysis is mainly statistical in nature and uses deductive process. Quantitative research differs from qualitative research in the several ways. First, the data is usually gathered using more structured research instruments. The results provide less detail on behavior, attitudes and motivation and the analysis of these results are more objective. Because the results are based on larger sample sizes that are representative of the population, the research can usually be replicated or repeated, and therefore is highly reliable. Quantitative research is looking at objective states where data is analyzed statistically. It relies on numbers and is concerned with

generalizing to large population entails the proper application of statistics to typically a large number of subjects

Some common quantitative research techniques include:
Observation or collecting data by human, mechanical, electrical or electronic means. There are many different types of observation depending on the situation of the research.

Experimentation, which is a way of establishing causality between variables. This highly controlled method allows the researcher to manipulate a specific independent variable in order to determine what effect this would have on other dependent variables. Experimentation also calls for a control group as well as an experimentation group, and subjects would be assigned randomly to either group.

Survey, which involves the collection of primary data about subjects, usually by selecting a representative sample of the population or universe under study, through the use of a questionnaire. It allows for standardization and uniformity both in the questions asked and in the method of approaching subjects, making it far easier to compare and contrast answers by respondent group. It also ensures higher reliability than some other techniques.

SYNOPSIS

To better understand the complexities of the main types of research studies, the table below offers a brief comparison of the Qualitative and Quantitative research.

	Qualitative	Quantitative
Purpose	Understanding- seeks why	Prediction and Control
Focus	Subjective seeks to develop an in depth understanding of individuals' interpretation of events. It is most concerned with the process.	Objective – seeks precise measurement & analysis of target concepts, e.g., uses surveys, questionnaires etc. It is more focused on the outcome.
Conditions	Naturalistic- Investigations are conducted under natural conditions.	Controlled- Investigations are conducted under controlled conditions.
Design	The design emerges as the study unfolds.	All aspects of the study are carefully designed before data is collected.
Sample Group	Qualitative research involves smaller more focused samples	Quantitative studies involve large random samples used
Hypothesis	The hypothesis continues to evolve throughout the study and dictates the design.	The hypothesis is formed up front.
Questions	Open ended and process-oriented	Pre-specified and outcome-oriented
Data Collection	Subjective- Data are perceptions of the subjects in the environment (context). It involves analysis of data such as words (from interviews), pictures (i.e. video), or objects. Uses participant observation, in-depth interviews etc.	Objective- data are independent of people's perceptions. It involves analysis of numerical data. Data is in the form of numbers and is analyzed statistically.
Analysis	Non-statistical. Narrative description & constant comparison are used.	Statistical. Data is usually in the form of tabulations. Numerical estimation and statistical inferences are involved. Findings are conclusive and usually descriptive in nature.
Results	The focus is on design and procedures to gain rich, real and deep data. The goal is not to generalize to large populations, but individuals and situations.	The focus is on design and procedures to gain replicable data in the results. The intent is to generalize beyond the group.

2.2 Align your research question with the appropriate methodology and provide a rationale for your decision.

Purpose / Focus

This study seeks to identify roadblocks to achieving innovator level as well as benefits and disadvantages to achieving at innovator level. The focus is to develop an in depth understanding of the subjective states of people and does not seek to generalize to a larger population outside of this study.

Conditions / Design

This research study seeks to understand the attitudes, values and beliefs of individual educators and then work to interpret how these perceptions influence the use (or non-use) laptops for instructional purposes. Through this investigation, the benefits to using laptops at the innovator level will be identified. Also the roadblocks to use will be revealed. The emphasis is on describing, understanding, and explaining behavioral choices. It will look for clues as to the motivation, desire, belief, and ways of thinking. This study seeks to develop an in depth understanding of individuals' interpretation of events and this understanding which can only be gathered by words, by talking to people in their natural environments not use of numbers. The focus will look at the behavior itself, as opposed to the outcome of the study.

Sample Group

The sample group will be selected via the initial survey and will be a smaller and more focused sample group.

Hypothesis

The hypothesis of this study is that educators' attitudes, values and beliefs related to laptops effects how they move along the ETaP scale. The hypotheses will continually evolve and undergo many revisions as further insight is gained.

Questions

The questions being asked during the interviews are open-ended and process oriented It is based on perceptions of subjects within their environment.

Data Collection

This study will be collecting subjective data in the form of text or words, rather than objective data in numbers and being more concerned with the process rather than the outcome. The data being collected in this study is non-statistical. Data will be collected through surveys, interviews, observations, and follow up interviews. In order to identify common themes in the areas of use and non-use of the tools, the triangulation method will be used. When working to answer these questions,

surveys, interviews, observations/demonstrations, and an in depth interview will be used to collect subjective data. Because triangulation is addressed by collecting data through multiple sources, the credibility of the findings will be strengthened. Performance indicators will be filtered out through face to face interviews and

Analysis / Results
As data is analyzed, reoccurring themes will be identified and hypotheses will continue to evolve.

All of the above are all the characteristics of a qualitative study: words, gathered by people, to determine their interpretation of events gathered in their natural environments. Therefore this is a qualitative research study.

3.1 Describe both internal and external sources of invalidity in research strategies and ways to control the threats to validity

VALIDITY

Validity concerns just how well the data being collected measures the intended variable. The instruments and procedures used must be in alignment with what they are supposed to measure. A study is considered valid if the questions or procedures actually measure what they claim to measure. Researchers select design methods that control as many threats to validity as possible. Each design method should be assessed based on the various threats to validity.

INTERNAL VALIDITY

Internal validity concerns the soundness of an investigation and considers the factors that affect the outcomes of a study. It examines the extent to which extraneous variables have been minimized or eliminated by the researcher, so that any valid causal relationships can be attributed to the variable being measured. There are some known threats to internal validity that often lead to error rendering the findings of the study invalid. Sound research studies are designed to control for the following threats:

- History: When an outside event other than the treatment event occurs between the pre and post test that influences the outcome, history becomes a threat.
- Maturation: Any change due to the passage of time may be a threat to the internal validity of a study. Maturation is a physical or mental change due to aging or development, either between or within groups.

