

Appendix A: Pre-study web-based Survey

INTEGRATION PATTERNS OF LEARNING TECHNOLOGIES

Technology and Teaching Style

Initial Survey

THANK YOU FOR TAKING TIME TO COMPLETE THIS SURVEY. PLEASE READ ALL INSTRUCTIONS CAREFULLY BEFORE ANSWERING EACH QUESTION.

DEMOGRAPHICS:

PLEASE ENTER YOUR PARTICIPANT'S ID NUMBER:

You started teaching (Enter year):

Enter GRADE LEVEL(s) you teach this semester:

Enter SUBJECT(s) you teach this semester:

Enter the average students number in your classroom:

Which of the following is available in your classroom? (Please check all that apply):

- Chalk board
- White board
- Interactive (smart) board
- TV monitors
- Projector
- Overhead projector
- VCR

- DVD player/recorder
- Desktop computers
- Laptop computers
- Handhelds
- Notebooks
- Tablet PCs
- Wireless connection

other:

From the list below, RANK ONLY THREE learning technologies which you most often use in your classroom (USE NUMBERS FORM 1 TO 3):

Chalk board

White board

Interactive (smart) board

Projector

Overhead projector

VCR

DVD player/recorder

Desktop computers

Laptop computers

Handhelds

Notebook computers

Tablet PCs

Other (RANK AND NAME BELOW):

TEACHING STYLE:

From the list below, RANK ONLY THREE activities which most often take place in your classroom (USE NUMBERS FORM 1 TO 3):

Group discussion

Individual projects

Small group projects/ activities (2-6 students)

Large group projects/ activities (more than 6 students)

Presentations

Modeling

Direct instruction

Free dialogue

Role playing

Computer lab work

Science lab work

Other (RANK AND NAME BELOW):

From the following list, please choose ONLY THREE statements which BEST DESCRIBE your role as a teacher in your current classroom:

- Provide support and balance with hypothetical discussions and free dialogue between students
- Assist students in discussing and evaluating their thinking strategies
- Instruct students in concept formation
- Nurture attention to logic and the nature of knowledge
- Nurture attention to language and meaning of words

- Teach students the process of investigating unusual phenomena
- Help students acquire subject matter
- Provide students with familiar materials to link with unfamiliar items to be learned
- Assessing students' developmental levels
- Adjust instruction to the learners' stage of development
- Provide learning experiences that give the student practice with particular operations
- Arrange for learning experiences that help students discover for themselves the logical connections between objects or events
- Encourage free expression of feeling
- Allow experimentation with common real-life problems
- Teach students how to reflect on significant teaching problems

other:

In the space available below, please further explain how you describe your role in the classroom; give examples and describe tools and methods you use.

Which of the following words best describes you as a teacher?

- Instructor
- Moderator
- Presenter
- Facilitator
- Advisor
- Co-learner
- Trainer
- Diagnostician
- Tutor
- other:

From the following list, please choose ONLY THREE statements which BEST DESCRIBE your personal beliefs in teaching:

- The teaching/learning experience should encourage students' interaction

- Teaching is the creation of environments in which students' cognitive structures can emerge and change
- Students must construct their own knowledge
- Lab work is of particular importance to induce students to investigate problems rather than just to illustrate text
- Through improving the concept of self, education can lead students towards greater mental and emotional health
- The central role of education is to prepare citizens to perpetuate a democratic social order
- An effective teaching model, is one which produces a group of persons trained to work with others and to function as problem solvers or product developers
- An effective teaching model should develop alternative patterns for students' personal and social development
- The group can serve as a learning medium
- The school must teach citizens to reflect on values and to participate with others in the reconstruction of society
- Students can study academic knowledge through negotiation

other:

Appendix B: Teachers' Interview Protocol

Thank you for taking the time to talk to me today. For the first part of this interview, I'd like to ask you during your class meeting to use this camera and capture every incident possible where you encounter a problem in the room. For me, the most critical ones are the ones which take place when you or your students are using one of the learning technologies available in the room. Please also record moments when the room layout is obstructing what the class is doing, or when you have concerns with it.

Afterwards, I'd like to discuss with you these pictures. Thank you.

1. Would you please tell me about each of the pictures which you have taken? What happened here? What do you think caused this? How did you try to solve the situation?

I'd like now to ask you a few questions about this room, what you and your students do in it, and these different technologies which you are using. I will also look in particular at performance problems which are caused by the design of the rooms if any exist.

2. Would you please give me a general idea about the course you teach in this room?
3. How do you spend the time with your students in this room? How can you describe the ways you interact with them? When applicable, can you tell me about different ways they work together without your assistance?

4. Do you have particular activities associated with this course, which you ask your students to do in this classroom? Can you think of other activities your students often do here for your course?
5. How much learning technologies are involved in these activities? What kinds? Can you describe to me how you use these technologies for your class activities?
6. Can you tell me about the layout/furniture arrangement of your classroom? During the activities which you have just described, would you tell me how you and your students work within this layout?
7. And what about rearranging this layout? Do you usually have to do that? When? Do you encounter any problems in doing so? What kind of problems? Do you ever have to do that to find more appropriate ways to use these technologies which we discussed earlier?
8. Let's discuss particularly lighting in the room. What do you have to tell me about that? Can you think of particular incidents when lighting really obstructed some work you or your students were doing during the class? How did you deal with that?
9. Earlier we discussed furniture rearrangements, do you think lighting or any other visual problems have to do with it? How?
10. Can you think of anything else in that regards which we haven't covered yet?

Before we end this conversation, I'd like to ask you to take a few minutes and ask you to draw for me how you think this classroom can be a better one for the way you teach this course and for the activities which your students do within the room. You have

all freedom to change all the furniture and to arrange it in a way you think of as most appropriate to you and your students. You are also encouraged to move, add or remove any opening in the room if you need this kind of change.

Appendix C: Post-study web-based survey

Integration Patterns of Learning Technologies: Follow-up Survey June 07

In this survey, we are trying to better understand your priorities when it comes to designing your learning environment. The categories listed below are primarily findings from your as well as other participants' input in previous stages of this study.

Under EACH category please choose the number of criteria indicated, and which represent YOUR HIGHEST PRIORITIES when it comes to designing your learning environment.

YOUR NAME:

FIRST-TECHNOLOGY INTEGRATION WITHIN THE LEARNING ENVIRONMENT

A. Accessibility, Communication and Mobility

* CHOOSE ONLY FOUR

- Restrict access to some technologies for safety and performance issues (tripping, image alignment, ...etc.)
- Choose learning technologies which enable future retrieval of information and data
- Enable easy and comfortable physical access to learning technologies
- Enable proper and comfortable visual access to learning technologies
- Provide outlets for electricity and other services
- Enable me to access learning technologies remotely (for example: from the other side of the room)
- Enable me to communicate with my students through remote devices (for example: handhelds)
- Provide remote and wireless enabled technologies

B. Controllability

* CHOOSE ONLY TWO

- Enable control of lighting conditions in the space for better visual performance when technologies are in use

- Provide multiple lighting zones in the space for better visual performance when technologies are in use
- Enable me to control learning technologies remotely (for example: from the other side of the room)
- Enable monitoring of students' computers

C. Position and Location of Learning Technologies

*** CHOOSE ONLY FOUR**

- Provide enough area for the learning wall (adjacent boards or multi-layered boards)
- Mount technologies at proper height and distance relative to the room layout
- Mount learning technologies at multiple corners of the room for students' convenience
- Define one specific room front
- Provide multiple room fronts
- Provide specific focus point(s) in the room
- Designate space and locations for learning technologies in the room design

D. Modes of Use

*** CHOOSE ONLY FOUR**

- Provide learning technologies which I am used to and comfortable using
- Provide only learning technologies which I use most frequently in my teaching-learning activities
- Provide learning technologies which I find easy to use
- Provide learning technologies which can function for multiple purposes
- Design for high student to computer ratio
- Enable monitoring of students' computer screens
- Provide technologies which can function with different group sizes
- Provide technologies for permanent display

SECOND-DESIGN OF THE LEARNING ENVIRONMENT

A. Space Layout and Orientation

* CHOOSE ONLY FOUR

- Define one specific room front
- Define multiple room fronts
- Proper orientation of windows and doors relative to technologies and occupants in the room
- Utilize room perimeter with furniture supporting learning activities (for example: lab benches)
- Room size designed with respect to activities, circulation and number of people in the space
- The learning environment connects to adjacent support spaces (for example: faculty rooms, project rooms,...)
- The learning environment connects to the outdoors
- Define separate activity zones within the space
- Provide enough circulation area for activity flow in the space
- Design for support spaces for my learning environment (faculty room, project rooms, ...etc.)
- Design for a multi-use learning environment
- Define entry and exit point which do not interrupt the teaching-learning activities

B. Controllability of Space Conditions

* CHOOSE ONLY FOUR

- Control access to some technologies for safety and performance issues(tripping, image alignment, ...etc.)
- Provide control over lighting conditions in the room (for example: dimming)
- Design for separate lighting zones within the space
- Design for controlled natural lighting penetration in the room
- Design for a proper layout for access to electricity outlets and other services in the space
- Provide task or board illumination
- Design for a controlled atmosphere for the learning environment (thermal, acoustical, ...etc.)

C. Response to Activity Patterns

* CHOOSE ONLY TWO

- Provide easy access to my students at their locations
- Design for privacy in support spaces (for example: faculty room, project rooms)
- Design for a learning environment which supports group work
- Enable students' communication within the space

D. Systems and Occupants of the Space

* CHOOSE ONLY FOUR

- Choose furniture which best accommodate my teaching-learning activities
- Design room proportions and layout according to room occupancy and crowdedness
- Design for proper locations for mounting and installing learning technologies
- Design for enough work-top area
- Design for enough learning wall area (adjacent or multi-layered)
- Provide proper visual access to other occupants and technologies
- Arrange furniture in support to my teaching-learning activities
- Design the learning environment to support the learning technologies in use

Appendix D: IRB Protocol, Participants' Consent Form and Approval Forms

Outline for Protocol to Accompany IRB Request

Investigator: Sarah Khalil Elmasry

Advisor: Prof. James Jones

Title: Integration Patterns of Learning Technologies

Justification of Project

Students today expect to utilize progressive technologies in their learning experiences; teachers are also becoming increasingly aware of the important role these technologies play in supporting their work. Accordingly, the classroom space is expected to host these technologies efficiently while accommodating a variety of teaching modes and learning styles.

More challenging questions still remain; how efficiently do these technologies integrate with other systems in the classroom space? What should architects and facility planners consider for a successful systems' integration which incorporates learning technologies in the design of the classroom space? This study attempts to answer these questions by developing a pattern language to support the early design phases of a technology-rich learning environment.

Through the proposed study, the researcher attempts to capture problems and challenges related to occupants' visual performance within the classroom space when learning technologies are in use. The variation of teaching-learning modes is taken into consideration. The outcome of this research is a set of integration patterns of learning technologies with the envelope and the interior systems as they pertain to occupants' visual performance. The findings are translated into the design language in the form of a pattern language at the building systems scale. The proposed pattern language aims at increasing the potential of consciously integrating learning technologies with other physical systems in the space.

The researcher will identify and interview a sample of teachers who are currently practicing in Governor's schools which are hosted in their own facilities, as well as a number of science and technology schools. Participating schools fall within a 300 miles radius from the Virginia Tech campus. This sample will represent a diverse population. The results will be presented through a discussion of emergent themes and patterns, which will be translated into the design language in the form of patterns for integrating learning technologies with the envelope and interior systems within the classroom space.

Procedures

The proposed research is qualitative in nature, and is based on interviews with teachers currently practicing in science, mathematics and technology classrooms in schools falling within 300 miles radius from the Virginia Tech campus. This sample will be selected from Governor's Schools which are hosted in their own facilities, as well as science and technology schools falling within that radius.

The choice of these schools is based on their practice of a variation of progressive teaching models as well as the utilization of advanced learning technologies in the teaching/learning process. The researcher will be responsible for submitting approval from each individual school to Virginia Tech IRB once approvals are issued.

During 2005, the researcher will contact and interview a sample of teachers who are willing to participate in the study; this sample will represent a diverse population. The sample size will range between 12-20 teachers in 3-8 schools, depending on the number of classrooms designated for science and technology studies in each school and number of teachers who are willing to participate in the study.

Initially, participants (teachers) will be required to complete a web-based survey accessible only by their designated ID numbers. The survey aims at collecting demographic information about participants and their classroom spaces, and gaining an understanding of their teaching style.

The researcher will conduct one face-to-face interview with each participant, each interview will range between 30-40 minutes and will be audio-tape recorded, and the tapes will be considered a primary data source. The interviews consist of three parts:

1. Teachers will be asked to photograph incidents when they or their students encounter visual problems when learning technologies are in use. Images of the classroom space are of particular interest, rather than occupants of the space. They will also be asked to reflect on these images during the interview.
2. A face-to-face, open-ended interview with the researcher.
3. Teachers will be asked to graphically illustrate their thoughts about their classroom space as they pertain to the research questions on plain index cards.

The interviews will take place in the classrooms at the facilities chosen for the study and in an environment that is agreed upon and comfortable to both participant and researcher, and is guaranteed to protect the participant's privacy.

The interview questions will be semi-structured, and designed in advance by the researcher, and approved by the research committee chair. Each interview will be audio tape-recorded, and transcribed by the researcher.

By the end of the academic year, participants may be required to fill a follow-up web-based survey designed and based upon their input in the initial survey and the interview. Transcripts of interviews and survey entries will be coded to identify emerging themes and patterns, analyzed and presented.

Risks and Benefits

Participants will be asked to describe and discuss previous events that took place during their teaching experiences. These events might involve interactions with other human subjects or the utilization of learning technologies or the facility where they are working. This could possibly cause feelings of discomfort if an unpleasant experience is being described. The researcher promises to take all possible measures to eliminate this minimal risk during the course of the study. Participants will have full freedom to stop the interview or withdraw from the study at any point. Each participant will have full access to his/her case of the study and the opportunity to preview the final research output as well as providing feedback to the researcher at any point during the course of the study.

Participants in this study will benefit from the opportunity of reflecting upon their teaching experiences, they will possibly judge the proper utilization of learning technologies at hand in relationship with the pedagogical approaches they are adopting. Putting their ideas in drawing might allow the opportunity that they enhance their learning environment in the future.

On the other hand, by identifying problems in the current practice, findings of this study will lead to better decisions regarding the design of the classroom space and the integration of learning technologies in the classroom's physical environment. It is expected that this will increase both teachers' and students' performance academically as well as socially.

The following benefits will also be offered to participants:

- 1- Each participating school will be provided with a printed summary of findings of the study.
- 2- A web-cast will be developed, to which participants will be invited to join at the end of the research process. This web-cast is potentially a valuable opportunity for exchanging information and expertise among participating teachers.
- 3- Finally, participants will acquire a certificate from Virginia Tech's Center of High Performance Learning Environments (CHPLE) indicating their full participation in the study and the web-cast. Potentially, this certification will count towards their continuing education, and professional development.

Confidentiality/Anonymity

All information collected from all participants will be confidential. All interviews will be audio tape-recorded, and the tapes will be considered a primary data source. The researcher will be responsible for recording one interview with each participant and transcribing the interview. Pseudonyms will be used to protect the participants' identity.

It is possible that the researcher might request feedback from participants during later phases of the study in the form of a follow-up web-based survey if necessary. Both the initial and follow-up surveys will be administered using individual participant's ID

numbers. Access restrictions will be applied to the surveys to assure participants confidentiality.

Tapes and transcripts of interviews, survey data, photographs and drawings collected from participants, as well as the researcher's journal entries will be stored in secure locations by the researcher. These materials will only be accessible to the researcher and other doctoral committee members upon request. Tapes and transcripts will be destroyed when research involving these items is deemed complete by the researcher and the doctoral program. Graphical illustrations and photographs of classrooms created by participants and interpretations made by the researcher will be directly presented and analyzed in the doctoral dissertation and might be presented as well in conference presentations and technical papers.

If occupants of the investigated classroom spaces are accidentally captured in any of the photographs, these captures will be treated graphically (blurring for example) to assure that their faces or any other significant physical features are not recognized.

The researcher will take all measures to guarantee that this study will not, in any case, affect the participant's current job or position.

VIRGINIA POLYTECHNIC AND STATE UNIVERSITY

Informed Consent for Participants

In Research Projects Involving Human Subjects

Title of Project: Integration Patterns of Learning Technologies

Investigator: Sarah Khalil Elmasry

Advisor: Prof. James Jones

I. Purpose of this Research

The purpose of this study is to provide decision makers in school facilities with architectural patterns that support their decision along the process of integrating educational technology in the classroom space. The researcher will interview a sample of teachers using face-to-face interviews at their classrooms to investigate their experience in utilizing educational technology, and how the classroom space supports, or not, these experiences. This sample will represent a diverse population.

The study specifically questions visual performance of occupants of the classroom space. Findings of this study will possibly lead to better decisions regarding the design of the classroom space, integrating educational technology in the physical environment, as well as avoiding any existing problems related to the physical environment. The IRB Protocol will be followed during the course of the study.

II. Procedures

Participants will be asked to complete an initial web-based survey using their designated ID numbers. The researcher will then conduct one face-to-face interview with each participant. Each interview will range between 30-40 minutes. During the interview, teachers will be asked to do the following:

1. To photograph incidents when they or their students encounter visual problems while learning technologies are in use. They will also be asked to reflect on these images during the interview.
2. To participate in one face-to-face, open-ended interview with the researcher.

3.To graphically illustrate their classroom space as they pertain to the research questions.

The researcher will be providing clear instructions on each during the interview. The interviews will take place in the classrooms at the facilities chosen for the study, and in an environment that is agreed upon and comfortable to both participant and researcher, and is guaranteed to protect the participant's privacy. Each interview will be audio tape-recorded, and transcribed by the researcher. Transcripts of interviews will be coded to identify emerging themes.

Further feedback might be required from participants as the research develops in the form of a follow-up web-based survey. All information collected from all participants will be confidential.

III. Risks

Participants will be asked to describe and discuss previous events that took place during their teaching experiences. These events might involve interactions with other human subjects or the utilization of different learning technologies or the facility where they are working. This could possibly cause feelings of discomfort if an unpleasant experience is being described. The researcher promises to take all possible measures to eliminate this minimal risk during the course of the study, and to guarantee that this study will not, in any way, affect the participant's current job or position.

Participants will have full freedom to stop the interview or withdraw from the study at any point. Each participant will have full access to his/her case of the study as well as the opportunity to preview the final research output and provide feedback to the researcher during the course of the study.

IV. Benefits

Participants in this study will benefit from the opportunity of reflecting upon their teaching experiences, they will possibly judge the proper utilization of learning technologies at hand in relationship with the pedagogical approaches they are adopting. Findings of this study will lead to better decisions regarding the design of the classroom space, integrating learning technologies in the physical environment, as well as avoiding

any existing problems related to the physical environment. It is expected that this will increase both teachers' and students' performance academically as well as socially in the contexts of the institution and the society.

The researcher does not offer any guarantee for these benefits.

V. Confidentiality and Anonymity

All information collected from all participants will be confidential. Tapes and transcripts of interviews, survey data, photographs and drawings collected from participants, as well as the researcher's journal entries will be stored in secure locations by the researcher.

These materials will only be accessible to the researcher and the doctoral committee members upon request.

All interviews will be audio tape-recorded as a primary data source, and pseudonyms will be used to protect the participants' identity. Tapes and transcripts will be destroyed when research involving these items is deemed complete by the researcher and the doctoral program. Also, both the initial and follow-up surveys will be administered using individual participant's ID numbers, and access restrictions will be applied to the surveys to assure participants confidentiality.

If the participant presents his/her ideas in drawing, these materials will be directly presented and analyzed in the doctoral dissertation and might be presented as well in conference presentations and technical papers. If occupants of the investigated classroom spaces are accidentally captured in any of the photographs, these captures will be treated graphically in order to hide any significant physical features of these individuals and to assure their confidentiality of these.

VI. Compensation

The following will be offered to participants:

- 1- Each participating school will be provided with a printed summary of findings of the study.
- 2- A web-cast will be developed, to which participants will be invited to join at the end of the research process, given that they have access to the required technologies (e.g. high speed internet connection). This web-cast is potentially a

valuable opportunity for exchanging information and expertise among participating teachers.

- 3- Finally, participants will acquire a certificate from Virginia Tech's Center of High Performance Learning Environments (CHPLE) indicating their full participation in the study and the web-cast. Potentially, this certification will count towards their continuing education, and professional development, which the center will not be responsible to seek.

VII. Freedom to Withdraw

Participants will have full freedom to stop the interview or withdraw from the study at any point without penalty. Participants can choose not to answer any of the interview questions.

There may be situations where the investigator may determine that a participant should not continue to be involved in the study.

VIII. Approval of Research

This research project has been approved, as required, by the Institutional Review Board for Research Involving Human Subjects at Virginia Polytechnic and State University.

IRB Approval Date:

IRB Approval Expiration Date:

IX. Subject's Responsibilities

I voluntarily agree to participate in this study. I have the following responsibilities:

1. To complete an initial web-based survey upon accepting to participate in the study.
2. To participate in one-to-one interview ranging between 30-40 minutes at my classroom.
3. To provide the researcher with photographs and graphical illustrations of my classroom.

Institutional Review Board

Dr. David M. Moore
IRB (Human Subjects) Chair
Assistant Vice President for Research Compliance
CVM Phase II- Duckpond Dr., Blacksburg, VA 24061-0442
Office: 540/231-4991; FAX: 540/231-6033
email: moored@vt.edu

DATE: April 14, 2005

MEMORANDUM

TO: James R. Jones Architecture 0205
Sarah Elmasry

FROM: David Moore 

SUBJECT: **IRB Expedited Approval: "Integration Patterns of Learning Technologies"**
IRB # 05-295

This memo is regarding the above-mentioned protocol. The proposed research is eligible for expedited review according to the specifications authorized by 45 CFR 46.110 and 21 CFR 56.110. As Chair of the Virginia Tech Institutional Review Board, I have granted approval to the study for a period of 12 months, effective April 14, 2005.

Virginia Tech has an approved Federal Wide Assurance (FWA00000572, exp. 7/20/07) on file with OHRP, and its IRB Registration Number is IRB00000667.

cc: File

Department Reviewer: Robert P. Schubert

Institutional Review Board

Dr. David M. Moore
IRB (Human Subjects) Chair
Assistant Vice President for Research Compliance
1880 Pratt Drive, Suite 2006(0497), Blacksburg, VA 24061
Office: 540/231-4991; FAX: 540/231-0959
email: moored@vt.edu

DATE: September 9, 2005

MEMORANDUM

TO: James R. Jones Architecture 0205
Sarah Elmasry

FROM: David Moore 

SUBJECT: **IRB Amendment Approval: "Integration Patterns of Learning Technologies"**
IRB # 05-295

This memo is regarding the above referenced protocol which was previously granted approval by the IRB on April 14, 2005. You subsequently requested permission to amend your approved protocol to include the addition of the listed changes. Since the requested amendment is nonsubstantive in nature, I, as Chair of the Virginia Tech Institutional Review Board, have granted approval for requested protocol amendment, effective as of September 9, 2005. The anniversary date will remain the same as the original approval date.

Virginia Tech has an approved Federal Wide Assurance (FWA00000572, exp. 7/20/07) on file with OHRP, and its IRB Registration Number is IRB00000667.

cc: File

Department Reviewer: Robert P. Schubert

DATE: February 22, 2006

MEMORANDUM

TO: James R. Jones
Sarah Elmasry

FROM: David Moore 

Approval date: 4/14/2006
Continuing Review Due Date: 3/30/2007
Expiration Date: 4/13/2007

SUBJECT: **IRB Expedited Continuation** : "Integration Patterns of Learning Technology", IRB # 05-295-06

This memo is regarding the above referenced protocol which was previously granted expedited approval by the IRB on April 14, 2005. The proposed research is eligible for expedited review according to the specifications authorized by 45 CFR 46.110 and 21 CFR 56.110. Pursuant to your request, as Chair of the Virginia Tech Institutional Review Board, I have granted approval for extension of the study for a period of 12 months, effective as of April 14, 2006.