- Testing: Familiarity with a test could affect performance or results because past responses were remembered. Testing is a threat when an observed effect may be due to the number of times particular responses are measured.
- Instrumentation: Changes in measurement instruments, observers or scores may change the way the treatment event is measured. Instrumentation is a threat when an effect might be due to a change in the measuring instrument between pretest and posttest.
- Statistical Regression: Test scores tend to regress toward the mean score after the pretest has been given. Therefore, subjects who scored in the extremes, whether high or low, may tend to regress towards the norm. Statistical regression is a threat when an effect might be due to the participant's being classified into experimental groups, highs or lows, based on pretest position in the distribution.
- Differential Selection: The selection threat is of concern when subjects are not randomly assigned to groups, particularly if groups are unequal in relevant variables before intervention. For example, if groups of students differ on variables other than the treatment variable differential selection would be considered a threat.
- Experimental Mortality: In the course of an experiment, some subjects may drop out before it is completed. It is a threat when new enrollment or withdrawal of participant occurs during a study.
- Selection-Maturation Mortality: As part of the selection, the sample actually has unknown differences that unknowingly effect the results instead of the treatment.
- Experimental Treatment Diffusion: Sometimes the treatments or conditions are revealed within the groups or across groups which . actually affects the treatment. If two different techniques are being tested in two different classes, the teachers may share what they are doing. Unconsciously, the tested variable may inadvertently cross over into the other group.
- Compensatory Rivalry by Control Group: This threat is often referred to as the John Henry Effect. Someone may feel sorry for the control group because they are not receiving much attention and begin giving them special treatment. For example, a researcher may be studying the effect of laptop computers on students' attitudes toward math. The teacher feels sorry for the class that doesn't have computers and sponsors a popcorn party during math class. The control group begins to develop a more positive attitude about mathematics not based on the control (use of laptops) but the reward (popcorn).

- Compensatory Equalization of Treatments: Sometimes, for whatever reason, a decision is made during the course of an investigation to let the control group also receive help from the personnel who are running the sample group. It is a threat to change in the personnel who run or control a program, so that they are reassigned to the other group who is receiving the treatment.
- Resentful Demoralization of Control Group: If the comparison group becomes aware of the program group and becomes discouraged and no longer tries to achieve on their own, there is a threat to internal validity.

EXTERNAL VALIDITY

External validity refers to the extent to which the results of an investigation can be generalized to other situations. External validity is important when the researcher wants to generalize from a set of research findings to other people, settings, and times. A study that readily allows its findings to generalize to the population at large has high external validity.

- Explicit Description of Experimental Treatment: If the researcher fails to adequately describe how he or she conducted a study, it is difficult to determine whether the results are applicable to other settings.
- Multiple Treatment Interference: If a researcher were to apply several treatments, it is difficult to determine how well each of the treatments would work individually since it may be that only the combination of the treatments is effective not any one treatment in isolation.
- Hawthorne Effect: Sometimes the behavior of an individual or a group will change to meet the expectations of the observer simply because they are aware their behavior is being observed. In designing any valid research, this factor can be taken into consideration, by concealing the purpose or sponsor of the research.
- Novelty and Disruption Effects: Sometimes the novelty of doing something different makes a difference. A treatment may work because it is new and the subjects may be responding to the uniqueness, rather than the actual treatment. On the other hand, the treatment may not work because it is unique, but if the subjects are given time to adjust to it, it might have worked.
- Experimenter Effect: It may be that a treatment only works with the individual experimenter given a different person, the treatment might not work at all.
- Pretest and Post test Sensitization: If the subjects have the opportunity to interact with tests (pre or post), it may influence their behavior and the results of the treatment.

- Interaction of History and Treatment Effect: As time passes, conditions change and generalizations may be affected by this condition. Caution should be taken to not to generalize to different time periods.
- Measurement of Dependent Variable: A treatment may only work in certain circumstances.
- Interaction of time and measurement of treatment effects: A result may not occur until several weeks after the end of the treatment. In this situation, a posttest at the end of the treatment would show no impact, but a posttest a month later might show an impact. Therefore caution must be taken not to limit the timeframe of the results.

TRIANGULATION

The issues for qualitative research are more about transferability, faithfulness, and dependability rather than reliability and validity. Therefore, it is important through qualitative research to give rich descriptions so that the results of the inquiry can be said to be transferable. Triangulation is a tool to that is used to support these arguments. It is a process used so that a researcher can argue that their study's findings are not simply an artifact of a single method, a single source, or a single investigator's biases. Triangulation requires the researcher to use more than one method or a combination of assessment methods to study the same thing. An example of triangulation would be an assessment that incorporated surveys, interviews, and observations.

1. Data triangulation: Checking out the consistency of different data sources, i.e. comparing and cross-checking the consistency of information derived at different times and by different means within qualitative methods. For example, compare observational data with the interview data; compare what people say in public with what they say in private; check for consistency of what people say about the same thing over time; compare the perspectives of people from different points of view. However, such comparison does not always mean to find the consistency. Instead, sometimes it helps to study and to understand when and why there are differences.
2. Investigator triangulation: Using several different researchers or evaluators to review the findings in order to reduce potential bias.
3. Theory triangulation: Using multiple perspectives or theories to interpret the data, i.e. examining the data from the perspectives of different stakeholder positions with different theories of actions.
4. Methodological triangulation: Checking out the consistency of findings generated by different data-collection method

The terms defined above are typically relative to quantitative research studies. Validity refers to the subjective nature of the inquiry and the possibility for multiple

meanings and interpretations. The goal of quantitative research is to describe or understand the problem and questions of the study from the participant's point of view. Internal validity (or credibility) in this type of research involves legitimate judgment that the results of the study are credible from the perspective of the participants as they are the ones who can objectively determine the credibility of the results. To control for the threats mentioned above, this study will use triangulation by collecting data through more than 1 means.

4.1. Describe the context, site, participants, population and/or events on which the study is focused.

This study focuses on investigating advantages, disadvantages and roadblocks to moving along ETaP scale and effective use at the innovator level on the ETaP scale when arming high school teachers (grade 9-12) with laptops to move them along the ETaP scale. The sites for this study will occur in two different school districts: Kutztown Area School District, A school that is in its 3rd year of a one-to-one computing environment and recipient of the Classrooms for the Future grant and Upper Merion Area School District, a recent recipient of the Classrooms for the Future grant for 2006-07 school year that is moving towards implementing a one-to-one computing environment. The two separate populations would be all the school professionals from both districts respectively. As a result of the survey information two separate samples for each school district would be chosen from the two populations. The populations and the samples would be kept separate by site.

Upper Merion Area School District

The Upper Merion Area School District is a suburban district in Montgomery County. It is about 15 miles east of Philadelphia that serves the approximately 3,500 students in Upper Merion Township, Bridgeport, and West Conshohocken, Pennsylvania. It is comprised of 6 schools: 4 elementary schools, 1 middle school and 1 high school. There are 75 teachers on the High School faculty. In 2006, 10 teachers from 5 subject areas were given laptops. In addition their classrooms were equipped with laptop carts, projectors, and electronic whiteboards for student use. As a result of the $153,673 from Classrooms for the Future Grant, in spring of 2007, laptops were distributed to the entire High School faculty for use.

Kutztown Area School District

The Kutztown Area School District is a suburban / rural district in Berks county. It is within the college town of Kutztown and serves approximately 1,800 students. It serves a combination of three municipalities and three townships. It is comprised of 6 schools: 4 elementary schools, 1 middle school and 1 high school. There are 45

teachers on the High School faculty. In 2004, over 700 laptops were distributed to all students and faculty members for one-to-one use. In 2006 this district was granted $52,279 through the Classrooms for the Future grant for projectors and electronic whiteboards.

Both districts have a half-time Classrooms for the Future Coach to guide technical needs assessments and strategic recommendations, identification of appropriate instructional and administrative technologies, and the delivery of local hands-on relevant professional development in each high school.

4.2. Describe an appropriate sampling plan for your study.
This study will be conducted with the above educators over a fifteen week time period starting in Fall 2007. In Upper Merion Area School District all faculty now laptops for planning technology integrated classroom lessons. It is a goal in both districts for teachers to move along the ETaP scale. This study is being done to investigate what causes teachers to move to upper levels of the ETaP scale.

Neither the Upper Merion Area School District nor the Kutztown Area School District has a policy in effect to govern the staff member participation of staff members in research studies. Within both districts there has been a past practice of asking for consent for interviews and access to classrooms before conducting observations. Only the researcher will have access to the data collected from the surveys, interviews and observations. That data will be kept in a locked file cabinet.

Educators in Upper Merion were given a hardcopy of the ETaP scale when the laptops were distributed. Educators in Kutztown Area School district are given this same ETaP scale as the beginning of each school year. At the start of the study, educators within the both school districts will be sent a brief message via email to announce that a survey will be placed into their mailboxes within a few days. A hardcopy of an initial survey with a cover letter explaining the general nature and reason for the study will be placed in each educators' mailbox. Educators will be asked a series of questions to facilitate the categorization of each individual educators' level of technology use (such as high or low) and either use or non-use of laptops during the prior school year. From the responses, those indicating a willingness to participate will be broken down into the categories listed in the **matrix** below. These categories were selected based upon subject area taught: English, Math, Sciences, Social Sciences, Special Education, Other. There will be one matrix completed for each district.

	EDUCATORS					
	Total Faculty		Laptop Users		Non-Users	
English			High Tech	Low Tech	High Tech	Low Tech
Math			High Tech	Low Tech	High Tech	Low Tech
Sciences			High Tech	Low Tech	High Tech	Low Tech
Social Sciences			High Tech	Low Tech	High Tech	Low Tech
Special Education			High Tech	Low Tech	High Tech	Low Tech
Other			High Tech	Low Tech	High Tech	Low Tech

For each area of the matrix above 1-2 educators from each of the categories will be selected from each of the schools. This will result in 48 potential participants. A brief face-to-face scripted solicitation (Appendix B) will be help with each of the selected participants that indicated interest during the initial survey. After the face-to-face solicitation is completed, an appropriate cross sampling form each school will be generated. Those individuals will be asked to complete an interview of approximately one hour to gather more detailed information (Appendix C). The purpose of this interview is to identify common themes and trends regarding feelings about laptop use. Pre-arranged classroom observations will then be conducted by the researcher and an assistant to collect additional data using the chart

Section 5 Identifying a data collection strategy (or strategies).

5.1. Describe the measurement tools that will be used in the study.

The measurement tools for this study will include a survey, an interview, and an observations/demonstration. Separate interviews will be used with different groups as identified within the initial surveys. Measurement tools used in this study are included in the Appendix.

SURVEYS
One survey will be used in this study. An initial survey will be provided to all high school teachers in both school districts. This survey will allow the educators to identify either use or non-use of laptops during the 2006-07 school year, to respond to a checklist that will be used to classify respondents as "high technology" or "low technology" users, and to indicate interest or non-interest in meeting with the researcher for the purpose of soliciting participation.

INTERVIEWS
Two interviews will be used in this study. The first interview will occur after the initial survey and will last one hour or less. It will be administered to participants self-identified as users or non-users of laptops. The interview will be recorded using a voice memo recorder. The second interview will take place after the observation/ demonstration once all data from the initial survey, first interview and observation/ demonstration has been analyzed. The second interview will last 10 minutes or less and will serve as a summarizing discussion to confirm observed themes or trends.