Approval of your research by the IRB provides the appropriate review as required by federal and state laws regarding human subject research. As an investigator of human subjects, your responsibilities include the following:

1. Report promptly proposed changes in previously approved human subject research activities to the IRB, including changes to your study forms, procedures and investigators, regardless of how minor. The proposed changes must not be initiated without IRB review and approval, except where necessary to eliminate apparent immediate hazards to the subjects.
2. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.
3. Report promptly to the IRB of the study's closing (i.e., data collecting and data analysis complete at Virginia Tech). If the study is to continue past the expiration date (listed above), investigators must submit a request for continuing review prior to the continuing review due date (listed above). It is the researcher's responsibility to obtain re-approval from the IRB before the study's expiration date.
4. If re-approval is not obtained (unless the study has been reported to the IRB as closed) prior to the expiration date, all activities involving human subjects and data analysis must cease immediately, except where necessary to eliminate apparent immediate hazards to the subjects.

cc: File

Department Reviewer: Robert P. Schubert

Invent the Future

Appendix E: Code Mapping for Patterns of the Physical Space

Second Iteration of Coding (Emerging Themes)		
A. Space layout and orientation B. Controlled space conditions C. Response to activity patterns D. Systems and occupants within the space		
First Iteration of Coding (Open Coding)		
The Direct Model	The Direct-to-Social Model	The Social Model
	Access restriction for safety and maintenance	
	Controlled lighting	
	Light zones	
	Utilized room perimeter	
	Furniture accommodating activities	
	Room size and availability of space	
	Location of learning technologies	
	Storage space	
	Connection to the outdoors and adjacent spaces	
	Separate activity zones	
	Access to power and service portals	
	Orientation of openings	
	Access to students	
	Room occupancy/crowdedness	
	Natural lighting	
	Flow of circulation and circulation area	
	Support spaces	
	Task/board illumination	
	Area of learning wall	
	Support of group work	
	Entry and exit points	
	Multiuse space	
	Visual access	
	multiple room fronts	
Privacy		
Work-top area		
Single room front		Single room front
		Furniture arrangement
		Controlled atmosphere
		Students communication
		Type of technologies within the space

Appendix F: Participant-by-Pedagogy Data Matrix

Data Sources:	W= Web-based Survey ,	I= Interview,	N= Image Narration,	G=Graphic Illustration,
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Category	Participant-by-pedagogy	Data
Teacher (1)- Computer Programming		
Course Specifics	Lab work is of particular importance to induce students to investigate problems.	W
Teaching-Learning Activities	1.Small group activities (2-6 students), 2.Presentations, 3.Computer lab work	W
	<i>“Every class I use as much as I can of the projector, especially if I’ll be the catalyst of the learning activity...otherwise they are at the computer stations doing the topic of the day.”</i>	I
Pedagogical Approach	Teacher as a <i>facilitator</i>	W
	<i>“..., differentiating the curriculum for all learners.”</i>	W
	Nurture students to concept formation	W
	Nurture attention to logic	W
	Arrange for learning experiences that help students discover for themselves logical connections.	W
	The teaching learning experience should encourage students’ interaction	W
	An effective teaching model should develop alternative patterns for students’ personal and social development.	W
	<i>“I wanted to show the mentality of the work force when they leave us and start working for a company... they’re going to know that they work as part of the group...”</i>	I
<i>“I don’t like calling them learning groups, I call them flexible grouping where students have the choice who will be in that group, and its never a group that stays together for the full year,... and they get to see different personalities and different group dynamics.”</i>	I	

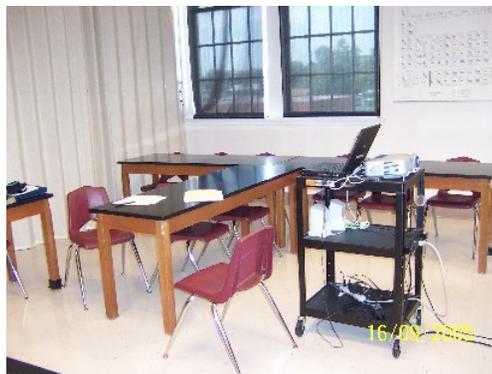
Teacher (2)- Mathematics		
Teaching-Learning Activities	1. Direct instruction, 2. Group discussion, 3. Individual projects	W
	<i>“Generally with new material, what I tend to do is presenting notes, working through some practice problems, working a problem or two for them, and model that on the board, usually getting one of the students working it step by step through.”</i>	I
	<i>“I don’t do group work as much I should... what I basically do is individual work and me teaching... I get my teaching style tends a little bit more towards lecture style.”</i>	I
	<i>“Generally with new material, what I tend to do is presenting notes, working through some practice problems, working a problem or two for them, and model that on the board, usually getting one of the students working it step by step through.”</i>	I
	<i>“At the very beginning of class, during the warm up exercise time they can talk to each other if they need help or something, at the end of class they got few minutes reinforcing what we’ve done starting with the homework if they didn’t get it done in class, during that time the students are talking to each other to see if they are on the same page.”</i>	I
Pedagogical Approach	Teacher as an <i>instructor</i>	W
	Nurture attention to logic	W
	help students acquire subject matter	W
	provide learning experiences that give the student practice with particular operations	W
	Students must construct their own knowledge	W
	An effective teaching model is one which produces a group of persons trained to work with others.	W
The group can serve as a learning medium	W	

Teacher (3)- Anatomy/Microbiology		
Teaching-Learning Activities	<i>“I do group work, they can change seats... most of the times they do group work back there [the lab area].”</i>	I

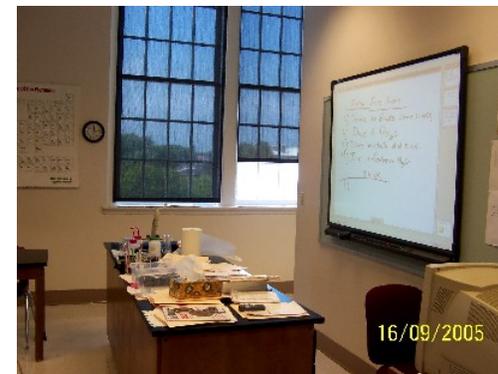
Teacher (4)- Chemistry		
Course Specifics	lab work is of particular importance to induce students to investigate problems	W
Teaching-Learning Activities	1. Science lab work, 2. Direct instruction, 3. group discussion	W
	<i>"I use the [lecture area] normally everyday."</i>	I
	<i>"Students work in groups... the [lab] tables come up and down. The tables can be lower."</i>	N4-1P
	<i>"This is the lecture discussion area we use demonstrations here and we also use the smart board. ... We demo using the fume hood."</i>	N4-2P
Pedagogical Approach	Teacher as a facilitator	W
	<i>"... by helping the individual student perceive concepts by actually experiencing them."</i>	W
	provides support and balance between hypothetical discussions and free dialogue between students	W
	Assists students in discussing and evaluating their thinking strategies	W
	Instructs students in concept formation	W
	Teaching is the creation of environments in which students' cognitive structures can emerge and change	W
	Through improving the concept of self, education can lead students towards greater mental and emotional health.	W



N4-1P



N4-2P



Teacher (5)- Mathematics		
Teaching-Learning Activities	1.Direct instruction, 2.small group activities (2-6 students), 3.computer lab work	W
	<i>"Primarily, I lecture, I think that's what they're used to, there is kind of resistance to change. I do try to do some group activities, so they move the desks together and work together in small group work. Occasionally I given them some lab work to do with MATLAB and so they go to these computers or there are computers in another room that they go to, and complete their work either in pairs or individually."</i>	I
	<i>"I do some group activities, put them [students] together, and move the desks and so on."</i>	N5-1P
Pedagogical Approach	Teacher as a facilitator	W
	Nurture attention to logic	W
	provide students with familiar materials to link with unfamiliar items	W
	Provide learning experiences that give students practice with particular operations	W
	Students must construct their own knowledge.	W
	An effective teaching model is one which produces a group of persons trained to work with others.	W



N5-1P

Teacher (7)- Anatomy/Psychology		
Course Specifics	lab work is of particular importance to induce students to investigate problems	W
	<i>"I teach anatomy and psychology, which can be very dry when you memorize them, that's one of the reasons why do different things with the Elmo and computer work, so they don't have to listen to me all the time."</i>	I
Teaching-Learning Activities	1. Group discussion and small group activities (2-6 students), 2. Computer and science lab work, 3. modeling	W
	<i>"Extra activities involved hypothesis testing, group data collections, graphing analysis and conclusions drawn from the lab."</i>	W
	<i>"And like with the Elmo if they are dissecting a small organ ...I dissect with the Elmo which projects over there [pointing to a screen] and they dissect on their desk at the same time, and that's lots of visuals that is going on at the same time to keep them going and keep their mind active for the time I have them."</i>	I
Pedagogical Approach	teacher as a facilitator	W
	provides support and balance with hypothetical discussions and free dialogue between students	W
	instruct students to concept formation	W
	nurture attention to language and meanings of words	W
	provide students with familiar materials to link with unfamiliar items	W
	Allow experimentation with common real-life problems	W
	the teaching/learning experience should encourage students' interaction	W
	An effective teaching model is one which produces a group of persons trained to work with others.	W
<i>"I am real active, I never sit, and I do that for several reasons; so I can keep eye contact with the students, so the students will pay attention."</i>	I	

Teacher (8)- Mathematics		
Course Specifics	lab work is of particular importance to induce students to investigate problems	W
Teaching-Learning Activities	1. Direct instruction , 2. Small group activities (2-6 students), 3. large group activities (more than 6 students)	W
Pedagogical Approach	Teacher as a presenter	W
	helps students acquire subject matter	W
	adjusts instruction to the learners' stage of development	W
	provides learning experiences that give the student practice with particular operations	W
	The teaching/learning experience should encourage students' interaction.	W
	<i>"... one of my goals is to help them enhance their logic and thinking skills."</i>	W
	Teaching is the creation of environments in which students' cognitive structures can emerge and change	W
<i>"If they are working individually I am walking around the room checking on them. Sometimes they are working in groups. They do group work to solve problems as well".</i>	I	

Teacher (9)- Mathematics		
Course Specifics	<i>"In the statistics that I teach, it is very calculator-based in terms of you have to be very efficient using the calculator... that's why I use this TV screen a lot to show them stuff on how to use that".</i>	I
Teaching-Learning Activities	1. Direct instruction, 2. Small group activities (2-6 students), 3. Group discussion	W
	<i>"I try to have discussions about ideas that might affect the outcomes of experiments/studies being done in Statistics."</i>	W
Teacher-Student Interactions	Teacher as an <i>instructor</i> .	W
	Instructs students in concept formation.	W
	Helps students acquire subject matter.	W
	Arranges for learning experiences that help students discover for themselves the logical connections between objects and events.	W
	Teaching is the creation of environments in which students' cognitive structures can emerge and change	W
	The teaching/learning experience should encourage students' interaction.	W
	The group can serve as a learning medium.	W
	<i>"Obviously, there is lecture in most of the classes. Today we had a lab, and they were doing things at their table together in groups... and the desks we could put together like in fours, so we have one big table in the middle. So we do this type of thing".</i>	I
	<i>"We're kind of very between a lecture mode and activity; where we're more collecting data and learning how to analyze the data and doing lab type of things".</i>	I
	<i>"I provide direct instruction, as well as facilitating the learning of concepts through activities/labs that help them discover ideas through hands on experiences which usually done in small groups."</i>	W
<i>"Definitely when it comes to their science fare time I am talking to them individually. In a regular class, by the virtual time, I have to do more group [work] than I like. I think the more hands-on they can get working in small groups, the more they remember, so I try to set up small group work as much as I can".</i>	I	

Teacher (10)- Aviation and Aerospace		
Course Specifics	lab work is of particular importance to induce students to investigate problems	W
Teaching-Learning Activities	1.Direct instruction, 2. Small group activities (2-6 students), 3. Role playing	W
	<i>“Generally, we would do class work where we present some idea which we want them to get the concept of. Whether it is hands-on or whether it is academic, kind of depends on how we approach it but will get the idea across one way or another... and thus having videos and DVDs here... it is very very interactive, up and down all the time. ... we might send them on a web site to do a web quest or pretty soon we will start flight simulators, and that’s going to be a big deal when we start going over principles of what controls an airplane. We generally at the end of time can bring them back together again. Often times the one thing that we have that kind of takes up a little bit of time, we would read an article or something that pertains to whatever we’re doing.”</i>	I
	<i>“Sometimes we can do the modeling ourselves and that works perfectly fine, sometimes we let them find out for themselves.”</i>	I
	<i>“Problem-based learning would call these things ill defined things. Their learning is not giving to the end but their learning is journey along the way. And sometimes that works really well, and that’s really rich learning for the kids.”</i>	I
	<i>“We generally start every class over here in the instruction area, where we have a math review question which we go over with every class...this is not intended to be instructional time, but it is intended to be review time.”</i>	I
	<i>“we might send them on a web site to do a web quest or pretty soon we will start flight simulators, and that’s going to be a big deal when we start going over principles of what controls an airplane... We generally at the end of time can bring them back together again. Often times the one thing that we have that kind of takes up a little bit of time, we would read an article or something that pertains to whatever we’re doing.”</i>	I
Pedagogical Approach	Teacher as a facilitator :	W
	Helps students acquire subject matter	W
	Provides students with familiar materials to link with unfamiliar items	W
	Provides learning experiences that give the student practice with particular operations	W
	An effective teaching model should develop alternative patterns for students’ personal and social development	W
	An effective teaching model is one which produces a group of persons trained to work with others.	W

Teacher (11)- Aviation and Aerospace (Note: Shared classroom with Teacher 10)		
Course Specifics	lab work is of particular importance to induce students to investigate problems	W
	<i>"we're doing sky divers so they watch the video and find out the science of the whole thing; Newton's laws that apply. Then we actually cut out little paper sky divers and make them do what the people in the video do."</i>	I
Teaching-Learning Activities	1. Small group activities (2-6 students), 2. modeling, 3. computer lab work	W
	<i>"We give them the basic information. And then we always try to demonstrate or model something. They are usually making a cutting or making something towards the final goal of understanding the lesson.... So, we gradually...we give them information and then gradually work toward application..... So by the end of the period, they've written down their notes, they understand the vocabulary involved, and then they take something and then they make it happen."</i>	I
	<i>"some activities lean towards group work, team work. We start out the beginning of the year with an awful lot of teamwork, um. And then some of it's individual. Probably more team than anything. We'll model something and then we'll let them build on it. And sometimes we'll give them basic information and let them figure it out from there. It varies. I don't like to stand up and lecture because we want them to be physically involved with a project."</i>	I
	<i>"So by the end of the period, they've written down their notes, they understand the vocabulary involved, and then they take something and then they make it happen".</i>	I
Pedagogical Approach	Teacher as a <u>facilitator</u>	W
	Nurtures attention to logic and the nature of knowledge	W
	Provides students with familiar materials to link with unfamiliar items	W
	Arranges for learning experiences that help students discover for themselves the logical connections between objects or events	W
	through improving the concept of self, education can lead students towards greater mental and emotional health	W
	An effective teaching model is one which produces a group of persons trained to work with others.	W

Teacher (12)- Health and Human Services		
Course Specifics	<i>"I talk about human services, but on top of that I also talk about fitness and nutrition and the parts of a healthy lifestyle including stress and stress management and that's where the eating comes in."</i>	I
Teaching-Learning Activities	1. Small group activities (2-6 students), 2..Presentations, 3. Group discussion	W
	<i>"If you come into my classroom you would rarely see any direct instruction. The more input students are allowed on a project, the more investing they become."</i>	W
	<i>"A lot of my projects are individual or small group. Meaning usually groups of two or three, no larger than that. In that case I direct groups that if they need help or they're stuck."</i>	I
	<i>"So I use a lot of that, a lot of computer, Internet, every single day pretty much, basically for research purposes. If they want to know something I tell them to go find it. Because that's what it's coming to now, you know, and if they don't know how to search then they are not going to be able to do anything."</i>	I
	<i>"Basically the students will come in and we greet each other and they know that they're to sit at the table where they're all facing one another. I have assigned seats. I do this purposely so that students who wouldn't normally interact with each other have the opportunity and sometimes I kind of push a little bit for that to happen".</i>	I
	<i>"If I've got extra time I try to get them outside and moving because a lot of students don't do that otherwise.... So part of, I feel like my job is, in this class to make sure they at least do enough to keep themselves healthy."</i>	I

Teacher (12)- Health and Human Services		
	<p><i>"Even when one group is cooking we'll all start here [the middle of the classroom], talk about what we're going to be doing, what's everybody going to be doing today, how's everybody. We do our warm-up our math warm-up problem and then, the one group leaves and the other group gets instructions on what they're going to be doing and I send them off."</i></p>	N12-1P
	<p><i>"most of them have to find out about that and they learn to use the technology to make one of those [pamphlets/brochures]. That's generally how I teach them just about everything, except for CPR and first aid which I...is more direction instruction and we use a video and note taking and they have to stop and do actual physical skills. That's the only time that my instruction varies a little bit because I have to."</i></p>	I
Pedagogical Approach	Teacher as a facilitator	W
	Provides support and balance with hypothetical discussions.	W
	helps students acquire subject matter	W
	Allows experimentation with common real-life problems	W
	Through improving the concept of self, education can lead students towards greater mental and emotional health.	W
	The teaching/learning experience should encourage students' interaction.	W
	<i>"... I see myself as a springboard for ideas, projects, discussion, research endeavors, etc...but the work and finished product is 'student-driven'."</i>	W
	<i>"I like to just be rotating and send them on."</i>	I
	<i>"I enjoy kind of, what I call a family setting...it kind of...everyone kind of works with one another and they all know that, um, that although we're all individuals working on things we all have something in common that we need to make happen as a class."</i>	I
 <p>N12-1P</p>		

Teacher (13)- Sciences		
Course Specifics	Lab work is of particular importance to induce students to investigate problems.	W
Teaching-Learning Activities	1. Small group activities (2-6 students), 2. Computer lab work, 3. Modeling	W
	<i>“Students in my class learn to propagate plants. This helps them develop another connection to the natural world. If they are connected to the real world, they are more likely to protect it.”</i>	W
	<i>“We do nature sketches outside. We often times have the kids sitting around and drawing things for looking at observation skills. When we are potting plants, students can often choose to work inside the greenhouse or outside the greenhouse, so we offer that openness.”</i>	I
	<i>“[most of the work is done] outside. We’re always doing environmental surveys.... In our original design of the concept was that we would have the students all day and we would be involved in long term projects. For instance we went and we planted trees along the river banks to control erosion”.</i>	I
	<i>“We do a habitat study. They select a site on the hill and try to identify the plants and animals that live there and talk about what they would do to improve it. But those are the main goals of our program and but what we’re trying to teach them is stewardship. We feel like the more they connect with these different things the more they are going to want to protect them”.</i>	I
	<i>“It kind of varies [the daily classroom activities]... Like I said we usually start out over here in a whole group type of setting.... So we have a combined use of the classroom. The 9th graders are in here while the 8th graders are in there. So that can happen. In large class settings, sometime we would start there together and then we’d break up and she might pick a group for the computers and I might take a group out to the greenhouse and then we’d switch halfway through class and we do the same lesson with the other part of the group or let’s see.... We might be over here in instruction and viewing, like we’d start there and then move here for instruction on how to do PowerPoint for instance or if we’re going to do a project we would show an example. Show some of the skills, like inserting your clip art into their poster or something like that into a Word document and then we’d show a few of those and then they’d be working and we’d be the facilitators.”</i>	I
Pedagogical Approach	Teacher as a <u>facilitator</u>	W
	<i>“I would say that I am more of a guide.”</i>	W
	Adjusts instruction to the learner’s stage of development.	W
	Provides learning experiences that give the student practice with particular operations.	W
	Allows experimentation with common real-life problems.	W
	The teaching/learning experience should encourage students’ interaction.	W
	<i>“I think that in a place like this it’s great to be able to have up to date information on weather channels and things like that available. So, um, I think that being connected to the world is really important nowadays. Kids need to see outside themselves and see how other things are happening.”</i>	I

Teacher (14)- Engineering and Architectural Design		
Course Specifics	<i>"We are mainly a very wide, but not very deep curriculum base for engineering and architecture. We want to do a lot of research into the duties and responsibilities and job descriptions of architects and engineers of various kinds and also give them a little taste of what they do."</i>	I
Teaching-Learning Activities	1. Individual projects, 2. Small group activities (2-6 students), 3. Modeling	W
	<i>"We always start class with our warm-ups which we call mug shot or mathematic. We then move directly into our...what we're going to do that day... So they come in and a lot of times go straight to the drafting board or straight to the computer and pick up where they left off."</i>	I
Pedagogical Approach	Teacher as a <u>facilitator</u>	W
	<i>"Facilitate problem-based learning opportunities. Provide students with knowledge and materials that are essential to the research or task at hand."</i>	W
	Nurtures attention to logic and nature of knowledge.	W
	Provides learning experiences that give the student practice with particular operations.	W
	Arranges for learning experiences that help students discover for themselves the logical connections between objects and events.	W
	Through improving the concept of self, education can lead students towards greater mental and emotional health.	W
	Teaching is the creation of environments in which students' cognitive structures can emerge and change.	W
	<i>"I do a lot of individual and actually that can change from class to class. Some classes can't work in teams. They just don't do well."</i>	I
	<i>"the lunchrooms right here and there's a lot of waving and back and forth. But I consider this more as an early experience at a workplace. And there are tons of distractions in your workplace and getting pulled in different directions to do different things, this is no different. This is probably a skill they need to experience earlier on."</i>	I
	<i>"it doesn't bother me a bit to see them look out the window...I like for them to look around and be aware and that's another thing we try to teach here, be aware of your surroundings and the children this age are" ..</i>	I
	<i>"To be interactive....To be able to...just because the sheer size of it [the space]...we can separate into three groups and have room to pull that off. You can't do that in a traditional classroom. I find that these students get a lot whether they know it or not. They're leaving here with a lot of information packed away and sometimes they're learning in spite of themselves... I do think the design of this space being open and airy lends itself to that".</i>	I
<i>"[students] Learn to make educated guesses and try to figure out what's going to happen and then going back to the drawing board. We're teaching them quite a bit of patience in the hands on because they can't finish things in one day. They have ongoing projects which they've never had in school before so they have to do good work, keep up with their materials, come back in and pick right back up on a project and meet deadlines... It's more like real life skills that we're trying to teach them."</i>	I	

Teacher (15)- Environmental Sciences		
Course Specifics	Lab work is of particular importance to induce students to investigate problems.	W
	<i>"This classroom...I teach environmental science, which is an elective and I also teach earth science which is a required subject and only in earth science do I do experiments per se at the may involve fire".</i>	I
	<i>"It's strange and it's interesting with the S.O.L. chase fewer and fewer minutes are devoted to experimental teaching which...teaching using laboratories. It used to be, very recently, up to forty percent of the class in science would be lab activities but now it's like down to ten to twelve percent... It's really sad. The teaching of science in Virginia has been so impacted by this S.O.L. standardized testing".</i>	I
	<i>"adjacent in between these two classrooms is a preparation area and again, um, sometimes teachers other than science teachers don't appreciate the need for a room for what we call lovingly, junk. Your junk room, that stuff that you have...projects that are half finished or laboratory equipment that's semi setup or not setup".</i>	N15-1P
	<i>"So one of the nice things about teaching an elective class is that I'm not, have to be strict by this S.O.L. thing. I can be more creative in my own curriculum... For example if I have, you know, I was expecting to use the computers today and I find out I can't use them, I usually have something else".</i>	I
Teaching-Learning Activities	1. Direct instruction, 2. Individual projects, 3. Presentations	W
	<i>"The activities in my class are models of real world situations, hoping the students make a connection between the two and is better prepared to make those 'real world' decisions based on what went in the classroom."</i>	W
	<i>"We have a lot of freedom in terms of what the environmental science people can do. We have, obviously, the computers and the classroom space and we also have the greenhouse, okay. So a lot of our activities will, you know, obviously depend on, you know, what unit we're doing. A lot of times we'll do two units at the same time".</i>	I
	<i>"We'll have a group project, we've done it a lot of times when the group project starts that it is geared towards an individual aspect of that".</i>	I
Pedagogical Approach	Teacher as a facilitator	W
	<i>"...but one of creating learning environments and activities that call on a student to not only learn subject matter, but to synthesize meaning and direction from that subject matter."</i>	W
	Helps students acquire subject matter.	W
	Provides learning experiences that give the student practice with particular operations.	W
	Arranges for learning experiences that help students discover for themselves the logical connections between objects and events.	W
	The central role of education is to prepare citizens to perpetuate a democratic social order.	W
	The teaching/learning experience should encourage students' interaction.	W
	<i>"The activities in my class are models of real world situations, hoping the students make a connection between the two and is better prepared to make those 'real world' decisions based on what went in the classroom."</i>	W
	<i>"I don't really use it [the podium] much. I walk around when I discuss and I think it's good because not only it is boring but classroom control to me is like a proximity thing too. If I'm over here and you start to not pay attention and then I can walk over here and all of the sudden you do... and to me that's a good thing. it's too dynamic. I think it's really important as a teacher".</i>	I
	<i>"if the teacher's not going to watch the video, the kid's not going to watch the video. And if you want them to gain something from that you know, even though they're the TV generation, you got to point it out to them. You got to like, you know, use that again as a teaching tool not as the teacher".</i>	I

Teacher (15)- Environmental Sciences



N15-1P

Teacher (16)- Sciences		
Teaching-Learning Activities	1. Direct instruction, 2. Science lab work, 3. Small group activities (2-6 students).	W
	<i>"Concepts learned in lecture are reinforced through laboratory activities and small group work."</i>	W
	<i>"I do a lot of lecturing using PowerPoint because there's a lot of information they have to get in the year. So, I normally a typical class starts off, do a lecture with PowerPoint, they copy down the notes and the second thing I do a lot of are labs. So they get the content with the PowerPoint and then I do labs to kind of reinforce concepts".</i>	I
	<i>"there's a lot of working in pairs and um, some of our classes are really small so if you have the laptop cart in here you might have enough computers for everybody. Um, there's a computer outside the guidance office and you can always send a kid there, let a kid work on that computer as a prize".</i>	I
Pedagogical Approach	Teacher as an <u><i>instructor</i></u>	W
	Instructs students in concept formation	W
	Helps students acquire subject matter.	W
	Arranges for learning experiences that help students discover for themselves the logical connections between objects and events	W
	Teaching is the creation of environments in which students' cognitive structures can emerge and change.	W
	The teaching/learning experience should encourage students' interaction.	W

Teacher (17)- Mathematics		
Teaching-Learning Activities	1. Presentation, 2. Group discussion, 3. Free dialogue	W
	<i>"I enjoy using examples from engineering and physics in instruction in my math courses. Students often ask why a certain topic is being presented and discussed in class. Often I answer this question by using the concept in an engineering related problem... Using this technique, students leave the classroom with a sense of why math is important in their education."</i>	W
	<i>"on long class days I have them work together in twos or in entire rows to solve a problem. I'll give them three different problems and then each team has to come up with a solution and then they select one or two representatives to come up and present that problem. That's a great thing. That really makes the class more dynamic. Makes it more interesting".</i>	I
Pedagogical Approach	Teacher as an <i>instructor</i>	W
	<i>"I feel that it is necessary to be a roll model to students"</i>	W
	Provides support and balance with hypothetical discussions and free dialogue between students.	W
	Provides students with familiar materials to link with unfamiliar items to be learned.	W
	Adjusts instruction to the learners' stage of development.	W
	The teaching/learning experience should encourage students' interaction.	W
	The group can serve as a learning medium.	W
	The school must teach citizens to reflect on values and to participate with others in the reconstruction of society.	W
<i>"They get to move around and you know, for students of this age that's a really positive thing and uh, you know, we'll take breaks... They come back and they're refreshed and you know they have a little bit of a change in their environment for a few minutes. I don't get in the habit of doing it too often because it disturbs the class too much if you get too many of those every time".</i>	I	