5.2. Propose an appropriate data collection technique.
The detailed steps below show the sequence of events for the data collection in this study:

1. Send an email to all professional staff announcing that a survey will appear in school mailboxes.
2. Place cover letter/initial survey in school mailboxes of all of the school district's educators' mailboxes. (See Appendix A.)
3. Wait one week for surveys to be returned to researcher
4. Keep log of educators who complete and return the survey.
5. At the end of the week, place another survey in the educators' mailboxes who did not respond to date.
6. Wait one week for the second set of surveys to be completed and returned.
7. Divide completed and returned surveys into two categories: consent to meet with researcher and no consent.

8. List the names of all educators who consent to meet with researcher.
9. Score all surveys with a "yes" response into two categories: "high technology users" and "low technology users."
   NOTE: "High technology users" will be considered those individuals who indicate "I use this tool/skill at home", "I use this tool/skill at school for planning purposes", or "I use this tool/skill with my students" in at least 50% of the responses. Those not indicating these selections in at least 50% of the questions will be categorized as "low technology users" for this study. Of the scores, the middle 10% will be disregarded as to eliminate borderline scores.
10. Sort each group of high and low technology users as user and non-user of laptop carts based on response to question 1.
11. Create a list of all responses of "yes to meet with the research" and also the subcategories of "high technology use" and "low technology use" and also users or non-users of laptops.
12. Make a copy of this list and place in a locked file cabinet for safekeeping.
13. Within one week after surveys are scored and sorted, contact those that responded "yes to meet with the researcher" to schedule a time to meet.
14. Meet with every "yes" respondent within two weeks after surveys are scored and sorted.
15. Meet with all potential participants and deliver the scripted solicitation (See Appendix B.)
16. Have consent forms signed after the solicitation from those that volunteer to participate and provide opportunities to answer any additional questions.
17. Thank the individuals for the time they have committed to the study and the time they shared.
18. Gather consent forms and place in a locked file cabinet.
19. Within one week after meeting 10 minutes with educators, schedule the one-hour interview with each educator that volunteered to participate and complete a consent form.
20. Meet with each educator for one hour, use the interview questions provided in Appendix C, and record each interview.
21. At the end of the interview, provide a copy of the memo to participants overviewing the next appointment, the demonstration/observation.
22. Within one week schedule a time for the demonstration/ observation.

5.3. Specify/describe the instrumentation that is required for your research investigation (e.g., tests, surveys, interview guides, participant observer).

SURVEY

One survey will be used in this study. The purpose of this survey is: to determine whether educators are high or low technology users, whether each educator is a

laptop user or non-user, and to request participation in the research study. The researcher will send a general email to all educators in each of the 2 high schools announcing a survey that will appear in educators' mailboxes within the week. The survey will be accompanied by a cover letter describing the survey and requesting that all educators complete the survey and returned to the researcher. At Upper Merion Area High School, surveys will be returned to the researcher via the inner office mail system. In Kutztown Area School District, surveys will be returned to the research assistant via inner office mail and then mailed directly to the researcher via US Post.

INTERVIEW

A one-hour interview will be scheduled within two weeks of receiving consent to participate with all educators who volunteer to be involved in the study. The interview has been designed to take approximately one hour. The purpose of the interview is to determine educator uses of laptops; to determine the feelings of the participants in regard to expectations for use of laptops; as well as thoughts about the ETaP scale. The interview is based on ten general questions/scenarios and is divided into two categories (laptop users or non-users) with similar s based on use. The interview will be recorded and cross-referenced as needed for clarification or transcription. This instrument will be administered over a three week time period.

OBSERVATION

An observation will be used in this study. The purpose of this observation is to allow the researcher to observe each individual participant as he or she demonstrates the way that that individual uses laptops to meet classroom objectives. During the observation the researcher will work to identify the ETaP level of the educator in the areas of curriculum, teaching, media, and information using the checklist in Appendix D. For this study, the term upper levels of the ETaP scale means that the lesson demonstrated includes elements which are classified at the appropriation and innovation level. The researcher will provide an overview of the procedures for the observation/demonstration in advance. During the observation period, the researcher will briefly clarify the procedures and then quietly observe the participant. During the observation, the researcher will the checklist (see Appendix D) available and check all that areas that are observed and make brief notes. Since all educators will be using laptops during the demonstration, the entry level has not been included in this checklist.

It is anticipated that the entire observation would take an educator less than thirty minutes to complete with the researcher (the research assistant may be needed at Kutztown if there are large participant numbers in order to meet the time limits of the study) Within a two week time period, all participant demonstrations will be observed.

5.4. Discuss the importance of pilot testing and describe procedures for constructing, piloting, and modifying methods/instruments to be used in your investigation.

A pilot study is a smaller version of a study is which is conducted prior to the actual investigation is done. Researchers use information gathered in pilot studies to refine or modify the research methodology for a particular study and to guarantee reliability and validity. Borg and Gall (1989) describe pilot testing as a way test the effectiveness of a proposed concept or concepts and allow for modification prior to full-scale adoption. During the pilot, changes often arise from unforeseen events or ideas not originally considered. A pilot study also gives the researcher an opportunity to validate the approaches and instruments being used in order to strengthen their impact when fully implemented. (Borg & Gall 1989: 71) A pilot study can also be an opportunity for 'trying out' of a particular research instrument (Baker 1994: 182-3). One of the advantages of conducting a pilot study is that it may show areas where the main research project could fail, where research protocols may not be followed, or whether proposed methods or instruments are either inappropriate or too complicated.

According to van Teijlingen (2001), there are a variety of reasons for conducting pilot studies including:

- "Developing and testing adequacy of research instruments
- Assessing the feasibility of a (full-scale) study/survey
- Designing a research protocol
- Assessing whether the research protocol is realistic and workable
- Establishing whether the sampling frame and technique are effective
- Assessing the likely success of proposed recruitment approaches
- Identifying logistical problems which might occur using proposed methods
- Estimating variability in outcomes to help determining sample size
- Collecting preliminary data
- Determining what resources (finance, staff) are needed for a planned study
- Assessing the proposed data analysis techniques to uncover potential problems
- Developing a research question and research plan
- Training a researcher in as many elements of the research process as possible
- Convincing funding bodies that the research team is competent and knowledgeable
- Convincing funding bodies that the main study is feasible and worth funding
- Convincing other stakeholders that the main study is worth supporting"

[van Teijlingen, accessed 8/3/07]

For this study, there will be a pilot study. During the pilot a school will be selected from the other Classrooms for the Future Grant recipients with similar demographics and resources to Upper Merion Area High School. Following the procedures outlined previously in this document, the researcher and assistant will conduct the pilot in order to test the steps and tools to be used in the actual study. Participants will be given the initial survey. The results will be analyzed in order to ensure validity. During the observations, both the researcher and assistant will be present in order to ensure what is being asked is valid and the information being gathered meets the objectives of the study. The pilot study will provide information related to the proposed time length of the study and the suggested duration time to complete each instrument, which will help to gauge if the proposed time constraints are realistic to the study. The questions will be evaluated for relevance. During pilot study both the researcher and assistant will observe together. This will afford the opportunity for the researcher to train the assistant in the procedures of the study, outline expectations for performance, and observe the assistant interacting with the pilot participants and ensure that the techniques of the assistant and the researcher are similar.

5.5. Identify issues related to quality of data (e.g., bias, missing data, non-response, attrition).

There are very specific instances where the quality of data within a study may be compromised. Four specific concerns are covered in this section. In addition, attempts of the researcher in this study to try to avoid or decrease the chances of flaws within the final research findings will be addressed.

BIAS

A bias is a flaw in either the study design or data analysis that leads to an erroneous result. Since qualitative research deals with people in their natural environments it is important to account for several different types of bias that must be addressed.

Researcher Bias:

As Brody (1992) states, "Since the naturalistic investigator is him- or herself the research "instrument," naturalistic inquiry cannot avoid observer bias by using the instrument to insulate the experiment from the preconceptions of the investigator. Instead, open disclosure of preconceptions and assumptions that may have influenced data gathering and processing becomes an inherent part of the conduct of the inquiry. "(p. 179)

Selection Bias:

Selection bias occurs when the sample is not representative of the population, or some members of the population are more / less likely to be included than others. In this study, selection bias will be addressed by numbering potential participants by identifying level and subject area and ensuring that a variety of teachers are selected.

Information Bias: Information bias is when non-comparable information is obtained from different groups of the study sample.

There are 2 data issues that need to be addressed

MISSING DATA
Missing data refers to a participant unintentionally omitting information or when data is inadvertently misplaced or lost. Creating copies of all data and maintaining record can help to control for missing data. The primary researcher will be in control of data and that will help to control for missing data. Missing data can pose a potential threat to validity.

In the survey, responses that may have been inadvertently omitted will be handled on an individual basis.

NON-RESPONSE
Non-response refers to a participant who willfully omits information or refuses to respond. This often occurs when a participant feels threatened by the results of the questions being asked.

Results would be classified as non-response if when the survey is sent out, an educator doesn't respond. This would be classified as a total non-response and would only become a concern if not enough participation was solicited at each level

To establish trust, participants will be told up front that they do not have to answer all questions. If a participant should chose not to respond during the interview, all efforts would be made to establish trust including reinforcing that the interview recording and data collected would only be heard by the researcher and that identity would not be disclosed. would include incomplete surveys

ATTRITION is the loss of people who do not complete the experiment
when someone drops out of study what are you going to do can you use the data when you don't have the same amt of data from everyone else in the study. In order to control for attrition, at least 2 educators from each subject area will be solicited to participate.

5.6. Describe different methods for establishing the quality of information gained from instruments and procedures

"How can an inquirer persuade his or her audiences that the research findings of an inquiry are worth paying attention to?" (Lincoln & Guba, 1985, p. 290).

High quality information is gained within a research study when reliability and validity of the quantitative constructs are established. In order to be relevant, the study questions must be important, and the research procedures, analyses, reported claims and conclusions must be of high quality and in alignment with the research questions and aligned with each other. The research questions must guide the research design and analyses. In addition, conclusions and claims must be supported by the data and tie back to the research question(s). When considering the quality of the information gained and the instruments used within a study, two common themes begin to emerge. The first is, whether the study is reliable, and second whether it is valid. Validity refers to the alignment of the study and its "ability to measure consistently" (Black and Champion 1976, pp. 232-234) and serves to answer the question are we measuring what we think we are? These two terms are constructs and therefore they are arguable. It is also important to consider reliability and validity through 2 lenses, reliability and validity of the study procedures and reliability and validity of the instruments used within. This section will demonstrate ways that the study described includes high quality credible information by showing how the research procedures and instruments are both reliable and valid.

RELIABILITY

Lincoln and Guba (1985) state that: " There can be no validity without reliability," (p. 316). A research study cannot be deemed as valid unless it is first found to be reliable. Therefore it is important within any research study to establish reliability. In general terms, reliability refers to the dependability or trustworthiness of a study. It is the degree to which a study consistently measures whatever it is intended to and gains consistent results. Kirk and Miller (1986) identify three types of reliability referred to in conventional research, which relate to: 1) the degree to which a measurement, given repeatedly, remains the same; 2) the stability of a measurement over time; and 3) the similarity of measurements within a given time period (Hoepfl, 1997). Reliability within a study is based on consistency. The more reliable the research instruments and the more reliably the research procedures are applied, the greater the probability that the study can be repeated with the same or highly similar results and another researcher can replicate the study's methodology and obtain the same or similar results. Within this study great care was taken to ensure that the process and the instruments were reliable.