Teacher (18)- Biology & Biotechnology (Note: Sharing space with teacher 16)		
Course Specifics	Lab work is of particular importance to induce students to investigate problems.	W
Teaching-Learning Activities	1. Presentations, 2. Science lab work, 3. Small group activities (2-6 students)	W
	<i>"in a Science class like mine there's always a lot of discussion and lecture kind of thing using PowerPoint, using writing on the board but there's a lot of dialogue and back and forth with the kids. It's not just standing up and talking at them for an hour. Uh, I'm trying to train them on note taking for college".</i>	I
	<i>"one of the things we emphasize at Governor's School is labs and so we do a lot of labs".</i>	I
	<i>"we do a lot of ...there are some group projects during the year usually related to like an environmental issue or bioethics issue where small groups will work up something and then present it the class. We do try to do a couple of things a year that are university or college."</i>	I
	<i>"We are not doing as many field trips as we used to and it's really sad. It's financial issues and there's also a bus availability issue".</i>	I
Pedagogical Approach	Teacher as a <i>facilitator</i> .	W
	Instructs students in concept formation.	W
	Helps students acquire subject matter	W
	Provides students with familiar materials to link with unfamiliar items to be learned.	W
	The teaching/learning experience should encourage students' interaction.	W
	An effective teaching model is one which produces a group of persons trained to work with others.	W

Teacher (19)- Chemistry		
Course Specifics	Lab work is of particular importance to induce students to investigate problems.	W
	<i>"There's no typical class. This is chemistry. There's no typical class".</i>	I
	<i>"I have 16 in my first-year chemistry and then 13 and 21 in my two AP chemistry. And so the AP chemistry has a graphing assignment that uses Excel".</i>	I
Teaching-Learning Activities	1. Direct Instruction, 2. Presentations, 3. Science lab work	W
	<i>"I prefer to use the overhead when I am ... I put up keys and work problems. They have problems to work. So I work out the keys with the problems all solved. And then put them on a transparency, which I go through one at a time. Instead of me working them out here, I already have them worked out and uncover... But it really saves time—unless I need to work a problem that they're all having trouble with. But just to check homework, I just put them up and they can check their problems themselves. So that makes for a glare. So that's a real problem".</i>	I
	<i>"If it's a lab day I always go over the lab first. I show them where all... I have the equipment out for them. They don't have a little of everything. I have everything out for them. I go over what they've got out and what each thing is going to be used for. I go over disposal—what can go down the drain and what can't. I go over all that stuff. We pick out partners. They have to change partners each lab. We select partners, and then if there's any other cautions or whatever. And then they work. And while they're working I have a checklist that I go around.... Like here's this morning's. I have a checklist and I'll look for these things that I check off. All these things each time. Who they work with and where in particular".</i>	I
	<i>"they have to go online for the questions and find answers. I always make sure there's an answer somewhere so they can type it in Google and find answer. They can't use Wikipedia. Unless they can find another website that gives the same information... I have some online assignments during class occasionally too".</i>	I
Pedagogical Approach	Teacher as a presenter.	W
	Instructs students in concept formation.	W
	Helps students acquire subject matter	W
	Provides students with familiar materials to link with unfamiliar items to be learned.	W
	The central role of education is to prepare citizens to perpetuate a democratic social order.	W
	An effective teaching model is one which produces a group of persons trained to work with others.	W

Teacher (20)- Mathematics		
Teaching-Learning Activities	1. Direct Instruction, 2. Small group activities (2-6 students), 3. Individual projects.	W
	<i>"I believe my students should be able to solve given problems using analytical methods.... I use direct instruction, discovery activities, labs, cooperative learning, and mathematical writing activities."</i>	W
	<i>"When they first come in they have a focused activity, is what it is. They come in and they do a practice AP question that counts toward their homework grade... They come in; they have 5 minutes to complete that; they turn it in. And while they are doing that, that's when I take attendance, check homework and do that kind of thing – take care of all the business kinds of things. And then we go over the question. We work it out on the board if we have to. And then we either go over the homework or we start the next lesson, and sometimes it's a discovery activity, sometimes it's a PPT presentation, with me supplementing on the front board with problems and that kind of thing. We do a lot of... I do one and then they practice one. We do labs. We do the application of what we've learned. And sometimes they'll go outside on to the field outside and do ... take measurements of things. And sometimes they'll bring things from home that they're going to measure. And write up a lab report about their findings. And so they're doing statistical analysis and they're coming up with their own equations and that kind of thing".</i>	I
	<i>"They do a lot of the word processing for the lab write ups. They get on the computers and do that".</i>	I
	<i>"They are learning how to do calculus problems numerically, graphically, and analytically. So they are continuously working problems out by hand and then using the calculator to verify or to discover or just to make sure that they can solve a problem all the different ways that it can be solved".</i>	I
	<i>"Throughout the course of the day, I may teach for a while from the board with the overhead projector, and my calculator is attached to an overhead piece that can project on the screen. They can follow what I'm doing with their own calculators. We then may have a short segment that's a PowerPoint presentation that has possible links to websites that have tutorials on the different topics—that have animation—things that I can't create myself".</i>	I
Pedagogical Approach	Instructs students in concept formation.	W
	Helps students acquire subject matter.	W
	Provides learning experiences that give the student practice with particular operations.	W
	Teaching is the creation of environments in which students' cognitive structures can emerge and change.	W
	An effective teaching model should develop alternative patterns for students' personal and social development.	W
	An effective teaching model is one which produces a group of persons trained to work with others.	W
	<i>"I try to give a lot of graded material, a lot of graded papers, because I want them to constantly feel that pressure of 'I'd better make sure I know it. I'd better make sure I'm going to ask a question because I never know when she's going to give me a homework quiz. I'd better make sure I've asked all the questions I need to about homework problems I don't understand'."</i>	I

Teacher (21)- Mathematics		
Course Specifics	<i>"I teach pre-calculus and calculus, and I also teach a "Product Design Engineering" course. The pre-calculus and calculus are the two that I teach on a regular basis, every day just about. The engineering course I teach once a week and then between Thanksgiving and Winter Break, that's the only class I see".</i>	I
	<i>"I've got 18 in both my morning classes – one pre-calculus and one calculus. And then I've got 13 in my afternoon pre-calculus".</i>	I
Teaching-Learning Activities	1. Direct Instruction, 2. Group discussion, 3. Small group activities (2-6 students).	W
	<i>"I want the students to have experience in thinking for themselves and developing strategies for solving problems, so I attempt to develop and use activities that support those goals."</i>	W
	<i>"I'll often give extensions to activities that require the student to research a concept, or read up on a particular topic...this helps encourage those students who may lack confidence in their math skills by giving them another venue to explain what they have learned."</i>	W
	<i>"Typically what I'll do is I'll do some stuff on the board, and then I'll either give them a problem or I'll give them some group work, and then I circulate around. Or I'll sit at the front and say, 'You come to me with questions,' and we'll work through. And that way I've got my table with scrap paper. And then a lot of times what I'll do if all of them are having the same question, I'll say 'OK, let's take a break. Everybody quit with the group. We're going to talk for a minute,' and then I put them back in their groups. Fairly traditional".</i>	I
Pedagogical Approach	Teacher as a <u>facilitator</u>	W
	<i>"I encourage students to ask questions and form connections between concepts."</i>	W
	Instructs students in concept formation	W
	Helps students acquire subject matter	W
	Provides learning experiences that give the student practice with particular operations.	W
	The teaching/learning experience should encourage students' interaction.	W
	An effective teaching model is one which produces a group of persons trained to work with others.	W
<i>"The calculus I do a good amount of direct instruction, but I also do a lot of group work –actually in both classes I do. I like for them to work in group projects. I typically like to have 3 to a group, at the most 4 to a group".</i>	I	

Teacher (22)- Mathematics		
Teaching-Learning Activities	1. Direct instruction, 2. Modeling, 3. Computer lab work	W
	<i>"I discuss the concepts and show examples making an effort when possible to relate the information to previously 'learned' concepts."</i>	W
	<i>"For applications of the concepts, students often work in groups to solve problems supplied by handout or text."</i>	W
	<i>"On lab days they have an opportunity to experiment and simulate an application studied from the textbook. On such days they work in groups and I work as an advisor/facilitator."</i>	W
	<i>"Well in almost all my classes they sit at least 2 at a table... And to begin the class we generally check homework and questions that they have. And the homework might be presented several different ways. I do have some some homework worked out on the smartboard so they can just see what the solution looks like, and then I don't have to work through them. I've made copies, worked out the problems myself, and then photocopied those and have one on each table so the kids can, again... they can look at it, they can talk to each other, and kind of figure out what their mistake was or how their problem could be like the answer. And then other times I'll put a problem on the board or students will put problems on the board. And then if we're learning a new concept I might present it with a smartboard. Always I'm trying to relate it to something that they already know or how they might be using it in the future. Try to give them examples of applications".</i>	I
Pedagogical Approach	Teacher as an <u>instructor</u>	W
	<i>"My goal is to build on or expand the knowledge of mathematics that each student already has."</i>	W
	Instructs students in concept formation.	W
	Provides students with familiar materials to link with unfamiliar items to be learned.	W
	Provides learning experiences that give the student practice with particular operations.	W
	Teaching is the creation of environments in which students' cognitive structures can emerge and change.	W
	Students must construct their own knowledge.	W
The teaching/learning experience should encourage students' interaction.	W	

Teacher (23)- Mathematics		
Course Specifics	Lab work is of particular importance to induce students to investigate problems.	W
	<i>"I teach integrative math and pre-calculus and fundamentals of research. I also have one student doing a direct study in aerodynamics, and two students who are doing technology research and applied physics, which is also an elective. The regular courses, the routine courses are integrative math and pre-calculus".</i>	I
Teaching-Learning Activities	1. Direct instruction, 2. Small group activities (2-6 students), 3. Computer lab work	W
	<i>"The regular courses, the routine courses are integrative math and pre-calculus. Those courses are routinely taught as part lecture, part guided directed practice if you will. Group work and labs where they either actually do something, either in pairs or threes. Sometimes it is something along the lines of a hands-on activity to demonstrate concepts. Sometimes it's... something along the lines of a research kind of thing where we get on the internet and they look up and research information about concepts and they perhaps do problems, look at new material, things of this nature. Sometimes they do problem sets that are more advanced to kind of extend them. And they would do those together so that they can kind of work off of each other and see how their ideas help each other envision the problem. So we do all of those things".</i>	I
	<i>"Most of the time homework and things like that are done of course individually. Labs and when we have specific things that we design for them to do in groups, in pairs. Don't normally get involved in groups larger than 2 or possibly 3 because it tends to dilute down the participation of the individual. And we want everybody to be fully engaged in the process, and not just be standing there watching the other 2 or 3 people do all the work. We want everybody to be involved. And usually there's enough work in a project like that for 2 people to be fully engaged, possibly 3. If you go beyond that it doesn't work too well".</i>	I
Pedagogical Approach	Teacher as an <i>instructor</i>	W
	<i>"My role is to instruct, assess, facilitate, and diagnose."</i>	W
	Helps students acquire subject matter.	W
	Provides learning experiences that help students discover for themselves the logical connections between objects or events.	W
	Teaches students how to reflect on significant teaching problems.	W
	<i>"I don't necessarily say, "Be sure to use this particular feature." It's just that we ask them to do a report, then they are free to use whatever they want to use. And so they may end up using Math Tab or MiniTab. They may end up using Excel Spreadsheet. It's really kind of up to them. We just turn them loose and let them fly and see what they come up with".</i>	I
Teacher (24)- Computer Science		
Teaching-Learning Activities	<i>"A typical classroom session is that I demo something here at the computer for 10-15 minutes that has to do with an assignment. Well, first of all I make the assignment, if I haven't already made it. And then I demo some things that I think the students will not know how to do already that pertain to the assignment. And then the rest of the class is spent with the students doing the assignment. And I just walk around and help out".</i>	I

Teacher (25)- Physics and Computer Applications		
Course Specifics	Lab work is of particular importance to induce students to investigate problems.	W
Teaching-Learning Activities	1. Presentations, 2. Group discussion, 3. Science lab work	W
	“... [I] do many demonstrations that require the student to describe what is observed and adjust the student’s thinking about the topic (in most cases). Demos can be java applets and other software simulations projected on the board, video segments, (laserdisc, VHS, DVD), and physical equipment. This allows for discussions, practice problems, and lab simulations.”	W
	“We do a lot of things in pairs. We don’t often do things in groups of 4 except for the lab station, and then once they finish with that, then they often break down into pairs to finish some assignment. So this to me gives me the flexibility that I really like in a classroom, in which I can reconfigure it easily to what we want to do that day”.	I
	“I probably do more lecturing that you’d expect I do...At the same time because physics has so many demos that can be done, there’s a lot of technology that’s involved with all of that. So, if it’s a real mixed session between projecting computer graphics, Java applets, taking and getting them to visually observe acceleration... a lot of different things that are done. I don’t know what my average class really is because some days there are a whole lot of demos and sometimes there’s probably more lecture than there really should be”.	I
Pedagogical Approach	Teacher as an <u>instructor</u>	W
	“I want to challenge what the student thinks s/he knows and refine the thinking to include more situations that often to have not been considered.”	W
	Provides support and balance with hypothetical discussions and free dialogue between students.	W
	Instruct students in concept formation.	W
	Provides students with familiar materials to link with unfamiliar items to be learned.	W
	Students must construct their own knowledge.	W
	The teaching/learning experience should encourage students’ interaction.	W
	“I’m always somebody who does not like PowerPoints because they are too cryptic. They should not be every note. PowerPoints...I use them just for a few things to keep me on task. They’re supposed to remind me of the other things I wanted to talk about kind of thing. And therefore, often to hand those out as notes is misleading because they need to add a lot more detail than what’s on there. So I don’t use PowerPoints very often. And PowerPoints and smartboards are what a lot people use. I project so they can interact with it while they’re up here doing things. Well, if I don’t use PowerPoints and I don’t use my annotations or things that I’m doing on the whiteboard anyway, then I’m perfectly satisfied”.	I
“And I’m saying—don’t be afraid to interact. Don’t be afraid to verbalize questions rather than try to figure... especially when you’re staring at the paper and thinking, I think I can figure this out. Well maybe you need to ask a question and that question could be asked of your neighbor, as opposed to it’s gotta be the teacher that answers the question. So that’s why this arrangement to me is important. That they’ve got to recognize that physics is just like any course. You communicate about it, and some people start communicating sooner than others”.	I	

Appendix G: Participant-by-Technology Data Matrix

Data Sources:	W= Web-based Survey ,	I= Interview,	N= Image Narration,	G=Graphic Illustration,
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Category	Participant-by-technology	Data
Teacher (1)- Computer Programming		
Technologies	Most often used 3 technologies: 1. Interactive (smart) board, 2. Projector, 3. Desktop computers	W
Monitoring	<i>"If we had wireless capability, the teacher can choose ... because they have the capability to choose which monitor can be flashed on the smart board."</i>	I
Mobility	<i>"In a course like that it would be nice for them to have a computer in front of them while am doing that too [working on a smart board]. So what usually happens I would have students watch first... then they go back to their seats and do the assignment they have."</i>	I
	<i>"Real time understanding or real time assessment, instead of walking around the room."</i>	I
Access	<i>"In a course like that it would be nice for them to have a computer in front of them while am doing that too [working on a smart board]. So what usually happens I would have students watch first... then they go back to their seats and do the assignment they have."</i>	I
Visibility	<i>"I teach with smart board a lot, at times I need to turn off the lights."</i>	I
Patterns/ Modes of Use	<i>"They [students] like experimenting with the new technology."</i>	I
	<i>"Every class I use as much as I can of the projector, especially if I'll be the catalyst of the learning activity...otherwise they are at the computer stations doing the topic of the day."</i>	I
	<i>"I have seen net meetings on the computer, I have tried that one time but it became too social for the kids because they would be interacting with each other rather than their actual lesson as a whole."</i>	I
	<i>"The smart board became my main teaching tool; I was able to do PowerPoint presentations... I'd be able to write on a PowerPoint presentation in real time. I can actually show the students off my computer the program..."</i>	I

Teacher (2)- Mathematics		
Technologies	Most often used 3 technologies: 1. Interactive (smart) board, 2. Desktop computers, 3. White board	W
Mobility	"The projector should actually hang from the ceiling, taking it out from the way."	G2
Access		G2
Patterns/ Modes of Use	"I am not using a VCR or DVD player; if I need to show something like that I am more likely to use the projector."	I
	"I have a smart board in the front of the room....the reason for that is twofold, one it allows me to take advantage of PowerPoint and things like that, it additionally allows me to save what am doing, or access into my website."	N2-1T



N2-1T

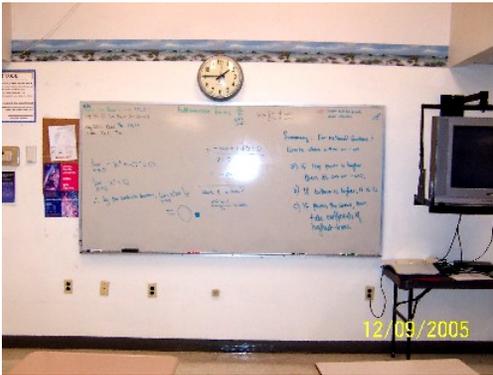
Teacher (3)- Anatomy/Microbiology		
Access	<i>"If anybody touches the cart, the problem is that you have to realign the smart board. If it was mounted on the ceiling, we can avoid that."</i>	N3-1T
Patterns/ Modes of Use	<i>"It's nice that we have the television mounted on the wall, that is very helpful. We are required to display the class objectives... it is very convenient to have the television hooked up to my desktop computer, so I can leave that up continuously, instead of writing it on the board."</i>	I
	<i>"I don't use the white board except for my classroom rules and project due dates, big things like that... I like having the white board; I think that they are indispensable."</i>	I
	<i>"Before I had the smart board I had a pull down screen, for the transparency projection. Most things now are digitized so you don't need the projection screen. And you can actually use the smart board screen as a white board, you can actually write on it with a marker... and you can save that as well."</i>	I
	<i>"It is nice to have something displayed permanently, like my classroom rules or my due dates. So you will always need a white board, it may not need to be as big as it used to have to be, or as in a math classroom where they used to have one here, one here, and one here [pointing around]."</i>	I
	<i>"And also the white board is so important in the lab, because sometimes you have to write instructions for the whole lab to be able to see. A bulletin board in the lab? I think there is no need for that."</i>	I



N3-1T

Teacher (4)- Chemistry		
Technologies	Most often used 3 technologies: 1. Interactive (smart) board, 2. Laptop computers, 3. White board	W
Mobility	"The MACs that we have are built in the lab tables."	I
Access	"The fume hood is in between spaces so I can access it from the classroom area for a demo or something or from the lab area."	N4-1T
Visibility	"There are some things that require dimming especially in chemistry with the flames... I just pull down the shades."	I
	"I don't use the overhead projector anymore, but occasionally I might use one, and there is some glare from that. I project on the white board or the smart board screen. Then they have to move."	I
Patterns/ Modes of Use	"I very seldom use the TV screen. We use it if we study weather."	I
	"I use the white board for permanent note. ...I save my notes on the smart board and I publish them on the web for them to use."	I
	"I can do everything on the smart board. The white boards are nice but you still have to erase them."	I
	"I don't use the overhead projector anymore, but occasionally I might use one"	I
		
N4-1T		

Teacher (5)- Mathematics		
Technologies	Most often used 3 technologies: 1. White board, 2. Desktop Computers, 3. VCR	W
Mobility	"I would like to use the TV more in order to be able to use the computer more and do the animations and so on, but I have to plan those because there is no connection between the TV and any computer, so in order to use that I have to generate everything I need on our school lab top in order for them to schedule it for me on that day ... And if I wanted to do anything on the internet, they have to hook up a cord that goes across over here and over to one of the computers, so it is very complicated for me to use the TV."	I
Access		
Visibility	"There is no place... there is no screen, so I can't use a projector, I can't use an overhead projector, that's a problem here; there is no place to put a screen, and there is glare on the white board if I do put a screen there."	N5-1T
	"They have a horrible time if they are sitting on this side... because of the TV. When they put up the TV there was no place to put it, they couldn't block the closets on the right or the door on the left, they only could put it over here, which blocks the board."	N5-2T
	"It is hard to see the TV if you're at the back of the room, so having a TV is not ideal, the ideal situation would be to have a larger screen, and have a projector to be able to project the computer onto that."	I
	"If I use the overhead projector, I turn the light off."	I
Patterns/ Modes of Use	"I would like to use the TV more in order to be able to use the computer more and do the animations and so on, but I have to plan those because there is no connection between the TV and any computer, so in order to use that I have to generate everything I need on our school lab top in order for them to schedule it for me on that day ... And if I wanted to do anything on the internet, they have to hook up a cord that goes across over here and over to one of the computers, so it is very complicated for me to use the TV."	I



N5-1T



N5-2T

Teacher (6)- Physics

Visibility

"We are already bringing in new computers, we already see a difference in glare; the old monitors versus the new ones."

N6-1T



N6-1T

Teacher (7)- Anatomy/Psychology		
Technologies	Most often used 3 technologies: 1. Desktop Computers, 2. White board, 3. DVD player/recorder.	W
	<i>"I use PowerPoint lectures, which are posted to the web-site for peruse later at [students'] own time; when instructing I use models for them to see coupled with computer diagram analysis."</i>	W
Visibility	<i>"When I am not using the screen the lights are on and the shades are open. I have to stop in the middle and use the white board and put the lights on."</i>	I
	<i>"I have to [use all the technologies at the same time], and I also use the white board, and if there is something I am showing or a PowerPoint presentation on there, I will click the lights back on and go to the board to draw and give them the chance to take notes. I post all the notes I put on the computers and the TV and our website, and they can download that for further study."</i>	I
Patterns/ Modes of Use	<i>"I put my lecture notes on this computer, and have them projected to this television set on this side of the room [pointing]. There is an Elmo ...hooked to the projector ... which projects on this screen right here [pointing]."</i>	N7-1T
	<i>"I do computer work; they [students] are all on the computers."</i>	I
		
N7-1T		

Teacher (8)- Mathematics		
Technologies	Most often used 3 technologies: 1. White board, 2. Graphing calculator, 3. Overhead projector	W
	<i>"I use the graphing calculator more than computers.... I can project the calculator screen onto the TV monitor that is in my classroom"</i>	W
	<i>"I don't have my overhead projector, I mean I try to use it to project... There is a big round glare on the board. I don't use it so much anymore, you see I use I calculator so much, and now I have the software that projects the calculator over the TV screen".</i>	N8-1T
	<i>"Relying on the white board and projecting the calculator on the TV screen. I have projected the computer over the TV a few times, not a lot. And I still use my overhead projector a lot usually for the calculator. I do have some overheads that I do use by occasion".</i>	I
	<i>"I would like to have a better way to project the computer like a projector. There is lots of information out there that I would like to use".</i>	I
Access	<i>"I don't actually use these [the desktops] during class... there is not much for them [students] back there, I think!"</i>	I
Visibility	<i>"The calculator projects really well on the TV, if I try to project from the computer on the TV, it is really hard to read it... the color is black and white or something".</i>	N8-2T
Patterns/ Modes of Use	<i>"They don't use the computers that much during lecture days".</i>	I



N8-1T



N8-2T

Teacher (9)- Mathematics		
Technologies	Most often used 3 technologies: 1. White board, 2. TV/Calculator, 3. Desktop computers	W
	"Also I rarely use the computer, and I do once in a while, .. a computer to project on, because I don't have a good place to set it up!"	I
	"That computer is hooked up to the TV, so I can project it to the TV on that one! But it's a pain to work back and forth between that and the projector. I work with the overhead projector a lot".	I
	"I have some stuff on my laptop that I bring in and project on the white board".	I
	"I don't have enough board space... A white board across the entire front of the room with one section being a graphing white board. Then a pull-down screen, and an overhead projector and a ceiling mount projector".	G9
	"I might have 2 TV screens mounted in both corners...I would still like the computers on the outside".	G9
Monitoring	"There is no wireless connection in the school... I don't want them on their desks; they would be playing around on the internet".	I
Visibility	"I don't have an issue with the lighting. The overhead doesn't shine very well, but I think that's because I have to shine it on the wall and set it on the table. Sometimes with the overhead I would shut the lights off, but normally I don't shut it off for other things that we're doing".	I
Patterns/ Modes of Use	"I think if they are on the computer a lot, having them on their desks would make sense. But I don't use them daily".	I
<p style="text-align: center;">Front</p> <ul style="list-style-type: none"> - white boards across the entire front of room with one section being a graphing white board. - Pull down screen for use with an overhead projector (on cart) and ceiling mounted projector. - TV mounted in both corners <p style="text-align: center;">Individual desks in rows for lecture or groups of 4 for group work</p> <p style="text-align: center;">computers or storage cabinets (door)</p> <p style="text-align: center;">G9</p>		

Computers

Computers

Teacher (10)- Aviation and Aerospace		
Technologies	Most often used 3 technologies: 1. White board, 2. Projector, 3. Overhead projector	W
	<i>"Most instruction starts with the new material that is to be mastered. This can be presented in a variety of different methods; VCR, DVD, overhead, LCD projection, PowerPoint, discussion, etc. The lesson continues with some activity that will reinforce the original goals which could include something at their table, a project that moves around the room, a web-quest or web-search at the computers."</i>	W
	<i>"Everything we have here is on a network. All of them have access to the internet."</i>	I
	<i>"The TV itself works, down there where the servers are; there are 3 or 4 DVD players. The idea was to get all the videos players and with this big remote, control what's coming on the TV, but the remotes are not working now. The only thing that we use them for now is for the announcements... which is kind of a shame, because it was an expensive system to come in, and now we are not using nearly half its capabilities... I think we just need to come up with the money to fix it."</i>	I
	<i>"As far as I know, no one in this school doesn't have a laptop if he wants one."</i>	I
Monitoring	<i>"Last summer, I redesigned all of this [the computer stations area] you can stand over here to see every monitor, all of them at one stop."</i>	I
Mobility	<i>"The laptop fits in that cart, so it's quite mobile, so we can put it in either place where we want it."</i>	N10-1T
	<i>"The one disadvantage that I could say is that I have probably 95% of everything I do with my instruction on that server back there! ...so if I have to work on a particular file I have to download it on another device and then update the one on that server, this is a disadvantage."</i>	I
Access	<i>"The pull-down screen doesn't get in the way, if we want to use the LCD projector over here that works perfectly fine for that."</i>	N10-2T
Visibility	<i>"This area is very very comfortable to teaching [the project/instruction area], as you notice we have an overhead projector and a screen for that. The one small disadvantage this area has is that if you want to use the board, the board is always away. You can have kids sitting in the back here trying to look at the board back which is up there. The traffic can potentially be an issue."</i>	N10-2T
	<i>"Its very very bright in here. We pull down the blinds."</i>	I
	<i>"The light is controlled by one particular switch over there, so we can't shut down part of the lights down to make it for them easier to see, and still be able to write... it's kind of a problem but we can overcome it, it's not bad at all."</i>	I
Patterns/ Modes of Use	<i>"Everything we have here is on a network. All of them have access to the internet."</i>	I