RELIABILITY OF RESEARCH PROCESS

Qualitative research is concerned with achieving similar results. It looks for differences and considers outliers. This is a quantitative study, which is well documented. The stepwise process outlined in 5.2 was designed so that another researcher could perform the research in a consistent manner. In order to establish reliability it is important to establish trusting relationships. The research and assistant for this study were selected because of the relationship of trust they have built in the buildings in which they are working. This study is based on a purposeful sampling of the population, which will help with reliability. The idea behind test/retest is that you should get the same score a first test as you do the second. The instruments help to address consistency. The face-to-face interviews will be taped so that these tapes can be reviewed and analyzed. The pilot study as well as the use of 2 districts will help to establish reliability, as it will enable the researcher to implement the measurement instrument multiple times. One of the biggest threats to reliability is bias. The assistant will be chosen so that their biases in the study are aligned with the researcher. In this study the researcher will prepare the assistant during the pilot study so that the interviews remain consistent. During the selection interview the researcher will state their bias that a teacher's attitudes, values, and beliefs related to laptops affects their ability to move towards innovation. The perspective candidates will be asked their feelings about this statement. This interview will serve to ensure that the researcher and assistant have biases that are in alignment. In addition, the researcher and assistant will meet weekly to ensure that the procedures are being followed in a consistent manner. Also in the pilot study, the researcher will work with the other data agent to demonstrate that the interpretations are consistent.

RELIABLITY OF THE INSTRUMENTS USED WITHIN

An instrument cannot be valid unless it is first established that that instrument is reliable because a prerequisite for validity is establishment of reliability. This section will discuss the instruments used and construct the argument that these instruments are deemed to be reliable. The instruments within this interview are an initial survey, a set of face-to-face interview questions and an observation form. The instruments within this study vary and all instruments (survey, one hour interview and demonstration/observation) in this study continually revisit the research questions so as the participant responses are analyzed, the researcher is able to analyze for consistency in response. Internal consistency estimates reliability by grouping questions in a questionnaire that measure the same concept. During the interviews the questions were grouped so that the consistency among answers can be demonstrated. Within the interview and the observation, both researchers will compare notes and review tapes together to ensure consistency of the data gathered.

VALIDITY

Reliability is a prerequisite to validity however, is it not the only requirement of validity. Establishing reliability is the first step. It is possible that a study can be argued to be reliable, and yet not found to be valid because it is possible to get consistent results on something that is not aligned with the study. Once reliability has been established, it doesn't assure that it is valid. It is only once you have established reliability in your study that you can begin to build a case for validity. In section 3.1 the term validity was defined as how well the data being collected measures the intended variable. and the methods that control the threats to validity were discussed.

There are 4 types of validity upon which a study can be measured. These include: content validity, face validity, construct validity, and criterion validity. Content validity is related to face validity, though content validity should not be confused with face validity. Face validity requires that your measure appears relevant to your construct to an innocent bystander, or more specifically, to those you wish to measure. Content validity is very similar to face validity, it is based on the extent to which a measurement reflects the specific intended domain of content (Carmines & Zeller, 1991, p.20). Instead of relying on target members of your population of interest, you must ask experts in the field. The theory behind content validity, as opposed to face validity, is that experts are aware of nuances in the construct that may be rare or elusive of which the layperson may not be aware. Criterion validity is a more rigorous test than face or content validity. Criterion validity means your attitude assessment can predict or agree with constructs external to attitude. Construct validity is a way of assessing validity by investigating if the measure really is measuring the theoretical construct it is supposed to be.

This section will focus on how this research study was designed to control for the threats to validity. It will also examine how the instruments and procedures used are in alignment to show that an educator's attitudes, values and beliefs related to teaching and learning with laptops affects progress or lack of progress within the ETaP stages.

VALIDITY OF PROCDURE

To begin with this is a qualitative study, which aligns with what want to know. Section 2.2 looked at ways that the research questions would be aligned with the appropriate methodology. This serves to demonstrate validity of procedure. Validity was defined in section 3 as how well the data being collected is measures the intended

variable. The instruments as well as the procedure used must be in alignment with what they are supposed to measure. It is the intention of a qualitative study to align with the questions being researched. This gives the study face validity.

VALIDITY OF INSTRUMENTS

Face validity is concerned with how a measure or procedure appears. Does it seem like a reasonable way to gain the information the researchers are attempting to obtain? Does it seem well designed? Does it seem as though it will work reliably? Unlike content validity, face validity does not depend on established theories for support (Fink, 1995). The pilot study will be used to determine if the instruments align with the categories of advantages, disadvantages, and roadblocks to technology use. During the pilot, the participants would be asked to classify the questions to determine what they thought the question was trying to measure. These questions would be aligned with the goals of the study was attempting to discover in order establish face validity. The researcher along with professor at Penn State University examined the instruments to establish face validity as well. The research questions were developed in partnership with a professor at the Pennsylvania State University based on her work with schools performing similar studies. Although neither the professor nor the researchers are experts in the field, these questions were carefully analyzed and determined to have face validity.

The Observation Checklist was adapted from Adapted from ISTE / ASUW Classroom Observation Rubric which was a rubric used during the PT3 Practicum Plus Program. The PT3 Practicum Plus Program incorporated many of the features of the Apple Classrooms of Tomorrow (ACOT) on which the ETaP scale. Like the ACOT project, the PT3 Practicum Plus Program objective was to improve students' learning through training teachers in the use of computers in the classroom. The results of this study provided multiple implications, which are similar to the data, which is sought in this study. Since the original instruments on which the survey and observation checklist were based were designed by a ISTE, a group of respected experts in the field, this instrument would be considered to have content validity.