Teacher (10)- Aviation and Aerospace



N10-1T



N10-2T

Teacher (11)- Aviation and Aerospace

Technologies	Most often used 3 technologies: 1. Desktop computers, 2. Projector, 3. DVD player/recorder <i>"Generally when we are in this lecture area, we utilize an overhead. A lot of times we use an LCD and put a PowerPoint on. DVDs and videos, we got all of that stuff too....Whatever we can do to get the visuals in there."</i>		W
Access	<i>"Like I said we usually move on out into the room...navigation would be out here on the tables, planning out a trip using plotters and markers to draw the trip out. But then they'll take the plan and then go over to the computers and get on the flight simulation and fly the trip, so we really move around the room quite a bit in a 90 minute period."</i>		I

Teacher (13)- Sciences		
Technologies	Most often used 3 technologies: 1. White board, 2. Desktop computers, 3. Projector	W
	<i>"We do have a sink right here that we really like... It's was specially equipped so we could put two 5 gallon buckets in there. It actually fits two five gallon buckets so when we went to the river and did collection samples and things like that we would be able to go through and use that."</i>	N13-1T
	<i>"It [the green house] has floor drains. It has an evaporative, two evaporative coolers. It has an automatic shade system. It's all thermostatically controlled by a larger system."</i>	N13-2T
	<i>"We have a TV that goes to CNN and thinks like that so if something happens we can get instant news."</i>	I
	<i>"we also have the Internet...And the networking. So really the computer to me is one of the greatest tools. The whiteboard is really nice. I think it's nicer because it's not chalk. You can have color. Kids like to color."</i>	I
	<i>"Ideally the copier is a really important thing nowadays. I hate to say it but I like to make sure each child has that document in their hand so they can see in front of them."</i>	I
Monitoring	<i>"we found that this particular shape of the computer aside from that one computer, we don't have very many problems with kids going on inappropriate sites because we have access to see where they are at all times. We just have to turn our heads slightly and I can see where every kid is on their computer and see if they are with me on that same page."</i>	N13-3T
Mobility	<i>"we can hook up to it [the projector] with a VCR and TV then and we can access and use it for group instruction. We decided to point it in this direction because we thought we could have more kids maybe viewing it at the time. And then we also have one on a cart so if we want to use a small group instruction and show an instructional video there we could."</i>	I
Access	<i>"there's no place to put the cords. And that's an issue and I wouldn't be surprised if it's more of a fire issue and a hazard. Kids kick under the desks".</i>	N13-4T
Visibility	<i>"we only shut the blinds just for presentation".</i>	I
	<i>"we can hook up to it [projector] with a VCR and TV then and we can access and use it for group instruction. We decided to point it in this direction because we thought we could have more kids maybe viewing it at the time."</i>	I
	<i>"we have the LCD screens now on the computers but the new computer monitors are all the flat screens which won't be hard for the students."</i>	I
Patterns/ Modes of Use	<i>"It's really nice to begin all together to give group instructions. So we find that sometimes we'll have them at those computers and we'll have the LCD projector, usually we project it onto the wall of our area that we project and it would be great to have a screen that pulled down there. These are the types of screens that we originally were given for the modules and that was because they were portable and so what we sometimes do is start here but often, most oftentimes the students come in. They sign in at the sign in sheet more like an office and then they have a seat and they have instructions on the board as to what they're doing so the whiteboard is essential. This area does not have a whiteboard. We originally started with a rolling board ... but this area is missing a whiteboard".</i>	I
	<i>"we have to hook up our LCD projector to one of the student computers. I guess it would be kind of nice to have one computer, you know, that is your terminal and then that is used for instruction purposes and for display. I think that that would be a kind of a nice thing."</i>	I
	<i>"I like to use it [the white board] to highlight the most important information... My theory is if the teacher writes it up, you should write it down. It's kind of like that's the most important thing. If I take the time to put it on the board it's probably something important. And because kids are visual learners it highlights what's important to me."</i>	I

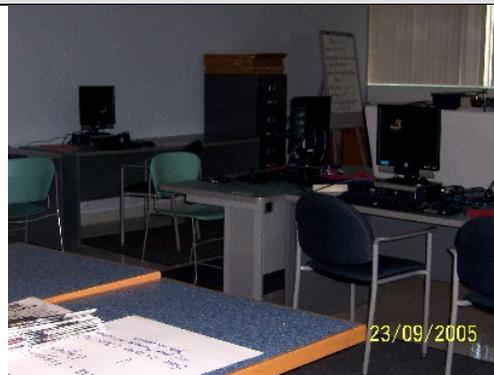
Teacher (13)- Sciences



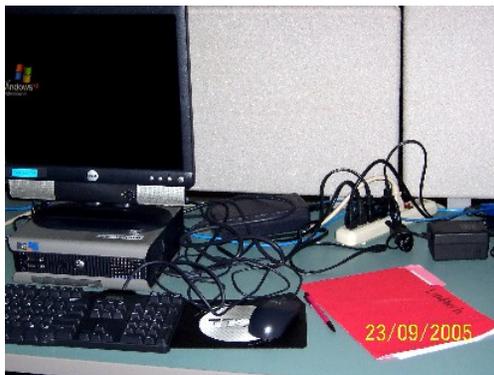
N13-1T



N13-2T



N13-3T



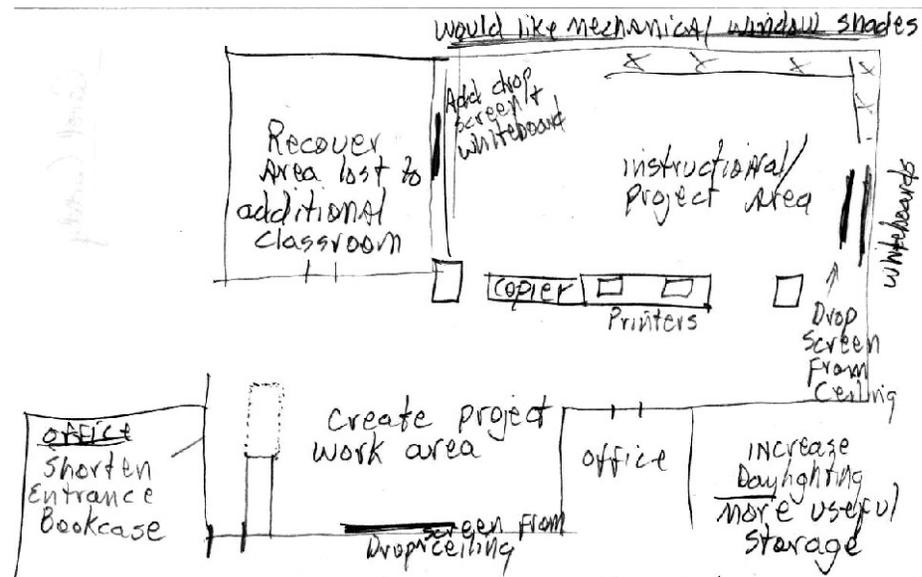
N13-4T



Teacher (14)- Engineering and Architectural Design		
Technologies	Most often used 3 technologies: 1. Desktop Computers, 2. White Board, 3. Projector	W
	"We work with auto sketch which is a form of CAD, working with traditional drafting, model building, testing."	I
	"I use the DVD projector, not quite as much it's just my style but I use the board. I have enough computers and I have over here a computer with a Scantech on it so I can show on the TV monitor pages on the Internet. I can show anything on the computer, I can show on the TV."	I
	"I would like to have another [projector] over here with a dropping screen."	G14
Monitoring	"My computers around the perimeter so that we can do instruction. It's set up so that I can see every computer. I can see...and if I do have split them up I can do...keep part of the group here and still...because they're working at machines they're separated and it gives them a little privacy so that they can do their own work. So that particular set-up...I think this right now is the way to be set-up".	N14-1T
Visibility	"I rarely ever cut back on the lighting in here. I usually keep it, everything turned on unless there's glare on the TV screen or computer screen."	I
	"[glare over the white board] is not an issue.... I use that every day. I like the whiteboard."	I

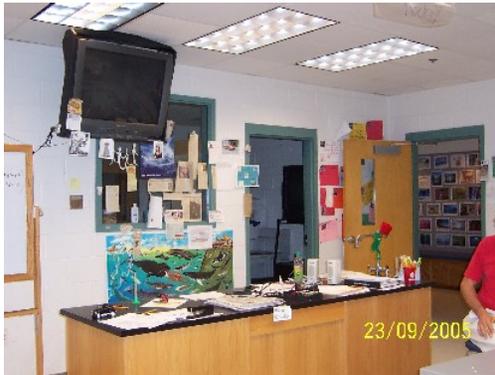


N14-1T

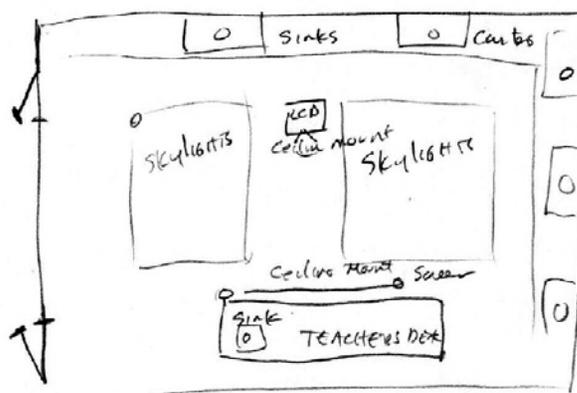


G14

Teacher (15)- Environmental Sciences		
Technologies	Most often used 3 technologies: 1. White board, 2. Desktop Computers, 3. Laptop Computers	W
	"the white board is probably going to be the primary technology".	I
	"We need another ten to fifteen laptops and we'd be there....the place is wireless and I've been trying to, for the last three years to get them... when we created a curriculum it was all, pretty much, Internet based. So a lot of my activities have been on the Internet".	I
	"I have the greenhouse with the technology involved with the greenhouse and that's been real good."	I
	"If I could use a projection screen which would be my fourth thing now, because what I do is I have a laptop or scrounge a laptop and put it there and I have to bring a projection screen and put it in here".	N15-1T
	"I would love, um, to do....a ceiling mount this way. And I would love a ceiling mount screen... That way if I had that and um, I could use my laptop from anywhere, you know. I guess they have wireless hookups to an LCD".	G15
Monitoring	"I like my white board because I think it's a manipulator and on it for example teachers will keep the same notes up on the white board the whole day and I, if you do that the kid doesn't pay attention. They at the board the whole day long and they won't listen to you so I wipe it every period and I rewrite it as I talk, you know. Again that, to me, you know, it's a dynamic part of that".	G15
	"one of the considerations okay, that you have to take into account is the high school...middle school and high school mind and supervision, okay? These are all internet connected so we'll give an assignment like I did today and we looked at hurricane Rita and you know..., researched some things on that but some of the kids will go to sites they're not supposed to go to... So the idea is to create a space with twenty-two computers in this case where from any spot I can monitor them all. And we've done a pretty good job".	I
Mobility	"I'll move it [the white board] around, uh, sometimes I'll write instructions on here and then take that whiteboard over to the computer so that.... So we don't have to keep running back and forth".	I
Patterns/ Modes of Use	"We used to have cable TV that had forty stations. Each one of us had our own VCR so if you wanted to tape something at night, we could set it and you know, tape off the Discovery channel, History channel, it was wonderful but because they got this grant, they got these TVs and there's one place where you can videotape and you're only able to tape four channels off of the cable. And no one knows how to use it anymore".	I



N15-1T



G15

Teacher (16)- Chemistry		
Technologies	Most often used 3 technologies: 1. Projector, 2. White board, 3. Interactive (smart) board	W
	<i>"the computer that I use for PowerPoint has a starboard panel on it and I can write on it with a stylus. So I can diagram things out or highlight".</i>	I
	<i>"I use PowerPoint and the starboard. The students use computers in a classroom for researching".</i>	I
	<i>"they also use sometimes, computer screen labs and we do have a mobile computer cart and so they can...and we have wireless in this room so they can have computers at their lab benches and connect it to different probes and sensors".</i>	I
	<i>"we've got this panel that you can write on it and it projects on the screen".</i>	I
	<i>"the whiteboard's fine, because you know it's nice to have a traditional whiteboard... I, um, part of it is kind of like habit, like even though I've been here for three years it's just you know...I've been teaching for ten years and I just not used to writing on the screen. I more used to writing on the board type thing. Um and also, again, I feel like I'm more in the classroom and less tied to the computer when I'm writing on the board".</i>	I
	<i>"I don't like the TVs there... I want to...because when you watch something you are, um; all the kids are kind of with their neck looking up. We did...for a while we did have the DVC and VCR hooked up so it projected on the screen and I really liked that, but that's not close captioned and we do have some deaf students ...it really is good to project it on the screen because it's kind of more like a movie when you're watching something".</i>	I
Mobility	<i>"the one thing that I would like to have...we had one but then it broke, is a remote to advance PowerPoint slides and then I can walk all around the classroom and...but since it's broken I kind of feel like I'm tied to the computer. So sometimes I feel like it's hard to interact with the students in the back when you're tied to the computer in the front".</i>	I
	<i>"we are going to get a mobile wireless laptop, the wireless they can work on anywhere. And that's been a huge transition because of the kids have accounts that their servers that they can get anywhere in school".</i>	I
Visibility	<i>"I do have to shut the blinds if we're looking at PowerPoint, you know a diagram or a picture make it look really nice if you shut the blinds".</i>	I
	<i>"when I do PowerPoint I can turn off those lights, you know, natural light's enough for them to see to write notes but then it's kind of darker on the screen so they can what I'm writing".</i>	I
	<i>"I don't like the TVs there... I want to...because when you watch something you are, um; all the kids are kind of with their neck looking up".</i>	N16-1T
	<i>[having 3 monitors in the room] "the kids in the back will look at that TV and the kids in the front look at this TV [pointing]... This one [the third monitor] is on the microscope".</i>	I
Patterns/ Modes of Use	<i>"we also use a computer just a little bit because I'm just, I haven't really had a good way to incorporate this into a lesson but the whole idea of bioinformatics and protein modeling and that sort of thing. I've been to a lot of different workshops but I haven't found any that are good, that the students can really grasp and understand but at least I introduce them to the idea that there are these huge databases out there".</i>	I
	<i>"that's a pain because our computer person ghosts the computer every summer, so every year you have to reinstall all the software and so, you know...and then technically I don't have administrative privilege to do that... it's a hassle anyway, just to incorporate something like that and learn how to start teaching that to students and then it makes it doubly hard because you always having software issues".</i>	I
	<i>"I've been teaching for ten years and I just not used to writing on the screen. I more used to writing on the board type thing. Um and also, again, I feel like I'm more in the classroom and less tied to the computer when I'm writing on the board".</i>	I

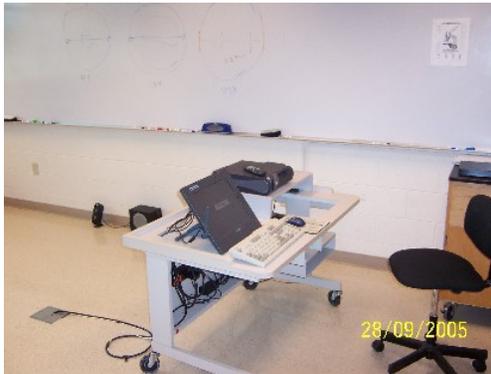
Teacher (16)- Chemistry	
	
N16-1T	

Teacher (17)- Mathematics		
Technologies	Most often used 3 technologies: 1. White board, 2. Overhead projector, 3. Desktop computers	W
	<i>"I start out with the front white board, fill that up and then start writing over on this board... And we use that [the third white board] for the lesson planning every day so we don't write on that board. I had a little bit of space allocated if I had a third student up here writing".</i>	N17-1T
	<i>"I taught in schools where we have what was known as an Elmo device. I think those things are very beneficial, because I can come in with a page out of a textbook and project that on to the screen and talk about it and here, we can't do that very much".</i>	I
	<i>"the overhead is used for calculator problems. We use a TI 83 plus in our math presentations and also for standard transparencies".</i>	I
	<i>"we have a wireless connection. There's a hub... there's a certain range, usually it's an access point, an AP access point and then it's spherical access range. The connection's really fast. It's really impressive as to how fast it is".</i>	N17-2T
	<i>"I haven't used it [the smart board] yet, uh, I guess when I start doing more computer oriented type things, I'll certainly start using the board. But that's tied in to the computer up front".</i>	I
Mobility	<i>"the ideal situation would be to have the same number of computers as the same number of students that can be accommodated in a room. ...we're a feeder school from thirteen other high schools and one of the high schools that we have partnership is [the] County and they are all...all [the] County students are given laptops".</i>	I
Access	<i>"the computer location which should be on one of your pictures here is good. Uh, this room is used also as a research...as a student research room and it's allowed students to have pretty easy access to the computers up front".</i>	N17-3T
	<i>"I like that flow. I like having access to a whiteboard here and a whiteboard here. You know, I just...I prefer blackboards, I'm just a blackboard type person but I'll live with a whiteboard if I have to. As far as the door is concerned it's good to have it where it's located".</i>	G17
	<i>"unfortunately the Elmo has to set in front of the projection screen... so maybe a table here with the Elmo, okay and this will be a computer here. Computer, stand, television...and one thing that I like is being able to stand and use the computer. You have to set down and take...it's easier just to be able to stand while using the computer. I'll put that standing here".</i>	G17
Visibility	<i>"it [the narrow windows] hasn't caused a problem because of the shades, the availability of the Venetian blinds".</i>	N17-4T
	<i>"that's the best accommodation that I've seen as far as the TV setup is concerned. I've had situations where you've had to wheel the thing in on a</i>	N17-5T

Teacher (17)- Mathematics				
	cart and was in a room twice as long as this and in the back the students can't even...hopeless to see... it's used for like when we'll show a video of math."			
	"The whiteboard is a little easier to see from the back of the room sometimes, especially when the blackboard gets really dirty".		I	
Patterns/ Modes of Use	"we've scheduled at least two videos to be shown and I think that's a good number for a semester. Usually one or two videos of an hour to hour and a half duration is good. Just to give them a little break in the monotony. So that's my recommendation. Too many of those turn it into just kids coming in and watching videos all day".		I	
	"I use [the projector]...when we talk about...when there book content like the calendar for the class is on the website and I pull that up, especially at the beginning to show them how to get to it and how they're going to use it and we use the calendar on a day-to-day basis. There's homework due and it's updated on a website link on the computer and certainly would like to start using more websites, math content websites".		I	
	"The smart board ...That would be important when you're trying to show them how to implement software. Instead of having to point and click on the computer, you know how smart board works you can go out and actually point and activate text boxes and yeah...while you're standing up there which is a little easier. Also this smart board allows you to write and it will put it into a document".		I	
				
N17-1T	N17-2T	N17-3T	N17-4T	N17-5T

Teacher (18)- Biology/Biotechnology			
Technologies	Most often used 3 technologies: 1. Monitor like a Tablet PC, 2. White board , 3. VCR		W
	"we have, I'm not sure what the name of this was ... It's like a tablet PC but it's just a monitor... It works just like a tablet PC or ever a smart board but it projects through the projector to the screen...So if you have a PowerPoint file up you can write on the thing or if you just want to right, you can open up just a plain piece of paper and instead of writing on the whiteboard you can just sit there and write on that screen. And I really like that... I like it better [than the smart board] because you don't have the alignment issues with the smart board".		N18-1T
	"the reason we didn't do a smart board in here was space. We thought we just didn't have the room for it... you know if we had one of the smart boards that were on wheels it would be in the way and then to mount a smart board we would have had to take that down, so we went that route".		I
	"I think we're going to end up replacing all the desktops with laptops eventually and then use the wireless, so...but that was nice to put that in the back".		I
Mobility	"until this year we had to have the cart in the middle because of the projector, um and so we were limited in space and by getting the projectors hung we were able to open up the front of the room and so that leaves a lot more walking space here".		N18-2T
	"I do a lot of assignments based on going to websites. And it's a guided thing... If you have either enough fixed computers or enough laptops then you have the flexibility and I think that's something different that maybe you see in some of the regular high schools where a teacher may not have a		I

Teacher (18)- Biology/Biotechnology		
	<i>couple of computers in the room and then they have to go to a computer lab and that kind of stifles this kind of activity".</i>	
Access	<i>"[university name] they had to buy these little, like little remotes and during class the professor will flash a multiple choice question and they have to click and answer...and it's recorded by the student and he's keeping track of each student's answers and it's basically a quiz going on during class... this one was set up to record each person's answers...it keeps track through the computer, through the software and so the professor, he's using it for attendance and he's using it for in class he has like a quiz grade. It kind of sounds like...for ten or fifteen minutes to put a question up to see if you're paying attention or understood the material. So that's kind of an interesting technology".</i>	I
	<i>"we don't use a blackboard here but each of the teachers here have there own websites and stuff so we're always sending the kids to our own websites for calendar and assignments and printouts and all that kind of stuff, so that's all computer access. That's important too".</i>	I
Patterns/ Modes of Use	<i>"I do bring laptops in here sometimes so they can just sit at these tables and work with their laptops".</i>	I
	<i>"In a typical class we're using the...almost exclusively now, the projector with the computer...Either using PowerPoint or writing on the screen. I find that if I'm writing on the screen I'm watching the kids at the same time or talking with them. If you're writing on the board you turn your back to them".</i>	I
	<i>"I use the whiteboards pretty minimally now...having the projector and the tablet like thing. And also if you're using the tablet and you're writing notes, you can save those so if somebody's absent you can either give them a printed copy or just print it out onto the screen for them. Uh, and that's....you can do the same thing with the smart board and that's nice for absent kids... I mean that screen is also the computer monitor".</i>	I
	<i>"Our whole teaching style would change if the computer and the projector went away. We haven't...used an overhead projector in several years. Okay and it's just because of that technology...I do a lot of assignments based on going to websites. And it's a guided thing. It's not just go out on the Internet and find it, you know it's a written up sheet, go to this website, read this section, answer these questions. You know it's all very guided".</i>	I
	<i>"I had eighteen last year in those two classes but we have...there are eight computers in the room and if I go down and get one of the portable laptops, they each have ten computers now. So you can have one or two kids on a computer".</i>	I

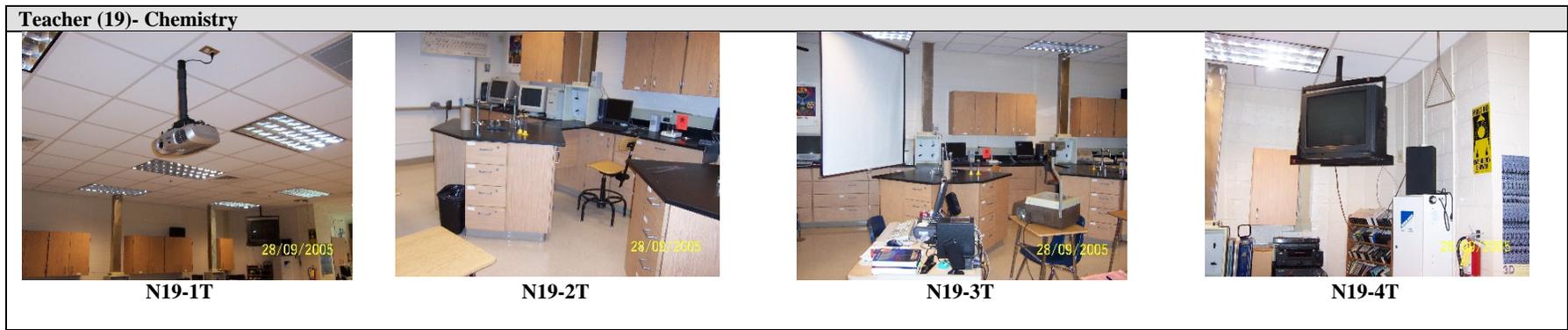


N18-1T



N18-2T

Teacher (19)- Chemistry		
Technologies	Most often used 3 technologies: 1. Interactive (smart) board, 2. Desktop computers, 3. VCR	W
	“all the [County] kids have laptops because [The County] gives them to all their students starting 9 th graders. So all my juniors and my AP in the morning and my sophomores in the first year, have computers. So they could bring them if I needed them too. And most of them bring them every day”.	I
	“I would like to have another whiteboard space. I mean the door is not placed good, but what can I do... The door is almost in the middle of the room”.	I
Monitoring	“I’m always walking around the room, and come back up here and the board... so I don’t like that kind of thing. I like open between me and the students... That way, When you’re walking around you can see what they’re doing—make sure they’re paying attention to you, not playing a game on their cell phone now or on their calculators, or doing other homework”.	I
Access	“finally we got this ... ceiling –mount projector, this was done last year after school was out, which was wonderful because it used to sit on that cart. That’s the little cart right here. Well, anytime anybody would go by, even though I had the wheels locked, and bump it. And it’s out of alignment with the smartboard. So I was always having to reorient the smartboard. Plus the cart here was in the way. It’s sitting by here so the chairs were back there”.	N19-1T
	“[having the computers at the same lab station] is good and bad. They have to be over here to do interfacing with lab equipment.... So they computer’s there and they work here, and that’s why I have these strips. I don’t have no power outlets. but sometimes it’s too crowded though—trying to work on the lab. There’s not a lot of lab space. I have to have balances. I’ve got balances in the back of the room, but these are just the little cheap balances. You couldn’t have a student work on the computer while other students are doing experiments...[It’s kind of tight here in this area]”.	N19-2T
	“even though we have many electrical outlets, there are still not enough. That’s why I have all these strips... I have hot plates. We don’t use Bunsen burners very often; I have hot plates. Well the hot plates requires a plug. And then if you have interfacing, like with the temperature probes and the TH meters, the interfacing has to be plugged in too. So never enough electrical outlets”.	I
Visibility	“when it gets afternoon I have to close the blinds, even if I’ve opened them in the mornings. The morning’s not too bad, but by 1:00 it’s really getting sunny and the glare... For me looking this way at the students, if I’m up at the board and stuff, it’s a glare for me; it bothers me... And not so much I guess the students, but then it also creates a glare on the board—the smartboard or the board. Or if you’re looking at a video you pretty much have to close it too”.	I
	“[mostly need to shut down the lights all the time...When [projecting]... having that [the projector] up there instead helps, usually you’ve got this little circle of reflected light that’s pretty much gone with it up high like that, which really helps”.	N19-3T
Patterns/ Modes of Use	“I prefer to use the overhead when I am ... I put up keys and work problems. They have problems to work. So I work out the keys with the problems all solved. And then put them on a transparency, which I go through one at a time. Instead of me working them out here, I already have them worked out and uncover... But it really saves time—unless I need to work a problem that they’re all having trouble with. But just to check homework, I just put them up and they can check their problems themselves. So that makes for a glare. So that’s a real problem”.	I
	“I use both [the white board and smart board]...just depends on what I’m doing”.	I
	“The TV... this is not a really good spot. The only other ... the two spots were like there or there. In fact, I just switched my VCR because if you’re sitting back over there...of course you have to turn your desk around and look up there. And if you’re sitting over on that side of the room, it’s small. So I pushed my VCR and now I project through the computer. So that’s for the smartboard. So it’s a lot bigger and the kids like it... But it’s such a small [TV]. And looking up and all that stuff –it gets awkward. So everybody has to turn around and all that stuff. So that’s a problem”.	N19-4T



Teacher (20)- Mathematics			
Technologies	Most often used 3 technologies: 1. White board, 2. Interactive (smart) board, 3. Overhead projector		W
	<i>"I don't like the whiteboard because it's messy. It's as messy as a chalkboard though, and the markers don't hold up. They're just....They empty really fast. Very fast. So that is kind of irritating"</i>		I
	<i>"It's not enough room [for using the smart board]. It's not enough space. And I would be capturing and saying 'Excuse me while I capture.' And then I erase everything and start over. At least these boards are long enough; I can work a whole problem. And some of these problems take a lot of steps. In calculus they do. So, if there was a way that I could... And there are instruments that you can tack on to the board that will capture what's on your actual whiteboard. I wouldn't mind having one of those. Where do you draw the line? They gave me a smartboard so I didn't get one of those"</i>		I
	<i>"[I'd like to have] Updated overhead projectors, and nicer overhead projectors. The screens are crooked and they don't... because the classroom is so big, I feel like I want to utilize that space and so I'd like to have the projector far enough out where it's not blocking anything. But I can't focus it well enough because of the location. So I have to constantly back and forth. It would be nice to have a permanent—something like that mounted or maybe something with a little more high tech than an overhead projector"</i>		I
Visibility	<i>"When I use the overhead I don't close the blinds because it's a pretty good bulb in that thing and it projects pretty well"</i>		I
	<i>"The cubbies are OK, but the students don't want to use them so that's wasted space. The cubbies could go and the screen could be there. I would much rather have a larger board and no cubbies"</i>		I
Access	<i>"I use it [the smart board] quite a lot. But I would use it more if I could access it better. I don't like having that computer there and apparently there's nothing they can do about it in the immediate future"</i>		I
	<i>"I like having the overhead mount for my projector... It projects what's on that computer on to that"</i>		N20-1T
	<i>"I hate that TV there. I hate it there. It needs to be in the corner or it needs to be in this corner or that corner. It needs to be out of the way. It needs to not be in the front of the room. That is awful"</i>		N20-2T
	<i>"My computer location with the hub for the smartboard is not working. Because I'm right handed, I need to be here. And when I'm here trying to point things out, I'm covering up and I'm running into my students. Now I suppose I could my computer over there, but the hub in the floor for my internet connection is not working. So I have to use an extension cord, which we'll take a picture of so you'll know what that is, is running from there over to there. And so it's like I'm tied. I'm tied to right there and I can't move either way because someone will trip over that invariably, and</i>		N20-3T
Patterns/ Modes of Use			

Teacher (20)- Mathematics	
that's not working. So what needs to happen is that they just need to activate...make sure that ALL of these are activated or they need to be in the wall. They need to be somewhere else. And they did this, I guess, so that the students could have computers on their tables if they needed to... But now we have wireless; we don't really need that".	
"I am a tall person and I am right handed, so I start on this side of the board, and I hover on this side a lot and I'm doing this. And it's very irritating. The plug needs to be somewhere else so all of this isn't in my head. I don't like that. The screen is right in front of the board so if I'm teaching, I'll pulling the screen down and then I'm pulling it up. I'm pulling it down. I could just shine my projector onto the whiteboard—I realize that—but it would be nice to have a screen elsewhere so that I have a full board and the screen somewhere else".	N20-4T
"I have another whiteboard ... I rarely go over there because I'm teaching to the bell. And to take the time... I guess I could have it up there when they get there, but I rarely use that".	N20-5T
"The pull-down screen I use for my graphing calculator projection".	I



N20-1T



N20-2T



N20-3T

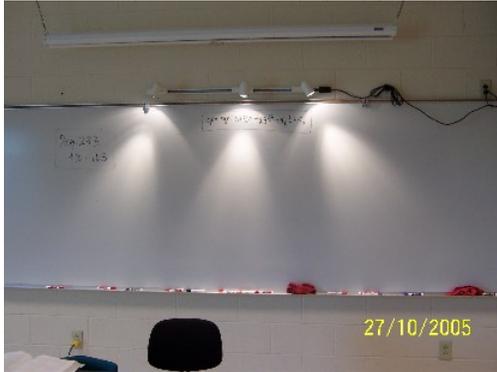


N20-4T

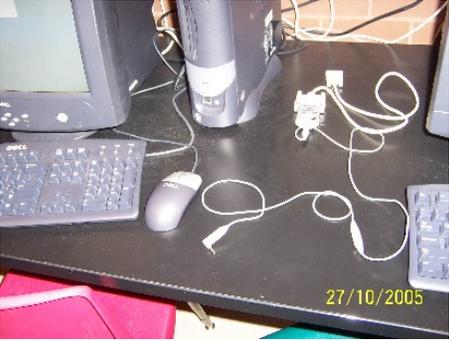


N20-5T

Teacher (20)- Mathematics		
Teacher (21)- Mathematics		
Technologies	Most often used 3 technologies: 1. White board, 2. Desktop computers, 3. Interactive (smart) board	W
	<i>“This actually right here is a bulletin board, but I’ve covered it with white paper because I like to use it for my projection. My projection screen hangs right there, and if I pull down the screen it covers my board and I can’t use both at the same time... I actually considered having it move, but in order to have it come so that it won’t cover my board, we needed to get long cords up where the ceiling does it’s little larger-to-smaller ceiling... In reality, I can deal without it, but hey why not—if they built it in I can definitely use it. But it’s just never been convenient to get that thing hung so it hangs down right. But that’s one of the things that I would like to have done if possible. Is to have that screen moved—I think that would be helpful”.</i>	N21-1T
	<i>“We use the graphing calculator an awful lot. And I’ve got my calculator linked on my overhead that I can use, so I can project what I’m doing on the calculator. They use the computers fairly often—if for nothing else to do web searches, to type up assignment”.</i>	I
Access	<i>“But the wiring is not very good. There’s not enough plugs. There are too many wires hanging. I think it’s an eyesore—and particularly because it [the TV] does not swivel, I think it’s pretty much useless. I’m lucky because I’m short, but if I get someone taller in here, it’s right up there in their head”.</i>	N21-2T
	<i>“We’ve got the drops in the floor for the computers if we need them. The only issue is that, on occasion, they wax the floors and they get waxed closed. And the other issue is that some of the drops are not activated. They’ve got power but they don’t have internet”.</i>	I
	<i>“that little thing back there, and I don’t have a whole lot of experience with it –it’s a wireless. And so some of my students who have laptops, they can use wireless internet. So it’s not as important to have the activated drops in the floor as it maybe used to be”.</i>	I
Visibility	<i>“I installed the track lighting. I made a special request and I installed that because I’ve got dead spots on my board that even on the brightest day, it’s hard to see. It looks like my board is shaded right there. And I think part of it is where that ceiling does come down. It blocks some of the light. But I had students that couldn’t see very well, so I did those lights. It’s a temporary fix; it’s not great. But it does the job”.</i>	N21-3T
Patterns/ Modes of Use	<i>“I’ve got my smartboard here. I actually don’t use it as much as I probably should. But it is really nice to have. You have to pull the computer out. I actually prefer that because then I can move the computer around. I can project wherever I want. A lot of the rooms have the projector mounted up in the ceiling. I actually... I wouldn’t mind it, but I like having it so that I can turn it around and project wherever I want...Or I can project on the screen or wherever. If it’s fixed it just has to point right at the smartboard. I don’t feel like I use it enough to warrant paying to have it mounted. I can pull it out and use it when I need it...I use the board most often. I do use that some”.</i>	N21-4T
	<i>“My TV sits so close against the wall that it doesn’t turn; it doesn’t swivel. So there’s no point in it being mounted on a swivel. To be perfectly honest, I’ve never once used it, other than when kids have said, like when we had 9-11 and the kids wanted to watch the coverage. I’ve used it like that. But I’ve never had to use it as part of a lesson”.</i>	N21-2T
	<i>“This board I usually mainly for supplementation when we do practice problems on the board. When the students write stuff up I let them use that. Or occasionally if I want to be able to talk about a particular problem and keep coming back to it, but I have to erase what I’m doing, I’ll put it over here and say, “Keep referring back to this,” so they’ve got it in their memory. But I’ve got that full board up there to use”.</i>	N21-5T
	<i>“I use it [the smart board] some, but I don’t use it probably as much as I should. But sometimes I find that using it just for the sake of using it, because it’s there, rather than using it because it would be a good tool. I’m more of the opinion that if there’s a good time to use it, I’m certainly going to do that, but I’m not going to force it just so I can say I used the technology... A lot of times when I need to project a graph or show an animation—particularly with Java applets ... It can be really useful... And then when the kids... A lot of times when I have them do a group project—part of that project will be presenting what they found. And they’ll use it when they do their presentations with PowerPoint and with writing things up. So, occasionally I get my stuff together well enough ahead of time to do a PPT of a lesson. And we’ll work some problems on the</i>	I

Teacher (21)- Mathematics	
	<i>board with the smartboard rather than up on the whiteboard. I typically use it in a similar way that I would use my whiteboard".</i>
	N21-1T
	N21-2T
	N21-3T
	N21-4T
	N21-5T

Teacher (22)- Mathematics		
Technologies	Most often used 3 learning technologies: 1. White board, 2. Graphing calculators, 3. Interactive (smart) board	W
	<i>"Sometimes the lesson is presented using a power point and smart board; sometimes the white board and or the overhead projector is/are used. When students are using a particular application on the calculator, I demonstrator using the overhead and the appropriate attachments."</i>	W
	<i>[The projector that is hooked to the ceiling, it projects to the smartboard and has the computer connected to it].</i>	I

Teacher (22)- Mathematics		
	<i>"I have one video that show occasionally. One video that has several different... I think 5 different things that I could show. That's another thing that I seldom think of... Rarely the TV."</i>	I
	<i>"we don't have enough [computers] for all of them, so we share them between rooms"</i>	I
Access	<i>"When they sweep the floor the connections sometimes are broken"</i>	N22-1T
Visibility	<i>"whatever is on the smart board might be a little bit difficult to see. And the room isn't too dark that the kids can't write with both lights turned off. But sometimes I do turn those on and there's a slightly different... One of them I have a better view of the smart board than the other switch"</i>	N22-2T
	<i>"With the white board I haven't had my students say that they can't see. I have a couple of people with vision problems that I instruct and move around the room. But I know in that class over there I had students who couldn't see the red pen when I used it. I don't know if that's just a personal problem because I hesitate to use red any more. But when I have some students, if I have it and I'm writing on the board, they've never had a problem seeing it"</i>	I
Patterns/ Modes of Use	<i>"Actually I don't use that one; I've used this one over here, and this is where my overhead is... sometimes if I'm working on the smartboard over there, I may take the overhead over there. And I have used that screen if I'm talking about the smartboard and I need to show them something on the calculator. Then everything is over there"</i>	N22-3T
	<i>"usually [use the smartboard] when I'm introducing a new topic. I'd say 2 times a week, if it's a week full of teaching... I could have shown them, gone through the presentation in a different way. But some of the classes really like the smartboard"</i>	I
	<i>"Usually on a lab day, which is one day a week, they need a computer. And sometimes the activity is two people on a computer. But most of the time I really like to have them do the activity ...each person to experience it so if they can have their own computer. And this year because we have county students, they usually bring a laptop in... Anyhow, I have enough students that bring their own laptop so that everybody can have their own computer"</i>	I
	<i>"But they are using the computer in some way almost every day. I'd say pretty much 5 days a week, for say, 3 out of 5 lessons, class periods"</i>	I
		
		
		
		
<p style="text-align: center;">N22-1T N22-2T N22-3T</p>		

Teacher (23)- Mathematics		
Technologies	Most often used 3 learning technologies: 1. White board, 2. Overhead projector, 3. DVD player/ recorder	W
	<i>“Technologies range from...well in the area of presentation I have the LCD projector and the overhead hooked up to the computer in the front of the room so I can do PowerPoints. I can do internet presentations. I can do mimeo, which is sort of like the poor man’s version of the smartboard. Interactive on the front board – I can do all of that. I have TI-83 Plus overhead, which I use extensively with the graphing calculator to demonstrate concepts on that”.</i>	I
	<i>“I don’t think as we evolve we’re going to see that many PCs in the building. We will have a few. I may end up with some PCs back here somewhere”.</i>	G23
	<i>“We have 5 computers in here, plus the presentation computer over there. 5 computers that are for student use, and the overhead projector for use with transparencies and the overhead. And that’s about the limit of the available technology in here, other than the available software that you can bring in on the computer”.</i>	N23-1T
Mobility	<i>“Now we have the remote in there so that the kids can bring in their laptops. And really, I don’t need to have PCs hooked up in there if I can have kids with laptops working off the remote”.</i>	I
Access	<i>“Computer access is an issue because (a) it’s a small room. I have a limited number of portals across the back for computers. I’ve maxed that out. Two computers and the printer take up all that are there. I have space down the sides of the room, but then if I put tables there to put computers on, then I’d have to give up space to do that”.</i>	I
Visibility	<i>“Usually you have to keep that window shade drawn for projection purposes and because by the afternoon the light coming through there puts a glare... it’s in the kids’ eyes that sit on the tables opposite the windows. It’s not a helpful thing”.</i>	I
	<i>“We thought we would have issues with there being a big spot, you know, of glare from some angle somewhere in the room, but it didn’t turn out to be that way”.</i>	N23-2T
Patterns/ Modes of Use	<i>“The old stand-by of just transparencies on the overhead projector for some things that are old material that I still have in that particular format. A lot of the projects that they do are ... the reports that they are required to do, or the product that they’re required to present is word processed, so they spend a lot of time on the computer working on that. And they have software applications such as MiniTab, and Graphical Analysis, and of course Excel spreadsheet that they’re using how to use. They all have mathematical applications so that they can process data. We teach team them early on how to take the calculator and hook it up to the computer, and dump calculator screens into the computer and put it into a Word document and integrate it. Do things like this so they can do integrated documents”.</i>	I
	<i>“They mostly use a computer for work. Of course, they take computer applications and technology cap, so they get a complete exposure to the curriculum there on how to use a lot of many different aspects of a lot of these programs. And we don’t necessarily use all of them in the math classroom, but it doesn’t mean that they can’t use them when they’re preparing their report”.</i>	I
	<i>“It’s a big plus because instead of having the projector on a roll-around cart—so that it keeps getting bumped all the time, especially if you’re working with a smartboard. You have to re-register your smartboard every class, or in the middle of class. It’s a real pain”.</i>	I
	<i>“This is the LCD overhead projector, and it’s set up so that it projects from the top of the whiteboard to the bottom of the whiteboard. And that allows me to use the mimeo. And I can write on the whiteboard. So I can actually project on the whiteboard instead of pulling down the screen and using the screen. So anything that I project up there I can take a marker and write on, or I can use the mimeo markers and use the mimeo screen, and navigate my way through mimeo and use the interactive mimeo”.</i>	N23-3T

Teacher (23)- Mathematics



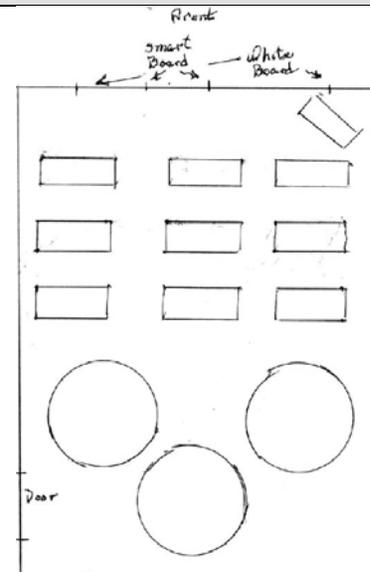
N23-1T



N23-2T



N23-3T



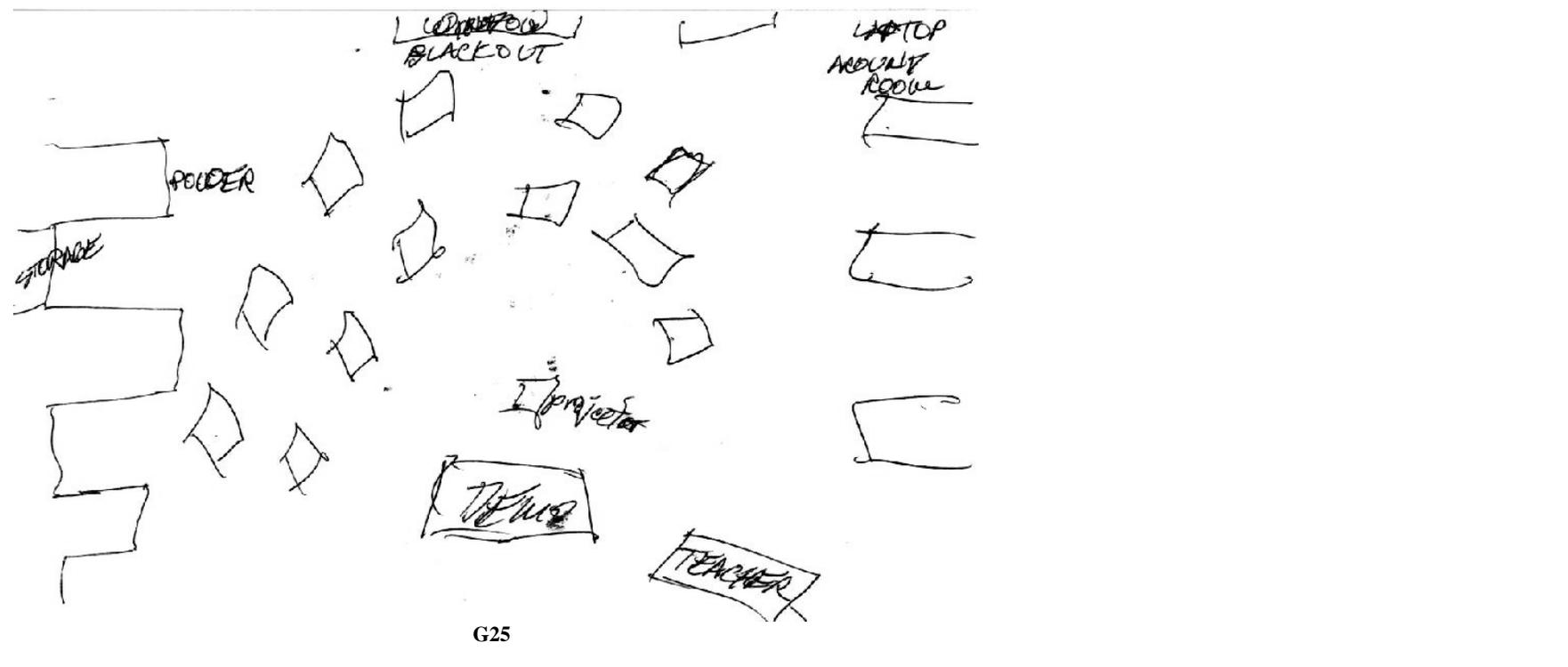
G23

Teacher (24)- Computer Science		
Technologies	<i>"Now the classroom computer in the past – and I'll just take a picture of a number of them – is the desktop computer. And we're moving more in the direction of the laptop computer".</i>	N24-1T
	<i>"it would help me to have a bigger screen and a better projector, that would project to a wider screen".</i>	I
	<i>"This one [projector] is attached only to this one computer. So I mean you could attach it to more than one computer, but if I want a student to demo something, I just ask the student to come up to this computer".</i>	I
	<i>"The largest class is about 18. I think we have 24 or 25 [computers]. It's more than one to one, so I may move out some of the computers and put them in other classrooms where teachers have requested them. I don't want any more computers in here than I have to have. Any more than the largest class".</i>	I
	<i>"I have never used that [the TV screen]. I don't know why it's in here. I don't think I've ever turned it on. I don't know if it works. So that's a feature ... that was here when I came here years ago... I mean I suppose there's something on TV I could show that has to do with my classes, but I just don't have time".</i>	I
Mobility	<i>"I don't choose to use a smartboard. Well, let me show you. This is just a tablet PC and what I can do with this –although I haven't hooked it up yet – is attach one of these Linxus units to the projector. And I could sit ... I mean in theory I could even walk around and do this, but you can write on them here with a tablet, with a stylus, and it projects up to the projector and then onto the screen. So I prefer this to the smartboard. I think the smartboard had its place. And a lot of teachers here do use them. But I've never requested one, but I did request this. So as far as I'm concerned, this can replace... It's possible that this could replace the smartboard. Plus you don't have to go through that set-up process".</i>	I
	<i>"I think more and more we'll be going to laptop computers, something like this. And the space situation will be improved because even if we don't have the amphitheater-type arrangement, because instead of having all this equipment you'll just have this much space for your computer. I hope that happens...And then people can kind of sit where they want to sit. It's less regimented where you have to pull up a seat in front of where a computer IS".</i>	I
Patterns/ Modes of Use	<i>"mainly what my classes are about is projected on a projector. The students follow along on their computers, but of course it's very important that they able to see what I'm doing".</i>	I
		
N24-1T		

Teacher (25)- Physics/ Computer Applications		
Technologies	Most often used 3 learning technologies: 1. White board, 2. Projector, 3. Laptop computers	W
	"... [I] do many demonstrations that require the student to describe what is observed and adjust the student's thinking about the topic (in most cases). Demos can be java applets and other software simulations projected on the board, video segments, (laserdisc, VHS, DVD), and physical equipment. This allows for discussions, practice problems, and lab simulations."	W
	"Both [use of laptops and desktops]. And that we've been switching over to the LCD, as opposed to the big monitors, which has made a huge difference in terms of the space on the desktops".	I
	"Two VCRs, laser disk, DVD player, audio tape. And that was just because there are times when something needs to be reproduced. I end up being able to make a tape and then copy it, kind of thing. And then the TV is down there so I can see what I'm doing without having to project it onto the big screen... Yes [I designed this station]. And at point... And this projector has the camera on it. One way or another, having a camera here is very helpful... So I can put things on here and project it I".	N25-1T
	"So from the standpoint of technology, I've got a Macintosh back there so I can do videoing there. I have got digital cameras, movie cameras – I've got access to a lot of things that I really enjoy being able to use if I could ever find the time to do as much as I should be able to do".	I
	"that TV is so old it doesn't show closed captioning. And so what I really need to do is bring the cable TV connections. Obviously I need to move this more toward the center".	N25-2T
	"We've basically bought 2 projectors a year, and each year it's gotten brighter and brighter and brighter. So eventually we'll be replacing these things. This is 5 years old and at that time it was an excellent projector. It was a \$4000 projector, which is very expensive".	I
	"[I'd like] A teacher's workstation that would be somewhat like what I've got where all of the media is available, and that would then be connected up and probably a projector. A hung projector would work. That projector, as long as I have a camera over here—a couple of cameras of here – then that's quite workable. It's out of the way. And just make things easier to deal with. So I'm OK with this. These lab stations. I would like to do a little bit more with storage".	G25
	"There's this device that is a graphics tablet... I like that concept. The fact that you could have 2 or 3 of them in the room and you could hand it to a student and they could write things and have it projected, as opposed to using the whiteboard and everything like that. It would help if it has a screen so that there would be feedback...So, I think that technology has got some potential that I think might be work taking advantage of being able to walk around the room and annotate".	I
Mobility	"I really think laptops are probably the way to go... I think I would say we don't want to plan for desktops nearly as much as the flexibility of laptops. Wireless laptops, and then go on the desks, or be used as the lab station. And then the question is does each individual kid have their own laptop or do you have laptops that are placed in a storage area and then they go pick them up and bring them to the lab station or bring them to the desk and use them. So laptop availability throughout the room".	I
	"If I had a little bit of options—most of the teachers really want this projector hung. Well I have all these other things that I want to be able to use with it, and I don't want to figure out what kind of cabling I'd have to have to get all this to be able to be projected. And then the camera would be lost. But I could get by with a movie camera and a small tripod, and leave it on the station, and move the station off to the side. And then hang this and not have to worry about the camera".	I
Access	"We had intended that there would be power here at the end of the table. When the electrician came in and did things, he decided he would put it there instead of down here. And so in doing that, in making that decision, it turns out that that was a bad one because now we have things coming up and over the edge of the sinks, on the sides, and power is not available out here so we could have been using it out in the room more".	N25-1T
	"Practically speaking, I would have thought that I had plenty of electrical outlets. I need more".	I
	"The projector is not as bright as it should be, so we have to turn part of the lighting off. We have 2 light switches, so we can cut off either 2 or 1. That works pretty well".	I
Visibility	Some classroom we've been able to go back in and connect the two together so that one switch would turn say this one completely off...[Which is	I