TRIANGULATION

Triangulation allows for the use of more than one instrument, researcher or method to compare the findings. Triangulation protects against the assumption or accusation that the findings of the study are a result of a single method, source, or an individual researcher’s bias. The purpose for the multiple data collection points is to establish the following in the initial survey: Is the participant a high or low technology user? How do they feel about specific aspects of technology that is addressed in the ETaP

scale? The observation helps to confirm if they are a high technology user in the classroom. In other words, the participant states that they do certain things with technology, but do they really. Triangulation has risen as an important methodological issue in naturalistic and qualitative approaches to evaluation to control bias and establish reliable results.

Within this study design Investigator triangulation is implemented through having a researcher and an assistant. These 2 will work closely to alleviate bias. In addition, the use of multiple qualitative methods surveys, interviews will serve to establish methodological triangulation. A triangulation of the survey, interviews and observation data will serve to improve the reliability and validity of the data collected. The initial survey will categorize teachers as high or low technology users. The interview will confirm the results of the survey. A user may state that they do certain things with technology, but the interview will examine those statements and the observation will confirm. Triangulation will serve to ensure that the interpretation of initial survey accurate and reaffirm the data gathered with each step.

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Upper Merion Area High School
435 Crossfield Road
King of Prussia, PA 19406

Dear Colleague,

I need your help!

I am interested in learning more about the use of laptops in our school. The funding from the Classrooms for the Future grant has enabled us to be able to supply classrooms with laptop carts. I would like to gather information related to laptop use in general from educators who are have implemented eClassrooms as a result of the grant, teachers that are currently using the laptops from the library, and also from educators that do use these tools. Only you can help me to learn more about what and how laptops are being used in our school!

You can help me to better understand laptop use in our school by completing a brief survey that is attached to this letter. Also, you can help me by noting within the survey that you will volunteer to meet with me for 10 minutes. After you volunteer to meet with me in the near future for 10 minutes, I will contact you personally to schedule a convenient time.

Thank you in advance for taking time from your busy schedule to complete this brief survey and also for returning this survey to me via inner school mail.

I look forward to your help.

Sincerely,

Kristin Hokanson
CFF Coach, Upper Merion Area High School

Laptop Integration Preliminary Survey

Please check the box that is applicable to your skill level and knowledge.

1. Do students in your classroom use laptops? If no, skip questions 2-3		YES ☐	NO ☐
2. IF SO, where does the laptop use occur?	In my classroom (class set) ☐	In my classroom(cart) ☐	In the Library (cart) ☐
3. How often do the students in your class use laptops?	Daily ☐	Weekly (at least once) ☐	Occasionally (2/3 times year) ☐

Please review the list of technologies below. Next to each tool, check the box that identifies the use of technology that applies to you. You may check more than one area.

	I do not have experience with or use this tool/skill	I use this tool/skill at home for personal use	I use this tool/skill at school for planning	I use this tool/skill with my students
Microsoft Windows Computer	☐	☐	☐	☐
Apple MacBook (laptop)	☐	☐	☐	☐
Office Programs Microsoft Word	☐	☐	☐	☐
Excel	☐	☐	☐	☐
Powerpoint	☐	☐	☐	☐
Webpage Software Dreamweaver / iWeb	☐	☐	☐	☐
Publishing Software Microsoft Publisher/ Pages	☐	☐	☐	☐
Presentation Software PowerPoint / Keynote	☐	☐	☐	☐
Media software Photostory Movie Maker/ iMovie	☐	☐	☐	☐
Educational software Inspiration/Kidspiration, Google Earth	☐	☐	☐	☐
Web Browsers Locating Credible Resources	☐	☐	☐	☐
Digital Media ie *UnitedStreaming*	☐	☐	☐	☐
Web 2.0 tools: blogs, wikis, podcasts	☐	☐	☐	☐
Tools & Devices iPod or MP3 Player, handheld	☐	☐	☐	☐
LCD Projector	☐	☐	☐	☐
SMART Board or CPS	☐	☐	☐	☐

_____ Yes, I will meet with you to help you to learn more about laptop use in our school.

_____ Sorry, I am unable to meet with you to help at this time.

Laptop Integration Scripted Solicitation and Consent

Thank you very much for completing the survey. I really appreciate you volunteering to meet with me today.

Within the survey, you indicated that you [do OR do not] use technology on a regular basis. Also you noted that you [did OR did not] use laptops during this past school year. Because I am interested in learning more about the potential for laptops in teaching and learning environments, I am interesting in finding out about how people feel about using and not using them and I need your help.

You can help me to better support our school district by participating in a one hour or less interview. You can also help by permitting me (or my assistant) to observe one of your classes in which the students will be using laptops.

It is important for you to know that your identity will only be known to me and to my assistant. Any information that you provide will only be noted as: "One educator stated", "One educator believed", "one educator demonstrated", etc. Because of the large number of participants, I have an assistant who is not connected to the Upper Merion Area School District / Kutztown Area School District. It is important for you to know that my assistant signed a confidentiality agreement and no information gathered by this individual will be shared with anyone but me.

Will you volunteer to meet me with for a less than one hour interview and for a less than thirty minute classroom demonstration?

Thank you for taking time from your already very full schedule to meet with me today. And thank you for considering further participation. I look forward to the opportunity to learn more from you and ultimately better support all educators and students in Upper Merion Area School District / Kutztown Area School District.