Teacher (25)- Physics/ Computer Applications		
	<i>above] The board and the projector and the screen, so that we'd still have light out in the room. So that one is something that ought to be done. In other words, turn off the lighting over the top of the screen would be VERY helpful as just a feature, which means instead of having 2 in 1 in these two banks, you'd just have them all in 1 switch and when you turn that switch off it turns these off completely. And then it turns off maybe the one light and all the others.</i>	
Patterns/ Modes of Use	<i>"They [lab benches] are enough for the labs, but then when I need to have maybe one computer per group, then it's become necessary to supplement it with these other machines. And that I've got one client that's 16 where they needed an individual computer, so I've got 4 laptops that some students will use out in the middle of the room – wirelessly. And as long as I have the batteries charged, then I don't need electricity".</i>	I
	<i>"the laptop has been helpful to me. I have ended up moving my office to here [at the projection table] rather than using the office very much. But that's because I've been fortunate in the fact that this room has not been used by other teachers... So I'm able to work in this space all the time. That's a luxury, and I know that. But there's always a need for me for more space".</i>	I
	<i>"There are times when I'm projecting onto the white board. I was projecting an image so I could draw right there on the image".</i>	N25-3T
	<i>"I don't like the smart board. It's too expensive. There are other things that I could spend that money on that I would find more effective. The resolution is too coarse. I find that there are some things I could do on the screen so I'm facing the kids more directly, rather than my back to them and looking up here. I just find that I'd rather do it other ways. These are some of the things that I do... We've got mimeos, which are the devices that sit here and captures what you are writing on the whiteboard, which are \$400 instead of \$1600. But there are still a few times when I feel like I really need to capture stuff. If I've got some images, most of the time they're on the computer anyway. My annotations aren't typically that important that I've got to worry about capturing those annotations. And I'm trying to get the kids to figure out how to take notes to deal with things like this anyway".</i>	I
	<i>"I'm always somebody who does not like PowerPoints because they are too cryptic. They should not be every note. PowerPoints...I use them just for a few things to keep me on task. They're supposed to remind me of the other things I wanted to talk about kind of thing. And therefore, often to hand those out as notes is misleading because they need to add a lot more detail than what's on there. So I don't use PowerPoints very often. And PowerPoints and smartboards are what a lot people use".</i>	I
	<i>"[don't use the TV] because I've got VCRs and laserdiscs and all that, so I want to project everything. Now my problem is that I've got a hearing-impaired student, so I need closed-captioning. There's no closed captioning that's available for projectors, although I found there is, but I can't get a hold of it yet. I've taken the VCR off of there. The only thing that's used for is to project TV—coming in across cable".</i>	N25-2T
		
N25-1T	N25-2T	N25-3T

Teacher (25)- Physics/ Computer Applications



G25

Appendix H: Participant-by-Space Data Matrix

Data Sources:	W= Web-based Survey ,	I= Interview,	N= Image Narration,	G=Graphic Illustration,
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Category	Participant-by-current space	Data
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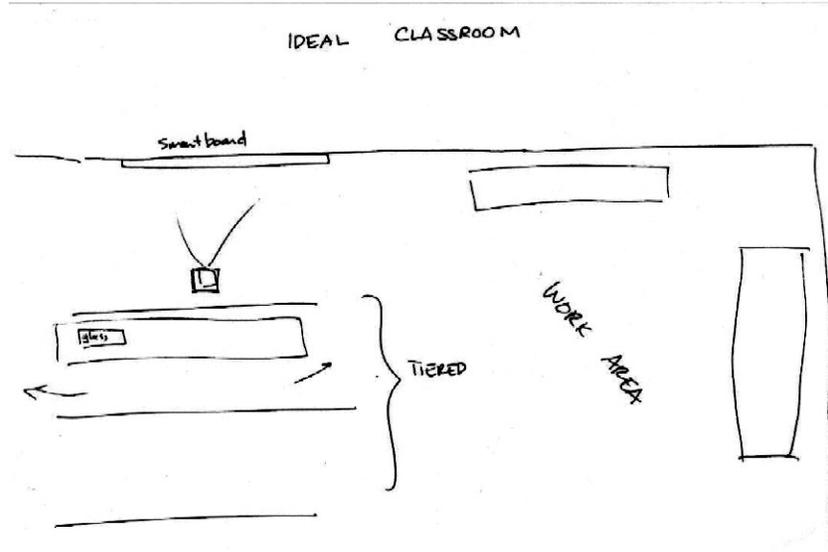
Teacher (1)- Computer Programming		
Flexibility	<i>"This set up does encourage team work or whole class participation ... I also find that this arrangement will make me move chairs even quicker than the individual chairs too. So if I wanted a different arrangement we can quickly adjust to that."</i>	I
	<i>"Several times we rearrange for more workspace, sometimes for learning groups, I don't like calling them learning groups, I call them flexible grouping where students have the choice who will be in that group, and its never a group that stays together for the full year,... and they get to see different personalities and different group dynamics."</i>	I
	<i>"If this was in a tiered nature I would like that very much ... I think the reason I would like that better is because its novel to me!</i>	G1
Access	<i>Probably I would like the rows where the monitors are under a glass surface... if it was tiered its not flexible, but what they want is the table top space... I think that's more important to me than rearranging the room to meet the needs... and then the second half of the room is an empty space, where we have work tables where they can do whatever!" ... "The only problem would be access for students from both sides."</i>	
	<i>"The layout of my classroom allows for greater movement and quick access to technological tools for achieving my goals for the day."</i>	W
	<i>"Access would be a problem sometimes [for the tiered layout]... another access would be nice on both ends [pointing at the instruction area]"</i>	I
Space Layout/Proportions	<i>"This set up does encourage team work or whole class participation."</i>	I
	<i>"I probably have a lot of space in this class... I can fit 40 students, 20 at this side and 20 at that side quite easily [pointing at both sides of the room], so I am not scared of space, but with the additional robotic systems in the back of the room... so you can see these chairs [the back row] are already passing the mark on the floor [marks the beginning of the robotics area]."</i>	I
Size of Learning Group	10 students	W
		I
Visibility/Lighting	<i>"I teach with smart board a lot, at times I need to turn off the lights."</i>	I
	<i>"The ceiling is awfully high... it has directed lighting... it has these grills which doesn't make it as genuine as pure fluorescent lighting would. And I think its high enough that it doesn't cause problems. ...The lighting I think is very very fine, we don't seem to have problem, if anything I think it might be too bright. "</i>	N1-IS
	<i>"The same type of windows would be fine with me... I would use different shades... give me something which either block [sun light] completely or let it all in, one extreme or the other."</i>	I
	<i>"I would make [the lighting] softer, that would add to the ambiance and the learning atmosphere too."</i>	I
	<i>"Partial lighting would be nice,, I think the dimming would be very ideal , especially if we are doing the movie scene (making of a movie)"</i>	I
Activity Patterns	<i>"Several times we rearrange for more workspace, sometimes for learning groups, I don't like calling them learning groups, I call them flexible grouping where students have the choice who will be in that group, and its never a group that stays together for the full year,..."</i>	I

Teacher (1)- Computer Programming

and they get to see different personalities and different group dynamics.”



NI-1S

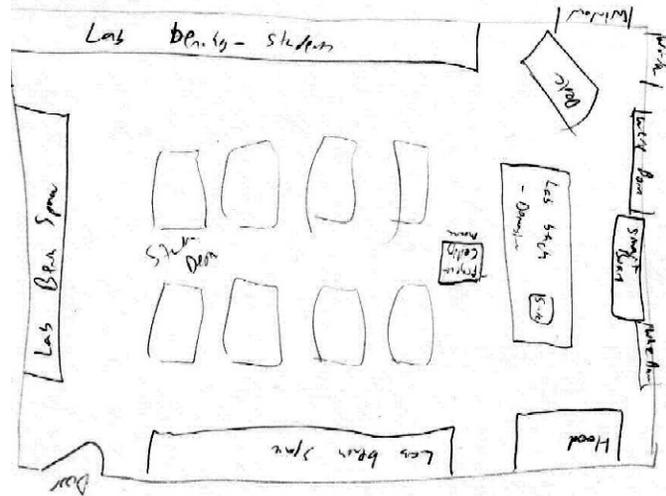


G1

Teacher (2)- Mathematics			
Access	"The projector should actually hang from the ceiling, taking it out from the way."		G2
Space Layout/Proportions	"I've got basically all of the desks set up where the focus of the room is this particular board [smart board], that's where I need their attention focused."		N2-1S
Size of Learning Group	15 students		W
Visibility/Lighting	"When the sun rises, and during morning classes... I might get a little bit of glare on my computer screen, and as it goes up it washes out the board."		I
	"If it's especially a bright day outside, I might put the lights down, but I usually put them on all the time, that I need to let them see their notes and everything clearly. I tend to keep the lights on."		I
	"I really don't have a problem about how the lights are laid out."		I
	"The one thing about the light that can be nice is if I have dual light controls, if I can kill these front setup lights without affecting the back lights."		I

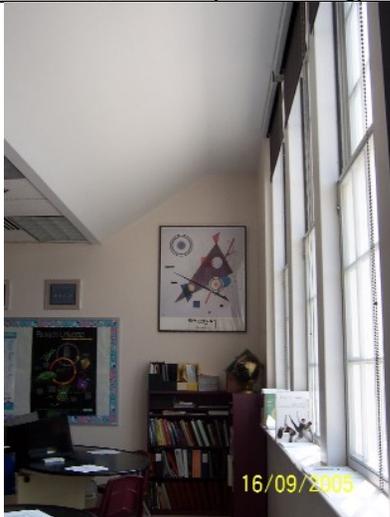


N2-1S

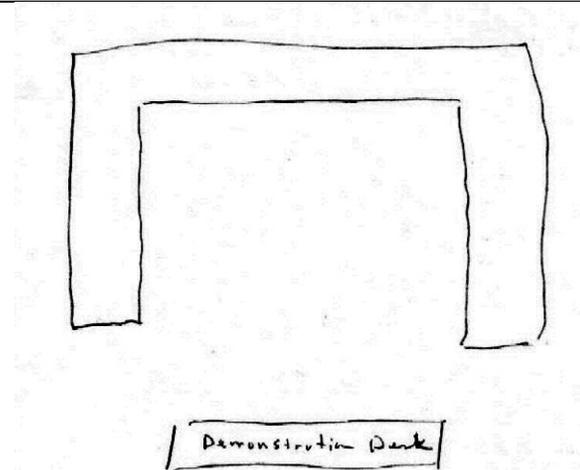


G2

Teacher (3)- Anatomy/Microbiology			
Access	"It is very important to have two doors in a lab. In case of emergency you can get out from both doors."		I
	"It would be nice to not have the cart at all; see I've got limit how I can arrange the table. But it has to be wired where it is."		I
Space Layout/Proportions	"They really arranged this room the wrong way. The problem is the white board is in the wrong place... for one thing, the front of the room is there [pointing], and what I have there is a bulletin board...I guess they wanted everyone to look this way [pointing to the direction of the white board], but unfortunately your demonstration table is in the wrong place!"		I
	"When we are doing microbiology, you need a place where there is no wind going around. And this area back here [pointing to the back of the lab area] is very helpful because you don't have much breeze blowing across your sample. On the kidney shape tables there is air movement by the people moving around."		I
	"This end of the room [back area] is supposed to be for research, this is the reason for the division. But it works out very well, because when you're doing microbiology things, this is more of research than dissecting a cat. So we do the big things over there."		I
	"I cannot rearrange the furniture until the cart is gone. In order to put the projector in the ceiling all the wires need to run in conduits."		I
	"I like them to see each other speak."		G3
Furniture/Surfaces	[The lab area: anatomy and microbiology]. "The neat thing about these tables is that they go up and down. That helps because when you have students lined up three on a table over there; it's very claustrophobic to take a test. So they have plenty of room, they can avoid being accused of cheating and things like that. And there are sometimes when you're using the microscope when you don't want to be standing up. So you can sit down, and I can room the regular chairs over here instead of having special stools... you end up with your back hurting from sitting down on a stool."		I
	"The only thing that I would change about these tables is that I would have them without the computer shells on top...because everything is on a laptop... when this was done in 1999 this was the way to go. If you didn't have the desktop over here, there would have been more space for storing microscopes and so on."		I
Support Spaces	"Having the classroom and the lab connected is good, because they[students] don't need all their junk in the lab... that's a lot of mess."		I
Visibility/Lighting	"I control the shades as the sun goes to the west, and since we have this semi transparent shades, by 3 o'clock in the afternoon I can have them all down and not let light coming through and I don't need to have any light."		I
	"It's true that in a lab where you use microscopes you need to have [lighting] control, if you're working with a microscope you need to have much dimmer light. Even if you pull down the shades, it would be nice to have some lights on and some lights off, because not every teacher likes to play with the shades all the time."		I
	"We were fortunate to have high ceilings so the classrooms stay cooler. We did these lovely things with the windows to keep their sizes. Which really adds a lot to the inside as well as the outside of the building because of the curbs.... I think this is a good solution because it gives you space for the modern duct work, and electricity, and yet you get all the original windows and the light is better. It ca be an architectural feature of the building."		N3-1S
	"It is a little dim on this side of the room [away from the windows], it would be nice to have the lights, in the ceiling, instead of having them all on at one time, if they had 2 or 3 lighting patterns that I can use. Some of them can have incandescent lighting on a dimmer."		I
Activity Patterns	"I do group work, they can change seats... most of the times they do group work back there [the lab area]."		I

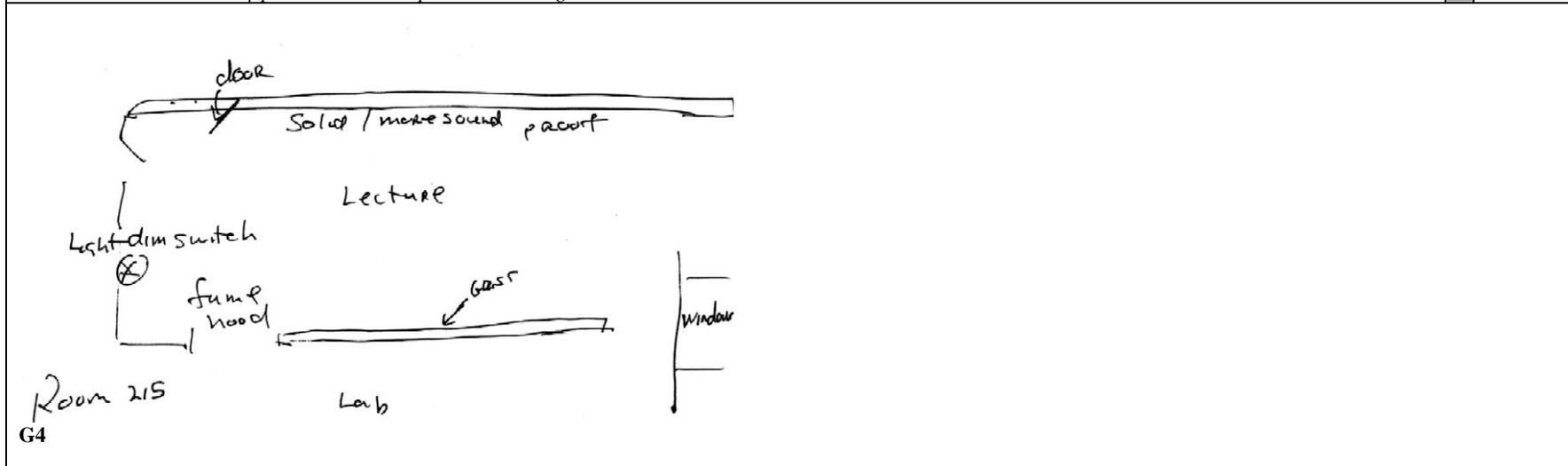


N3-1S



G3

Teacher (4)- Chemistry			
Flexibility	"The room is quite suitable for science, we can do it in this room, or we can conduct it in the lab."		I
Access	"It is OK for them [students] to walk between the class area and the lab."		I
Space	"I don't change the layout during the year. For the students, other than moving the chairs, the layout stays the same."		I
Layout/Proportions	"I like the furniture the same way."		G4
Visibility/Lighting	"There are some things that require dimming especially in chemistry with the flames... I just pull down the shades."		I
	"I would say [the one best thing about the room] is that it's conducive to learning. It is very quiet, the lighting is good, and that students I think feel comfortable coming into the room, or threatened by the subject or me or the room."		I
	"Dimming controls will be nice; sometimes I have the lights off so they can see the smart board. I just turn the lights off, and then on."		I
	"Sometimes I had to come over here [the classroom area] to put something on the smart room, so it blocks my sight momentarily. A glass partition would improve monitoring."		I



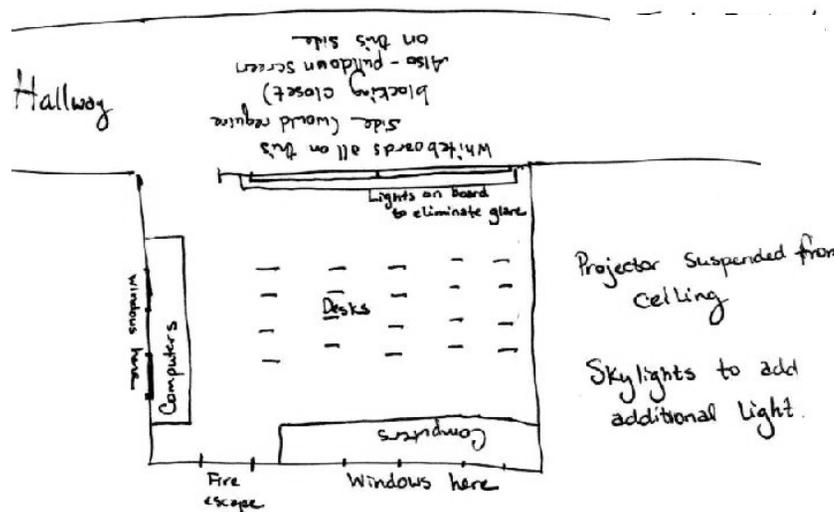
Teacher (5)- Mathematics		
Flexibility	"if they need to move entirely they are welcome to do that, I let them sit wherever they want. I had a student who sits on his desk most of the time."	I
	"I actually like that classroom is wider than it is long, and that way all the students are near the front of the room, and they can easily slide together and do things together."	I
Space Layout/Proportions	"They would have to share computers. Ideally, these tables would not be here any longer [on the perimeters], this is a converted lab room, and so if these tables are gone, I would have computers on the back and I would be able to keep everyone in the same room."	I
	"I find that they get distracted by the window up above... if it was not above the board or on what we are supposed to be doing [that would be better]."	N5-1S
	"I prefer to have at least some connection to the outside world."	I
	"Another problem that we have is that students on this side of the room can't see this board, because there are students sitting in front of the board, so I can only usually write halfway down the board... they would stand up and so on. I usually write only on one side of the board"	N5-2S
Visibility/Lighting	"They have a horrible time if they are sitting on this side... because of the TV. When they put up the TV there was no place to put it, they couldn't block the closets on the right or the door on the left, they only could put it over here, which blocks the board."	N5-2S
	"I've been in classrooms which have lights over the board that eliminates glare. That would be nice... I prefer more natural light because there is not much glare with it."	I
	"I do some group activities, put them [students] together, and move the desks and so on."	I



N5-1S



N5-2S



G5

Teacher (6)- Physics		
Access	"Back here, and we have to make it clear, we have a fire door, they made that because the building is wood. Every room has a fire escape door. And it is narrow [access]."	N6-1S
Space Layout/Proportions	"We are already bringing in new computers, we already see a difference in glare; the old monitors versus the new ones... the criteria [for choosing the new computers] really was space...it will feel more roomy, the students won't feel as crowded."	N6-2S
	"You can see the crowding and the storage problem, we are running out of space for storage"	N6-3S
	"One sink I can use...for the refraction experiment. We don't use chemicals. [Wet lab] is not a big deal."	I
Visibility/Lighting	"Because of lab work we need more control, studying optics, polarization, photoelectric effect, all kind of electrical stuff, modern physics if you like.... I have to have complete control of light, off and on, it's not really everyday."	I
	"Back here, this light is off because I have to disable it. You see, if this light is on, when I turn the lights off it stays on, its battery powered, it's what they call emergency light, but it becomes a serious problem for me. When you're doing labs, you have to control the light, but here it is, right in the middle of the room, it wouldn't have been in a worse space if they tried!"	N6-4S



N6-1S



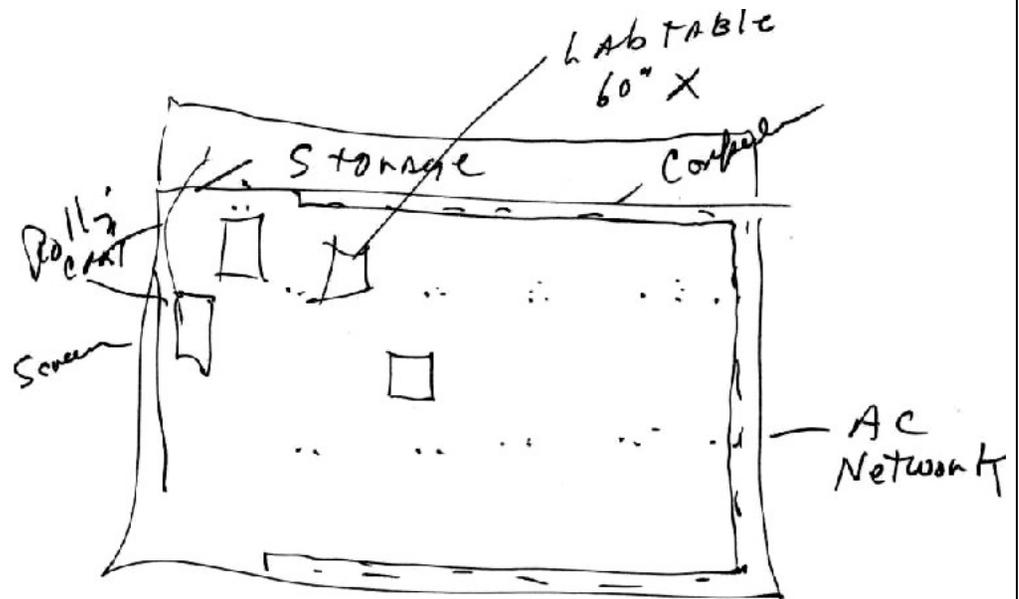
N6-2S



N6-3S



N6-4S



G6

Teacher (7)- Anatomy/Psychology		
Flexibility	<i>"I have two classroom fronts, and they [students] have to look around the posts. The room is a handicap for teachers."</i>	N7-1S
	<i>"[I would rearrange for different activities]. If they are doing lab exercise they would put the tables together and set up their exercise at the table, and they do lots of group work because you see leadership developing."</i>	I
Access	<i>"They move about very much. The thing with a structure like that I find that it causes much chatter."</i>	I
	<i>"I do a lot of work on the computers... I can't walk around the aisle [while students are using the desktops]; I have to move around one table to another."</i>	N7-2S
Space Layout/Proportions	<i>"The biggest problem with the room is that we are very crowded; there are 26 over here. And it's just too many of this room. They have to move around and the room is crowded."</i>	I
	<i>"It's hard in a room like this to use it as a lab and a classroom."</i>	I
	<i>"It's hard to move around the room, because of the posts that's kind of stops you. They are an obstruction in the room, and it's been hard to overcome."</i>	I
	<i>"If I can redesign, I would make the room bigger."</i>	G7
	<i>"I would put a large storage area as a refrigerator."</i>	G7
Furniture/Surfaces	<i>"I would have real lab tables with electrical and water at each desk and equipped."</i>	G7
Size of Learning Group	<i>"The biggest problem with the room is that we are very crowded; there are 26 over here. And it's just too many of this room. They have to move around and the room is crowded."</i>	I
Visibility/Lighting	<i>"When I have all the things going on at one time, the darker it is, when they are looking at the projection, it is hard for the back row to see, because some of these lights in the ceiling never go out. They are night lights. And this light shines though, and I have just unhooked this light so they can better see the screen."</i>	I
	<i>"If the lights are down for projection, I am constantly moving around the room... and they watch me. That's the way I prevent the lighting from having effect on them, because I don't want them to go to sleep. I don't lecture a long time, I try to keep it no more than 30 minutes, and then I have an activity for them to do."</i>	I
	<i>"I would have a window at either side."</i>	G7
Activity Patterns	<i>"They move from station to station, with a different objective at each station that I am testing for. They stay at each station probably for a minute or two, and when they finish they can go back and review anything. And there are several stations set up on the computers around the room with a website that I have that links them to atomic structures and physiological ideas that they can apply what they are learning."</i>	I
	<i>"[I would rearrange for different activities]. If they are doing lab exercise they would put the tables together and set up their exercise at the table, and they do lots of group work because you see leadership developing."</i>	I
	<i>"If I had more space I would [rearrange the room], because I love to do group work and I like to rearrange, and it makes your mind alert to every change."</i>	I

Teacher (7)- Anatomy/Psychology



N7-1S



N7-1S



N7-2S



G7

Teacher (8)- Mathematics		
Access	"If they are working individually I am walking around the room checking on them. Sometimes they are working in groups. They do group work to solve problems as well".	I
Space Layout/Proportions	"The chairs are put together to form a group, but I think group work would be easier with tables, but lectures and testing are much better with desks".	I
	"[The layout] was dictated by where the boards are when I came here, and there is more space at this row, board space, as opposed to this row. I tried once to have a different layout, where all the desks were pointing towards the center in an angle... the students were not comfortable with it".	I
	"I would like to have a larger room for sure".	I
Size of Learning Group	"The room is really crowded. There are 26 students in each class. It's hard for them to see around each other sometimes. And a lot of times another teacher would need to bring students in to use the computers, which makes it more crowded in the back".	I
Visibility/Lighting	"I usually keep the lights closed; you can see the glare on that board over there".	I
	"I think back here everybody can see the board fine. There is not much of glare if I can keep the blinds closed".	I
	"I might turn [the fluorescent lighting] on when I use the projector".	I
	"I have to leave the blinds closed... even with this light there is a glare".	I
<p style="text-align: center;">G8</p>		

Teacher (9)- Mathematics		
Flexibility	<i>"I'd have Individual desks in rows for lecture. Groups of four for group work".</i>	G9
Access	<i>"It's pretty crowded, you can hardly walk around".</i>	I
	<i>"I would say the biggest issue is being crowded, and students who have to turn around all the time to see the board or the see the TV".</i>	I
	<i>"I still would like to come from the back of the room".</i>	G9
Space Layout/Proportions	<i>"The biggest issue I see in this room is that we're sitting at tables, which means that wherever the students are sitting, I have students with their backs to the... like for example if I am projecting something on the TV, I have students sitting with their backs to the television, so they have to turn around to look at the TV. The same thing when I am writing on the white board, I again have students who are sitting with their back to the white board, and they have to turn around which makes it very hard for them to write!"</i>	N9-1S
	<i>"In order to use the overhead projector, right now I have it sitting on the side because I don't use it very much, because I have to put it on the table and shine it on the wall. Well! What that means is that if I have 5 students sitting on that table in one period, where do the students sit?! ... so it's a space utilization problem.. if I had this [individual desks] that would make it much easier. So if they were in desks, and they were in rows or whatever, everyone would be facing the front. And if I have an overhead cart or something to put the projector on".</i>	I
	<i>"We have rearranged [the layout] and this seems to be, space-wise, the best way. But we have had it in different ways".</i>	I
	<i>"When we are working labs and putting things together, [the layout] is nice, but I still think the desks are nice too because we can still put them together".</i>	I
	<i>"I don't think that anything else is bad other than the table and the projector in the ceiling and a place where I can have a screen to pull down when I have the projector".</i>	G9
	<i>"I'd have Individual desks in rows for lecture. Groups of four for group work".</i>	G9
	<i>"Computers on the perimeter are preferred because there is no extra room for a separate computer room".</i>	G9
Size of Learning Group	<i>"We have computers around the room, and I don't have enough for each student, but I can put 2 on each computer".</i>	I
Visibility/Lighting	<i>"I don't have an issue with the lighting. The overhead doesn't shine very well, but I think that's because I have to shine it on the wall and set it on the table. Sometimes with the overhead I would shut the lights off, but normally I don't shut it off for other things that we're doing".</i>	I
	<i>"Windows! I don't know. It's nice to have a little light but I have never had a lot of windows in my classrooms, will see how I will like that!"</i>	G9
Activity Patterns	<i>"Obviously, there is lecture in most of the classes. Today we had a lab, and they were doing things at their table together in groups... and the desks we could put together like in fours, so we have one big table in the middle. So we do this type of thing".</i>	I
	<i>"Definitely when it comes to their science fare time I am talking to them individually. In a regular class, by the virtual time, I have to do more group [work] than I like. I think the more hands-on they can get working in small groups, the more they remember, so I try to set up small group work as much as I can".</i>	I

Teacher (9)- Mathematics



N9-1S

- Front
- White boards across the entire front of room with one section being a graphing white board.
 - Pull down screen for use with an overhead projector (on cart) and ceiling mounted projector.
 - TV mounted in both corners

Individual desks in rows for lecture or groups of 4 for group work

Computers

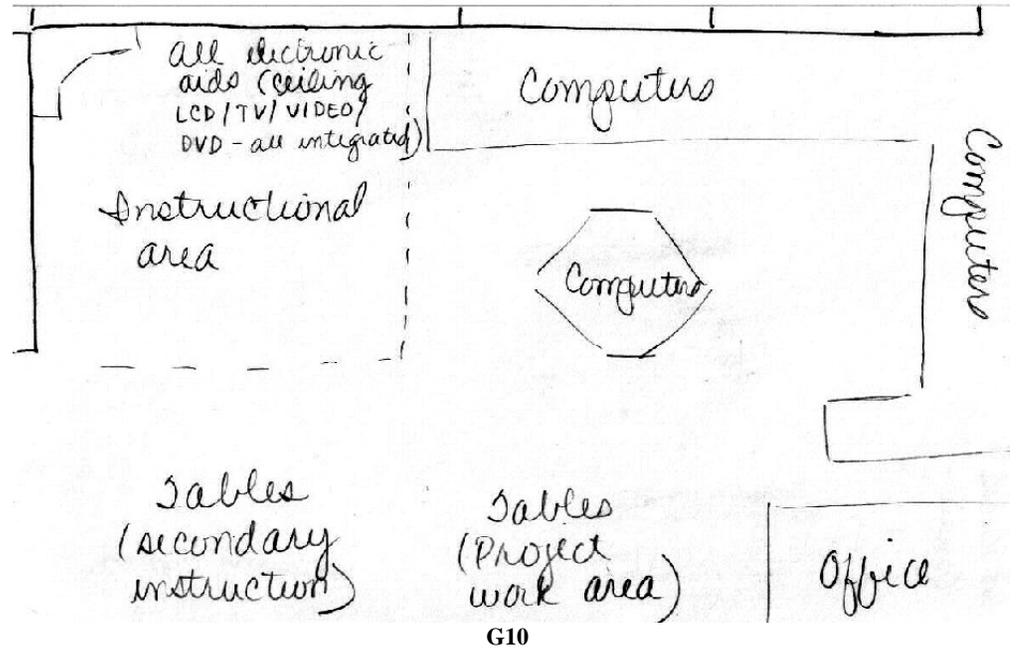
Computers

computers or storage cabinets (door)
G9

Teacher (10)- Aviation and Aerospace		
Access	"The windows to me [between the classroom and the cafeteria] is not a big issue as the door... the other three of them, rarely, rarely when somebody stands there and disturbs students down here.... But that door lets a lot of noise in. it gets loud in there, especially if kids are here trying to take a test or something, you can hear all the stuff going on in the cafeteria. The unfortunate part is that I am the only one in that school who has this problem."	I
Space Layout/Proportions	"I think that one of the things that we have a huge advantage of here in this school, is that each room is quite large as you can see, that this area has about 45 00 square feet of floor space, and this is a one classroom, two teachers at a time."	N10-1S
	"The one disadvantage of this, is when you have one teacher over here like social studies, it's a large area to keep up on, and we find that the computers have changed... the classroom becomes a little huge for a single teacher in this room, but two of us love it."	N10-1S
Visibility/Lighting	"Its very very bright in here. We pull down the blinds."	I
	"The light is controlled by one particular switch over there, so we can't shut down part of the lights down to make it for them easier to see, and still be able to write... it's kind of a problem but we can overcome it, it's not bad at all."	I
Activity Patterns	"We generally start every class over here in the instruction area, where we have a math review question which we go over with every class...this is not intended to be instructional time, but it is intended to be review time".	I



N10-1S



G10

Teacher (11)- Aviation and Aerospace (Note: Shared classroom with Teacher 10)		
Flexibility	"We will get shortly into navigation and for the big international charts, you know, they need the space so we're all over the room including the floor. We utilize just about everything in here."	I
Access	"We do have a lot of area and so then reduce that area and it's going to be more difficult."	I
Space Layout/Proportions	"Generally we don't need to [rearrange the furniture] there is one particular chart which is huge. Sometimes we'll have to change the tables to accommodate the size of this chart."	I
	"We're pretty happy with the layout. It pretty much allows us to do everything we wanted to do. I haven't lacked for space that's for sure. It's a huge room."	I
Visibility/Lighting	"Generally speaking I don't find that we have too much problem with glare. When we show videos, we close the blinds to prevent the glare on the screen and generally I don't like to turn all of the lights out when we show a video because heads tend to go down. So, but we have the ability to turn one light out and that just makes the picture just clear enough that we can get away with still having lights on if kids need to take notes or something."	I
	"I think we're able to do it [manipulate the lights] pretty well, so...and we chose where the screen got to be so that was the control and we have double of everything. We've got another screen here. For large classes we've got the two overhead projectors and the two screens so um, though not being able to manipulate the lighting we really were able to choose where we wanted to put the screens in front. That was probably the way around it."	I
<p>The image contains two hand-drawn floor plan diagrams. The left diagram shows a room layout with a 'Project Room' containing a 'TV Screen' and 'Windows'. It also indicates 'tile floor' and 'double doors outside'. The right diagram shows a room with a 'window' and '4 computers'. It includes a 'computer' station, a 'chart table', a 'carpet' area, and a 'sink'. The label 'G11' is centered at the bottom of the diagrams.</p>		

Teacher (12)- Health and Human Resources		
Access	<i>"I'm a big believer in everyone seeing each other...I, the traditional in a row, all facing the board goes against every grain. It never worked for me when I was a student. I don't think it works now. If you're trying to get them to be little soldiers I think that may work, but as far as exchanging ideas and being more approachable and open to one another, I don't think that that aids any kind of communication at all."</i>	N12-1S
	<i>"Maybe I'm just so used to [having the classrooms open] but it doesn't bother me at all...students aren't allowed to cut through. They have to go out in the hall. Now, the teachers and everybody else they do walk through it all the time."</i>	I
Space Layout/Proportions	<i>"We are seated in a circular fashion so everyone can see one another. I refer to this as 'family-style'. I think this encourages discussion and interaction between people who may not ordinarily interact. I also feel that it breaks down the 'good' student in the front row and the 'slacker' in the back row theory has everyone equally present."</i>	W
	<i>"If I shift to doing CPR and first aid that's the big thing, going from watching the DVD and demonstrating something as far as notes go and doing some direct instruction then have to go into the physical skills that the students have to perform in order to get their CPR card, I oftentimes have to move tables or move the DVD player and other things to allow enough floor space for all of my students to partner up. Because you do all the physical skills with a partner, so in order to do that I need to create more floor space. And that area of the room is generally more difficult. I don't do it in the front of the room mainly because there's traffic going from classroom to classroom"</i>	I
	<i>"I can put all of my students at the back table. When we're cooking it's usually half of the class I have at the back and it's divided into two groups for that purpose only. Only because the kitchen is so small and I couldn't fit my whole class in there."</i>	I
	<i>"I wish I could have all of the computers on the outside and leave the whole center empty. Move these into lines like the rest of them. This little, this is where all the connections are and that."</i>	I
	<i>"Well like everything else I mean there are positives to that [openness of space]. I would enjoy once in a while being able to shut my door and speak to my students and have it be a very, this is our room. On the same hand I think the fact that it is the way it is gives a feeling of freedom, openness and airiness that the institutional setting of the middle school is so far the opposite."</i>	I
Support Spaces	<i>"we're short on, everybody is short on storage. So I think there are some boxes that we use that we can't find a place to put. That's not a good excuse. It would be better if it were opened up."</i>	I
Visibility/Lighting	<i>"Generally they have to turn; the people on this side turn their chairs sideways so they can see the screen. I don't let anyone sit up here because they'd be under the screen. So luckily I have the room here where I can do that and I usually sit back here so I can see them all in front of me."</i>	N12-2S
	<i>"They're [the window blinds] closed more for presentation and I open them back up. I don't open them all the way. I just leave them like that with the light coming through. It bothers me that we can't open up the windows, but that's the way it was constructed."</i>	I
	<i>"I think the lighting is sufficient. I've never had an issue with the lighting. I think that there's a glare on the computers but I don't know how you would avoid that"... "I turn the lights off...I turn some of the lights off just to allow the computer to be more visible. It seems to be clearer on the monitor if you lower the lighting."</i>	I
	<i>"The computers that are by the windows, I have students that ask me if I could please pull the blinds because they can see the reflection on the computer screen. Yeah, that can be a problem. Generally like I said it's the ones that are closer to the window of course and if they ask me that and they're having trouble seeing I just tell them to close the blinds. That seems to take care of it."</i>	I
Activity Patterns	<i>"Basically the students will come in and we greet each other and they know that they're to sit at the table where they're all facing one another. I have assigned seats. I do this purposely so that students who wouldn't normally interact with each other have the opportunity and sometimes I kind of push a little bit for that to happen."</i>	I
	<i>"generally students aren't allowed when they change class if they have Environmental and they're coming to my room they're not allowed to cut through. They have to go out in the hall. Now, the teachers and everybody else they do walk through it all the time"</i>	I

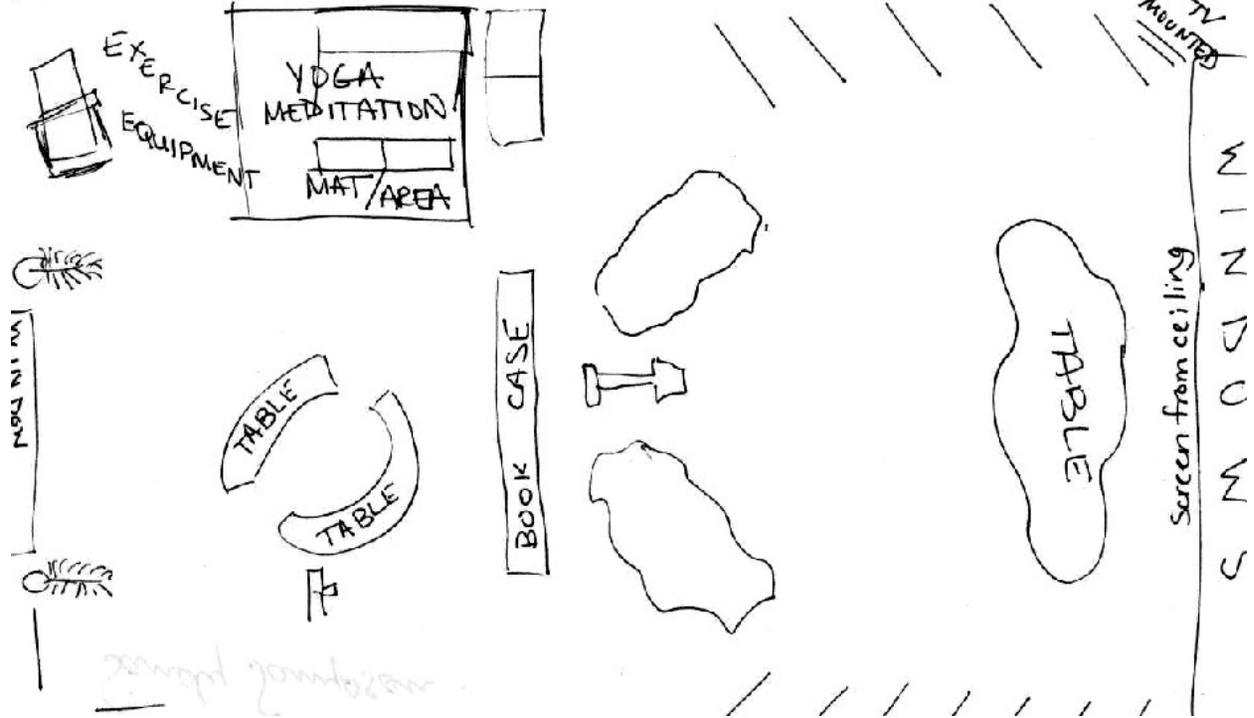
Teacher (12)- Health and Human Resources



N12-2S



N12-2S



G12

Teacher (13)- Sciences		
Flexibility	<i>"the power strip is really nice to access because we set up microscope stations all along here and around um so when we do plant studies or whatever we can set this up and then kids move from station to station."</i>	N13-1S
Access	<i>"You can see that we have a door to the outside. That's been really critical, access to our greenhouse setting..... We have the outdoor pond. So the kids can do study there and then we also have gardens. I mean the garden doesn't look that good but.... That's the greenhouse. So we use the woods. We have the greenhouse study area. We have an outdoor seating area that the kids can access opening on to our classrooms."</i>	N13-2S
	<i>"we found that this particular shape of the computer aside from that one computer, we don't have very many problems with kids going on inappropriate sites because we have access to see where they are at all times. We just have to turn our heads slightly and I can see where every kid is on their computer and see if they are with me on that same page."</i>	N13-3S
	<i>"The windows [towards the corridor] can sometimes be distracting but not that much because we're on the end of the building."... "Because the open nature of the building it's not so bad. We have created this barrier here between the classrooms"</i>	N13-4S
	<i>"it would be great to maybe have...to put it [the sink] on the side so maybe it wouldn't interfere with the way that the..., the flow of the work area. I'd like that better being on the end if you were going to have one on the end of it. It's worked out pretty well um, because then we can still hook up microscopes. We have a power strip".</i>	I
Space Layout/Proportions	<i>"But the whole sink setup probably would be a, you could save money by not doing that. Um, when we turn the water on it splashes their paperwork, they mess with them. They're sitting here on their stools and they're messing with the water, turning them on. It's more of distraction and we really, it's not that useful. It's easier just for them to go over, clean up in one space. They tend to put trash in the sinks".</i>	I
	<i>"These little cushy chairs are just more of the office area.... The kids sit in small groups and discuss and they can go to the counters and work. Like they're working on a project, they do the gluing over there and there posters over there but they can print stuff up on the computer to use over there with it. I like this arrangement".</i>	N13-5S
	<i>"Another thing that we have an issue with is that we have to take chairs and move them back and forth... Because of the number of chairs. Ideally we'd have enough chairs here and enough chairs there for kids to be in both spaces. We've even had to take chairs from one room to the other. But that's more of an everyday kind of issue".</i>	N13-6S
	<i>"We like this seating arrangement where their in a circular type of seating so we can see. We turn the chairs in here for presentations so this gives us flexibility".</i>	N13-6S
	<i>"I do like the central control area for the computers also because it seems like it's all um, kind of organized there with the printers on one station".</i>	N13-5S
	<i>"The lab tables were chosen to be originally for the 9th grade program to set up independent lab experiments but with how we kind of saw it in the future that's not how it's worked out. It's worked out that the 9th graders kind of have that other lab room across the hallway and there's no really a time for them to set up individual projects as much. But now this, I would change. .. I want you to see the sink. We found that we use that sink more. I think that we probably could have done away with the sink in the actual, this area right here.".... "I wouldn't have put this in because we have that central sink. We usually typically give them water in a jug and then turn these sinks off. What happens with, these very pretty expensive um, pieces of plumbing equipment".</i>	N13-7S
	<i>"Sometimes when we're doing a lab having them in l-shaped is a little bit harder to make sure you're getting focused attention. Like you really need to stand in that one position there,... the way the labs set up it fits nicely into the room and it is an option when you don't have a lot of space. I think it works pretty well because your groups are spread out."..... "And you can have a group working over here and observe them and have students doing individual work over there as well. Like if I'm done with something here they could go over there and work and I could still observe them. It's all very open that I can keep an eye on a lot of things that are going on and I can move a student to a place where they might best be served by that environment.... If they need to</i>	I
Size of Learning Group		

Teacher (13)- Sciences		
	<i>do a small group or like they need to do oral reading together they could go back over there and do that."</i>	
	<i>"As our program changes, as our numbers change, we've had to rearrange".</i>	I
Visibility/Lighting	<i>"I don't know because it's kind of dark. I could turn the light on".</i>	I
	<i>"I really love the windows. This is an awesome place because the colors are really pretty... It's amazing the difference with the windows open. It's a really bright atmosphere".</i>	N13-8S
	<i>"we only shut the blinds just for presentation""We have done some work with paper whites and stuff so maybe we'll close them so that they don't get too much sun and grow too fast. But usually we have it open".</i>	I
	<i>"we have two sets of lights. One for this area and one for that area so that's kind of nice... There's emergency lighting in the room that you cannot turn off. So sometimes that's in a place where it's like with, the one that you walk in the door is right over the board. So if you're doing an overhead projection that light is always on. I don't know how they determine which areas are lit under emergency conditions. I like the lighting, the original lighting in this building had a kind of pink color to it. Really, really soft lighting and it is wonderful. It has some very nice, you can see that some of the light bulbs have been changed and their more of a blue and I always really liked the pink light... It was much warmer, more..., I remember the food in the cafeteria was greener and more vibrant and maybe it is subconscious to me but I would think that that would affect kids in their personality and their outlook on things."</i>	I
	<i>"Having the windows there [by the lab work tops] has been really great. Because the get the natural light and then we also use the microscopes, we have two stereo microscopes that we typically use the most and so they are able to use natural lighting or they can use the lighting in the microscope."</i>	I
Activity Patterns	<i>"And you can have a group working over here and observe them and have students doing individual work over there as well. Like if I'm done with something here they could go over there and work and I could still observe them. It's all very open that I can keep an eye on a lot of things that are going on and I can move a student to a place where they might best be served by that environment.... If they need to do a small group or like they need to do oral reading together they could go back over there and do that."</i>	I
	<i>"it [the outdoor study area] works out really nicely with a smaller group, like if we have 15 or so, half the class or if we have a small class it works out wonderfully. We do nature sketches outside. We often times have the kids sitting around and drawing things for looking at observation skills. When we are potting plants, students can often choose to work inside the greenhouse or outside the greenhouse, so we offer that openness."</i>	I
	<i>"sometimes we'll set these[tables] into smaller groups of two so that they have like, lab work up here and I set up stations at the, on the top of the counters and I have them move through stations to see something. Um, I've even put these tables up against this wall and put microscopes on them. We've done everything you can imagine probably."</i>	I
	<i>"They worked in pairs or they worked individually at the computer. And sometimes they'll work in a group of four, when we do a habitat study outside they'll work in a group of four and they'll take on leader roles and that kind of thing."</i>	I

Teacher (13)- Sciences



N13-1S



N13-2S



N13-3S



N13-4S



N13-5S



N13-6S



N13-7S



N13-8S

Teacher (14)- Engineering and Architectural Design		
Size of Learning Group	<i>"I've set it [the room] up more or less in stations because I want this, this project is set up so that certain students make the walls, others are making the trusses... Different tasks, different groups, and then it all fits together."</i>	I
Access	<i>"I do have fifteen computers and my larger classes are twenty. So that makes it [moving around] a lot easier since I'm...you notice that I come here they can't see each other, I come over here they can't see each other. I'm by myself. So I have a cap of twenty-two per classroom. That helps me out a lot."</i>	I
Space Layout/Proportions	<i>"I rearrange it [the tables] more just to get them...they walk in and say, 'Wow! Something's different. The room's different'... Well it's just, well are we doing something different today because the room's different and it's easy to slide tables around."</i>	I
	<i>"I'd like to recover that area so it's more efficient. There are twice as many windows if that area's opened up...well more windows. I would like different places...actually I'd like a...I'd like different places so if I want to use this as an instructional area, I've got a screen that will drop, a screen that will drop so that I don't have to stand up at one place every day which I don't. I try to mix it up so that I can teach from back here, from back here and I have a screen I can drop. Three different places..."</i>	I
	<i>"I will move those tables around, particularly on projects move them further apart, plenty of space in between with certain areas with certain chores. In other words if they're using X-actos that's one table, they don't leave the X-actos away, away and the students never move them from one table to another. There are never two people at that table".</i>	N14-1S
	<i>"just because the sheer size of it [the room]...we can separate into three groups and have room to pull that off. You can't do that in a traditional classroom. I find that these students get a lot whether they know it or not. They're leaving here with a lot of information packed away and sometimes they're learning in spite of themselves."</i>	I
	<i>"for eighth graders this much space to some of them is something that they can't handle... Too much visual interruption... It's not desk in a row looking facing forward. And it's a little bit harder to manage for those students and we have quite a few that are ADHD that come through and all this visual stimulation it's hard for them to handle".</i>	I
	<i>"I try to. I configure that room differently three or four different time a week... I just slide tables around in different...just to shake it up a little bit, to give them a different look... I'll teach from the back one day and then I'll teach from the front one day."</i>	I
Flexibility	<i>"I can slide these tables and chairs any way I want to. The computers are pretty much set and I did that on purpose so that the interior of my classroom, I could move those tables, configure them any way I want to. I can put them in a dovetail. I can put them so the students face out... Some can't handle...this...for eighth graders this much space to some of them is something that they can't handle... Too much visual interruption... It's not desk in a row looking facing forward. And it's a little bit harder to manage for those students and we have quite a few that are ADHD that come through and all this visual stimulation it's hard for them to handle."</i>	N14-2S
	<i>"And we have some for their, I have some students that come in and know and they request this area right here... Because they know they can't succeed over there... Stimulus overload".</i>	
	<i>"The space is planned very well in this school because of the way of this openness and having the ability to move around."</i>	I
Support Spaces	<i>"this area is for modeling basically[pointing]... This is usually for storage. Storage is a real issue and it is with...and we're trying to get through that in our design for our other facility. Storage is an issue when you have ongoing projects with three students doing each one of these and I have one hundred and twenty students."</i>	N14-3S
Visibility/Lighting	<i>"I open them [the shades] up every chance I get... They're always open... I rarely ever cut back on the lighting in here. I usually keep it, everything turned on unless there's glare on the TV screen or computer screen.... we're working on scaled walls and models and we're trying to measure, their using 7th and 16s that's as far as we one 16th of an inch and they need plenty of light to make sure that everything is visible."</i>	I
	<i>"We'd like it [the room] to be more...better lit. I would appreciate more day lighting."</i>	I
	<i>"I would move my tables closer to the daylight... just think they perform better. And it doesn't bother me a bit to see them look out the</i>	I

Teacher (14)- Engineering and Architectural Design

window."