Laptop Integration Study Consent Form

Participant Information:

Name:_____

Grade/Content Area/Subjects Taught:

_____

Please check the box beside each statement to indicate agreement or understanding.	
	I give consent to be interviewed for one hour or less.
	I give consent to be observed demonstrating classroom use of laptops for 30 minutes or less.
	I understand that during this study, I will be tape recorded during the one-hour interview for reference purposes only.
	I understand that only the researcher and will have access to the recorded information and that the media files will be kept in a secure and locked location for the duration of one full year. After that time, all recordings will be destroyed.
	I understand that my identity will be known only to the researcher. Should any part of this research study be considered for future publication, no information that could identify me personally will be released.
	At any time, I may decline to respond to specific questions without penalty.
	I understand that during this study, I will not be exposed to any discomfort or risks.
	I am aware that my participation in this study is strictly voluntary. I understand that I may choose to cease participating in the study at any time by notifying the principal researcher.
	My withdrawal of participation from the study in no way affects my position or treatment at the Upper Merion or Kutztown Area School Districts.
	I have been and will be given opportunities to ask questions. All questions will be answered by the principal researcher. Direct any questions, concerns, or comments to Kristin Hokanson at 610.205.3893, or by email at khokanson@umasd.org

Signature: _____ Date: _____

For Clerical Purposes Only:
Participant Name: _____ Participant Number: _____

ONE-HOUR INTERVIEW
Classroom Use of Laptops Hour Interview (NON-USER)

Encourage participants to answer questions with as much detail as possible.
This conversation should be recorded for reference and will remain confidential.

1. One thing I like the most about having laptops for classroom use is…

_____

_____

2. One thing I like the least about having laptops for classroom use is…

_____

_____

3. If I could only do one thing with laptops in the classroom, it would be…

_____

_____

4. What is one thing you would never ask students to do with laptops?

_____

_____

5. If I could change one thing about having laptops in the classroom, it would be….

_____

_____

6. With the laptop cart in your classroom what do you love to be able to do with your students? Describe for me an example of a technology enhanced lesson.

_____

_____

_____

7. What are your feelings about using instant messaging, blogging, podcasting and other Web2.0 tools in the classroom for collaboration? Do you use these tools? Explain why or why not.

_____

_____

_____

8. What if starting tomorrow you were required to use laptops daily for instant messaging, blogging, podcasting and other Web2.0 tools in the classroom for collaboration. How would you feel and why?

_____

_____

_____

9. Were you trained in the use of the laptops? If so, by whom and in what format?

For Clerical Purposes Only:
Participant Name: _____ Participant Number: _____

ONE-HOUR INTERVIEW
Classroom Use of Laptops Hour Interview (NON-USER)

_____

_____

_____

10. What did you like the most about the training? Why? Please complete the following sentence: "If I could change 1 thing about my training it would be..."

_____

_____

_____

11. What are three things you think would be most beneficial to you as a user of laptops in the classroom. Which of these is most important?

_____

_____

_____

GIVE COPY OF ETAP SCALE

12. This copy was given to faculty members when laptops were distributed. Where do you currently see yourself on this scale? Can you predict how long it would take for you to move.

_____

_____

_____

13. What are 3 things you think would be most beneficial to you as a laptop user to help move you through the ETaP scale: professional development, mentoring, etc… Which is most important?

_____

_____

14. IN REGARD TO THE SCALE…What do you like most about it? What do you like least about it? How icould this scale be useful to you in designing technology enhanced lessons?

_____

_____

_____

15. Please complete the following sentence: "I feel the expectations that the administration has for me related to technology are..." Why do you feel this way?

_____

_____

THANK YOU FOR TAKING TIME TO MEET AND SHARE
YOUR ANSWERS TO THESE QUESTIONS!

For Clerical Purposes Only:
Participant Name: _____ Participant Number: _____

ONE-HOUR INTERVIEW
Classroom Use of Laptops Hour Interview (USER)

Encourage participants to answer questions with as much detail as possible.
This conversation should be recorded for reference and will remain confidential.

1. One thing I like the most about having laptops for classroom use is…

_____

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2. One thing I like the least about having laptops for classroom use is…

_____

_____

3. If I could only do one thing with laptops in the classroom, it would be…

_____

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4. What is one thing you would never ask students to do with laptops?

_____

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_____

8. What if starting tomorrow you were required to use laptops daily for instant messaging, blogging, podcasting and other Web2.0 tools in the classroom for collaboration. How would you feel and why?

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For Clerical Purposes Only:
Participant Name: _____ Participant Number: _____

ONE-HOUR INTERVIEW
Classroom Use of Laptops Hour Interview (USER)

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_____

THANK YOU FOR TAKING TIME TO MEET AND SHARE
YOUR ANSWERS TO THESE QUESTIONS!

For Clerical Purposes Only:
Participant Name: _____ Participant Number: _____

OBSERVATION CHECKLIST
Classroom Use of Laptops

Curriculum:

Amount of class time spent using textbooks or printed materials	_____
Amount of class time using technology for acquiring basic skills	_____
Amount of class time in which students are using computers to develop key concepts	_____
Amount of class time in which students are using computers to solve real-world problems	_____
% Class time spent teacher directed activities % Class time spent student collaborative work	

Teaching

Amount of class time spent doing whole group instruction / lecture	_____
Amount of class time note taking or taking tests / quizzes paper based	_____
Amount of class time in which students are use computers for note taking or taking tests / quizzes online	_____
Amount of class time in which students use computers to manipulate information or construct products demonstrating their understanding of key concepts.	_____

Information

Amount of class information comes from print resources and textbooks	_____
Amount of class information in which the library is used to gather information that is not in a textbook	_____
Amount of class material that comes from online research (teacher directed)	_____
Amount of class material that comes from student use of data bases and other search strategies to find online information	_____

Productivity

Amount of time student use completing assignments which are required to be handwritten on paper	_____
Amount of time student use completing using word processing or other software.	_____
Amount of time student use software to analyze and peer edit student work.	_____
Amount of time student spend publishing, evaluating and discussing work collaboratively online.	_____

Projector used for the following purposes

- ☐ Teacher presenting slide show created to deliver information
- ☐ Teacher demonstrating a concept using multimedia or simulation
- ☐ Teacher introducing an activity in which the students will be constructing or using multimedia / simulations
- ☐ Students use projector for presenting their own investigations / findings

For Clerical Purposes Only:
Participant Name: _____ Participant Number: _____