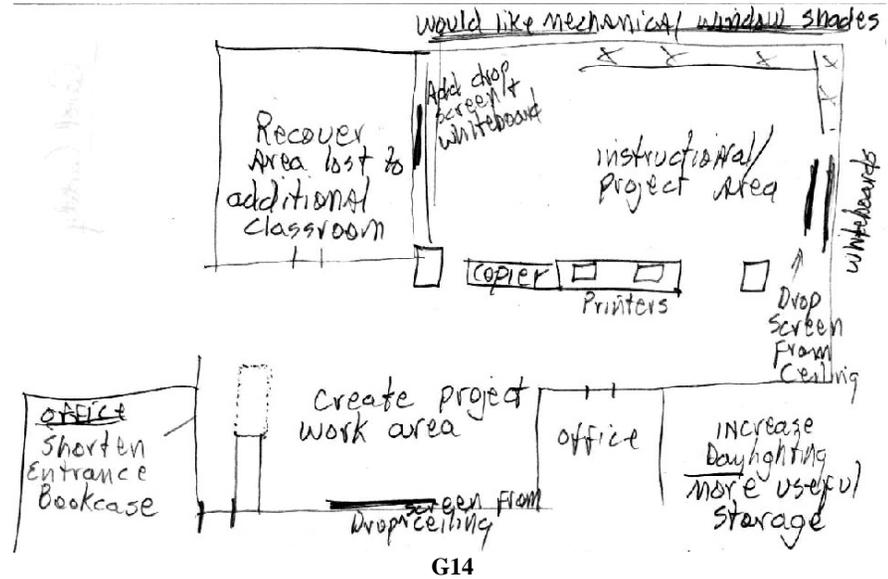
N14-1S



N14-2S



N14-3S



G14

Teacher (15)- Chemistry		
Flexibility	<i>"I will use that as my teaching station and one of the good things about this is I can move the tables around accordingly... And I like that a lot... but the way I have this here facilitates discussion so they can see each other. One of the things I tend to do if we're in a testing situation or in we're in groups, I'll put two tables together and let them work around those tables. So that's kind of nice. The flexibility of that is very good for this room and for what I do".</i>	N15-1S
Access	<i>"I like to have my doors open to air, you know to me it's like an open, more airy feel".</i>	I
Support Spaces	<i>"We have plenty of storage and that storage room does not impact the teaching, you know? It's not in the way sort of stuff. We have room for four kids, work itself and also any lab equipment I would be able to have... In addition, the prep area between the two classrooms is really ideal".</i>	N15-2S
	<i>"adjacent in between these two classrooms is a preparation area and again, um, sometimes teachers other than science teachers don't appreciate the need for a room for what we call lovingly, junk. Your junk room, that stuff that you have...projects that are half finished or laboratory equipment that's semi setup or not setup".</i>	N15-2S
Space Layout/Proportions	<i>"One of the things I tend to do if we're in a testing situation or in we're in groups, I'll put two tables together and let them work around those tables. So that's kind of nice. The flexibility of that is very good for this room and for what I do".</i>	N15-3S
	<i>"I'll do it [seating rearrangement] for testing for example, that's the most obvious one. If I'm testing I'll put them in standard rows. And if they're doing some kind of individual project, you know, I really want it to be individual I would do that in rows. I'll do it daily".</i>	I
Visibility/Lighting	<i>"the lighting in this room is horrible. It's all fluorescent. Oh to have daylight, to have any kind of daylight would be wonderful. And I'm not sure, I mean I, I think I could probably fit some nice, you know uh, skylights in to this part".</i>	I
	<i>"I'm kind of a nut about it [changing the light level]. I mean I go with the minimum amount because I'm an energy nut ...and I think there are applications when we need all this light and there are a lot of applications where we don't need all this light. So we do have some flexibility and for example, we have one of them, will turn off two lights versus one which only turns off one light".</i>	I
	<i>"I'm really am happy with this room, except for the, except for outside light and the sound".</i>	I
	<i>"I wish there was a way to use a rheostat".</i>	I
Surfaces	<i>"One interesting thing and we haven't figured out why, they didn't carpet this area...That's what we were thinking that possibly with the water but again bring the carpet to here, you know? That makes it homier, that makes it acoustically better and it's interesting. It's to me...kind of a harsher environment with the floors like this".</i>	I
Activity Patterns	<i>"So the idea is to create a space with twenty-two computers in this case where from any spot I can monitor them all. And we've done a pretty good job".</i>	I
	<i>"often we'll have kids working at those lab stations [the black counters] and you notice that they're water without gas, again, and that doesn't impact this at all. Generally speaking even the noise level....with these kinds of visual barriers is enough to not impact my instruction here".</i>	N15-4S
	<i>"One of obviously the aspects they wanted to create in here was the office... you know... feel. And I think that we have overcome that noise impact barrier thing... and I think the kids get used to it and I think they tend to respect each others' space".</i>	I

Teacher (15)- Chemistry



N15-1S



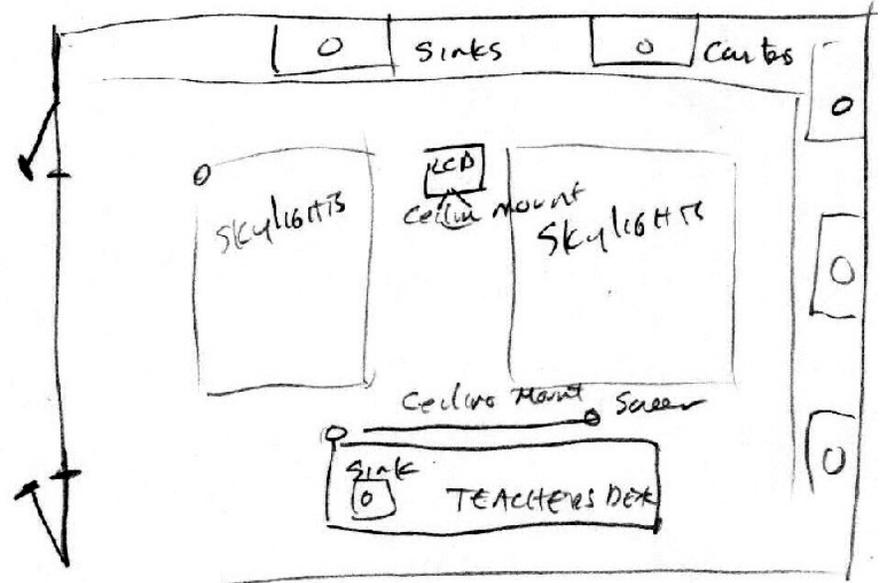
N15-2S



N15-3S



N15-4S



G15

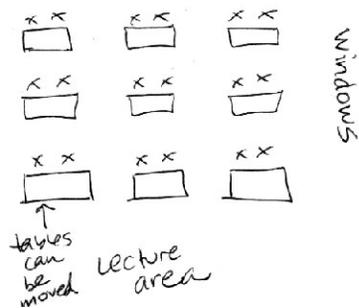
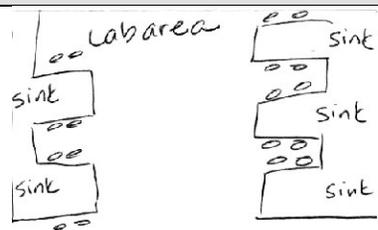
Teacher (16)- Chemistry		
Access	<i>"The cubbies are important because if they didn't have the cubby's you'd be tripping over everything in the classroom".</i>	N16-1S
Space Layout/Proportions	<i>"the way the room is laid out there already sitting at their lab table, so their lab table can double as a desk and lab table".</i>	I
	<i>"The tables are fixed... There's no rearranging".</i>	I
	<i>"the way the room's set we have counters in front of the windows and so right now all of the students are kind of sitting with their sides to the window and I think that's good, you know, because everybody gets to see outside a little bit if they want to. But then the light's not coming right in their eyes".</i>	I
	<i>"that's something that I would totally change about the room if I could design it [using the lab tables as desks]. I would love to have a separate area where I could lecture and then a separate area for lab".</i>	I
Support Spaces	<i>"We have a prep room I can use... this is where we hide our junk".</i>	I
	<i>"we have our... a light bank for plants... when we have projects with plants they come in here a lot. So it just depends on what experiments are set up at the time".</i>	N16-2S
Visibility/Lighting	<i>"I love the great big window. So I like having a lot of the natural light in the room. The um, and I hate to shut the blinds but I do have to shut the blinds if we're looking at PowerPoint, you know a diagram or a picture make it look really nice if you shut the blinds".</i>	I
	<i>"the lighting really doesn't affect most of our experiments but we do have um, a room that has no windows at all, so if we have to have dark, like you're looking at something under a particular lighting, we can [use that room]... right at the top of the classroom".</i>	I
	<i>"we have two switches and can have both on or one off".</i>	I
	<i>"I have another prep room and the light really comes in the late afternoon and so in the late afternoon it was just pouring in and so we couldn't do it [looking at DNA bands on a gel] ... we just ended up going into the plant room, which is the opposite end of the classroom."</i>	I
	<i>"I'm happy with the lighting arrangement, you know, as far as the lights in general are kind of depressing, so you know? So I mean, I guess ideally it would be nice to have lamps around the room but you know, it's fine".</i>	I



N16-1S



N16-2S



G16

Teacher (17)- Mathematics		
Access	<i>"no one had a problem with twisting and turning, because I go back and forth. I'm not here the whole time. I go here and then alternate and students...this works really well because I can have one student working on a problem and another student working on another problem at the same time".</i>	I
	<i>"What's nice is the power strips around the room. That's a nice feature because, with the laptops, when students' batteries run low, they have a way to charge their batteries while they're working".</i>	I
	<i>"I'm having to get used to the fact that the faculty office is back here and people, while I'm talking and teaching, come back and forth. They're here and so I've got to get used to it... The place is not private. If this was the front of the room and people were doing it that would be a big problem. Other than that I can't think of anything...this room's arranged pretty well".</i>	I
	<i>"I would make a bigger aisle way. That aisle way is too small. The students are filing in and filing out, you're trying to get to your next class, it's hard...the flow is not that good".</i>	G17
Support Spaces	<i>"right now it's where the students do there metal and woodworking for their projects. We teach several research classes. We have a track course which is a research course for applied physics applications ... and these students have access to the equipment ...they construct airplanes or whatever their project involved they can construct in here. We don't have to send them to another school... that door leads to the outside and they can load in their materials".</i>	N17-1S
Space Layout/Proportions	<i>"To me the layout seems to work pretty well. The only thing that's a little bit difficult is when the students all come in with their book bags you have to jump over a book bags in the aisle way... And uh, so...you know that's basically constrained by the size of the room".</i>	I
	<i>"I haven't had to do any rearranging of anything...I move the overhead back and forth but that's the only thing I move in here. Sometimes I move this computer table off to the side so I won't knock into it".</i>	I
	<i>"I'd like to have a podium... they don't do a lot of that here because they want to kind of keep the teacher more connected with the students. A podium tends to do just the opposite. So...but I like a podium because it kind of gives me a focal point from which to lecture from".</i>	G17
	<i>"A door in the front is really a disruption because people, you know, get up and come and go and especially with the flow the way it's here. That's about it. The desk's arranged just fine. I have no problem with that".</i>	G17
Size of Learning Group	<i>"we can accommodate up to sixteen/seventeen students, so if we did a computer project, a computer activity it would have to involve, maybe shifts of students and or students in groups of three or four".</i>	I
	<i>"the ideal situation would be to have the same number of computers as the same number of students that can be accommodated in a room. You know funding certainly limits that...and space limits that as well. I totally...it would be beneficial to be able to say, okay go to the computers and everybody have their own computer. But there's another point to this; we have...we're a feeder school from thirteen other high schools and one of the high schools that we have partnership is [the] County and they are all...all [the] County students are given laptops. So, if there's a situation where we don't have enough computers for the students we can take the Roanoke County students and say okay you use your laptops".</i>	I
Visibility/Lighting	<i>"one very simple concern that I have is control of the lighting in the room...but in this room there's no... When we go from overhead to...you know it needs to be dark or it needs to light. It would be good to have a control up front for that... every room I've been in the control for the lights are in the back and you have to have a student stand up and interrupt the flow of the class to turn out the lights to see the overhead".</i>	I
	<i>"it [the narrow window] hasn't caused a problem because of the shades, the availability of the Venetian blinds. Uh, I would prefer a room with more windows in it... In the afternoons it's dark in here even with both spaces lights turned on and students come in and they've just had lunch and they're kind of tired and the dark setting makes them even tireder and I open that up on a sunny day and it really helps the room a lot".</i>	N17-2S

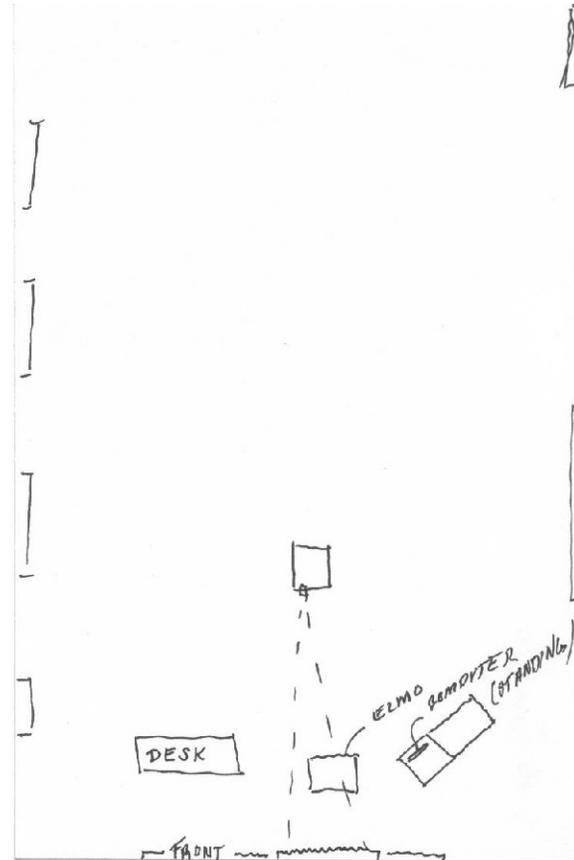
Teacher (17)- Mathematics		
	"I'm sure the rooms with the bigger windows there's a problem [with glare] but here if there's a problem with glare all you do is close the blinds and it immediately goes away. The way this building is situated, the sun is....north is that direction so the sun is really never on this side of the building past that wall so it doesn't have direct sunlight".	I
	"it would be nice to have a bay of windows at least one length of the walls... more windows, I'm a fan of that because you can always control that".	G17
	"a little bit brighter [light] would be nice but this is about the level to work at".	I



N17-1S



N17-2S



G17

Teacher (18)- Biology & Biotechnology (Note: Sharing space with teacher 16)		
Flexibility	<i>"one thing you would be interested in is there's a Science class that was put in [...] high school, in which the tables move. Uh, they're on wheels but then you can lock them. And so they're bench type tables and so if you have them out in the middle of the room the kids could be sitting there. It'd be up high and there'd be stools but then when you want to do a lab you can push stuff up against the two sides so you could plug...then you could plug things in. And that's a really nice, very flexible kind of environment"</i>	I
	<i>"And also the fixed [lab tables] ones give you a little more storage because they do have the doors on them. Yeah I mean I think the movable stuff would be really nice but you need a bigger room"</i>	I
Support Spaces	<i>"I really like having separate faculty offices I think is a real positive, because more than one teacher can use the room and the other teacher their own space"</i>	N18-1S
	<i>"We just don't have enough storage because if the room was larger, you know, you could put more storage space in there"</i>	I
	<i>"the prep room, although it looks big um it's really too small. The one when it was originally twice that size was more appropriate"</i>	I
	<i>"we had this little plant room that has the plant carts in it and it's really too small. It needs to be at least twice that big. Some people would like to have a greenhouse, some would not it just depends"</i>	I
	<i>"we have a need for more research space to keep expensive equipment in and it's not in the classroom like that. If you go to the Governor's School in [...] they have the class...like the Biology room which is actually not real big but off of it there are several research labs for all of the equipment. Now we need more of that here, uh, for what we're trying to do"</i>	I
Space Layout/Proportions	<i>"probably one of the disadvantages of this room is that it's long and narrow. So kids to the back have a little trouble maybe seeing...and I've found when I listen to guest speakers and I'm sitting in the back they need to be talking pretty loud. Just because of the distance and the air conditioner up there"</i>	I
	<i>when I did the original design for this room, it went out another almost six feet that way, and the prep room was twice as big and this little room here was twice as big...what I had in there was still six tables but they were larger...And then in the budget cutting prior to construction they shrunk this down and now this is the smallest science room ...I don't think the room is big enough for all we try to do here"</i>	I
	<i>"It [the smaller lab table] is tight for four people. If you have four kids at one of these tables with all their stuff, it's a little crowded"</i>	I
	<i>"the original tables were a little bit larger...[and they] had the door here and an electric outlet here [on the edge of the table]"</i>	I
	<i>"that table is probably not...was not deep enough when we had the old monitors but now we've gotten the flat panel monitors they're fine"</i>	N18-2S
	<i>"The problem here again is that everything is fixed like with those tables because of the electricity issue... And if it's movable you can't plug things in"</i>	I
	<i>"if space was not an issue I probably would like a split lab/lecture area where the front part was chair, little desk things and then the lab sort of towards the back but you know.... In those other science labs the chairs are kind of in the middle and the benches are to the sides but they're kind of crowded."</i>	I
	<i>"I'd still be happy with this if we had the bigger tables and the bigger room and I would be satisfied"</i>	I
	<i>"I know that there are tables that are not rectangular... and that might be a possibility, to have a different shape. I just put these rectangles for now...It might be just kind of interesting if it was more semi-circular...[Just have a different dynamic in the room]"</i>	G18
Visibility/Lighting	<i>"One thing they did do which was nice was these [the lighting fixtures]...they have three bulbs in here and you can either run it as one bulb or two bulbs so you can dim the room when you're using the projector... we can have one bulb everywhere or two bulbs everywhere but not just turn this front completely off and that wasit's a minor thing but it would help somewhat"</i>	N18-3S
	<i>"we do have to keep the blinds closed when we're using the projector and stuff because there's too much glare, but we just close the"</i>	I

blinds, it's not a big deal".

"that [lighting] is really very nice. It's much better than the old fluorescent fixtures. It's not glary. Uh, and it certainly is bright enough. So, I don't, you know, I don't...I wouldn't really change anything about it, I don't think".

"[conduits coming from..]Ceilings are an issue because if you have the conduits coming down you know that would block your vision".

"the one bulb, two bulbs, three bulbs is a reasonable control. I mean when the faculty was having input in this building we suggested that in addition to the fluorescents there be some canned lighting around this room that we could dim if we wanted to and that would be nice".

N18-3S

I

I



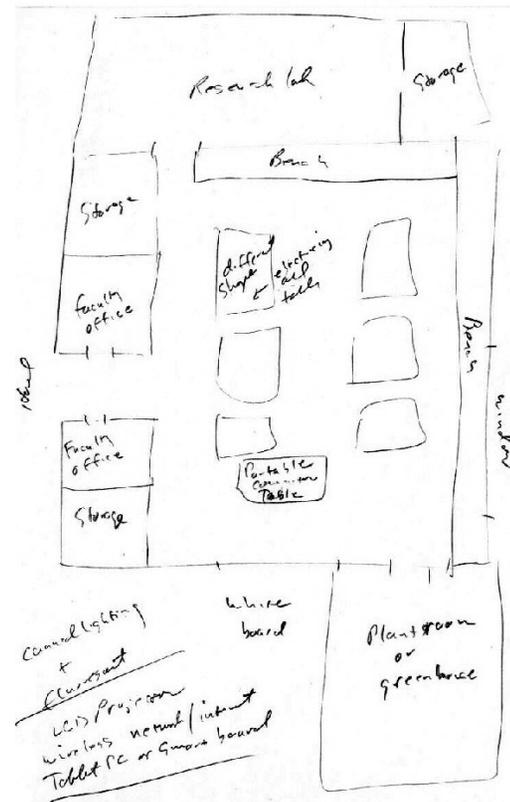
N18-1S



N18-2S



N18-3S



G18

Teacher (19)- Chemistry		
Flexibility	<i>"I asked for these small tables so I could move them around better".</i>	N19-1S
	<i>"Now the chairs I'll move around. That's why I like the tables; they can move around and get in pairs or groups... I like tables and chairs as opposed to desks. They are so much harder to move around and group. I don't particularly like the tables—this particular choice—it wasn't what I thought they were going to get. I wanted a little bit larger, sturdier tables".</i>	I
Access	<i>"the students can use things that give off gasses or whatever, they can use them right here [on individual lab benches] and they don't have to go over there. So that's really wonderful because it ... I mean, all of them can be doing an experiment – like they're heating something in an acid. Well they used to have to do it over there one at a time. Well now they can all do it at the same time. We have a nice exhaust so it's not all out in the room".</i>	N19-2S
Support Spaces	<i>"They come with me. They don't use it [alone]—not at this level. I use it. They come with me. They do a project, they get it all ready, and then they watch me as I actually do it. It's too dangerous. But there's not a lot of storage space here so we've had to make more".</i>	I
Space Layout/Proportions	<i>"the way the room is arranged and where the board is. All right... The whiteboard goes all the way over here, but the chairs,... they were on the side. So the board has always been over here, but the students have always been here, so you've got this portion over there. And of course I have no other space to put my smartboard. So I'm using up a 1/3 of the whiteboard... So if you've looking at layout, that's not good".</i>	N19-1S
	<i>"The TV... this is not a really good spot. The only other ... the two spots were like there or there. In fact, I just switched my VCR because if you're sitting back over there...of course you have to turn your desk around and look up there. And if you're sitting over on that side of the room, it's small. So I pushed my VCR and now I project through the computer. So that's for the smartboard. So it's a lot bigger and the kids like it".</i>	N19-3S
	<i>"Now these book cases—they were not part of it. I got them out of one of the shops at the TH and painted them up. It makes a nice divided area...Well this is the instrument area, and kids don't come back here normally and it makes it more separated. Because these are some expensive instruments...So it makes a nice separation. And when I'm cleaning up glassware and chemicals and stuff".</i>	N19-4S
	<i>"That's supposed to be a teaching hood where you can be on this side or the other... I can say I really like this little divider—it sort of separates this part of the room from the classroom. One thing that ... I like having the lab benches over and away to the side, but if there's a group over there and over here, it is a little separated during a lab day".</i>	N19-5S
	<i>"I used to do 5 across and 4 rows, instead of 4 across and five rows. Five this way and four this way. I used to do it the other way, but I felt like the desks were too close together".</i>	N19-1S
	<i>"I don't know other than having the board more in the middle. I'd like to have the whiteboard separate from the regular board—like in the math room. They have all this wall space. They don't have to have all these cabinets for equipment. So, I've got the only bare wall right there. And that's the only part of this room that was not renovated. That's the original whiteboard... I mean there's no other place".</i>	I
Visibility/Lighting	<i>"The building was remodeled and they moved into the remodeled building in 2000... So when they added that wing, they came in and they remodeled this room...The old rooms –the front bank of lights you turn off separate from the back. So if you were showing something, you could turn off and it would be dark on the screen. These, you could turn off half, or turn off the two side lights, or the middle ones. So there's always a light there. That's a real problem. It makes a glare. And if you turn off all the lights, then it's dark. The kids can't write".</i>	I
	<i>"if you turn this one off, see it's too bright, so that's too much. So it's either ... You can't do the front half and the back half".</i>	I
	<i>"In the afternoon I have to keep the blinds closed—there's such glare because that's west...So especially on a sunny, winter and summer, it's REALLY, REALLY bright... even in the winter, when it gets afternoon I have to close the blinds, even if I've opened them in the</i>	N19-6S

Teacher (19)- Chemistry		
	<i>mornings. The morning's not too bad, but by 1:00 it's really getting sunny and the glare... For me looking this way at the students, if I'm up at the board and stuff, it's a glare for me; it bothers me".</i>	
	<i>"Well the instruments you can't [expose them to the sun]. It's the heat through the window—it gets warm, and that's the main thing. So that's a problem".</i>	I
	<i>"If you could turn the front bank off, that would really help with the glare on the smartboard and the screen for the overhead. That's one thing, and then the window is really a glare...from that window, especially in the afternoon".</i>	I
	<i>"Lighting is not an issue during the lab itself... in December when the kids are doing their research projects. I mean sometimes I'll have a bank of ... I've got a couple of shop lights and have a bank of shop lights sitting over an aquarium with ___ growing and all that kind of stuff. But normally the lighting isn't an impact on the lab. It's just instruction in getting the kids to see".</i>	I
	<i>"If I could change it, I would have it where I could shut off the whole front but half. These two front rows and these lighting zones ... So we still have a little light in the back of the room. In fact, I thought about buying a couple of floor lamps to turn on in the back to have... I'm not sure exactly where I'd put them, but maybe a couple of floor lamps to turn on when we turn off all the lights. There would still be enough lights for the students to see to write".</i>	I
Furniture	<i>"I like the lab bench shape. This is good. I like the shape. One thing though is that ... and these are individual hoods. I pushed for those and got those hoods. So the students can use things that give off gasses or whatever, they can use them right here and they don't have to go over there. So that's really wonderful because it ... I mean, all of them can be doing an experiment – like they're heating something in an acid. Well they used to have to do it over there one at a time. Well now they can all do it at the same time. We have a nice exhaust so it's not all out in the room".</i>	N19-7S
	<i>"So I like that [the dividing shelves], plus it gives me some nice storage because what kind of storage space do I have? I don't have much...The wall cabinets are packed –that's glassware—beakers, graduated cylinders, flasks. The cabinets are full of glassware. The drawers are full of tongs, some glassware, and pipettes—small equipment. I mean all the drawers are full. And so I have lots of books and magazines. Where do I put them? And the cubbies are for the students. Now I like the cubbies and I make the kids use them. Because those backpacks take up too much space".</i>	N19-4S
	<i>"I asked for these small tables so I could move them around better".</i>	N19-1S
	<i>"I don't use it [the podium] much. I use mostly to put my lesson plan book on. So I don't ... it's a little bit too skinny for putting a book on. I don't really use it that much. I mean I could get away without using it".</i>	I
	<i>"I like this much better because the room the way it was before ... first of all I didn't have any demo-desks, which I hate... I was stuck with this thing in between me and the kids. And I'm always walking around the room, and come back up here and the board... so I don't like that kind of thing. I like open between me and the students... That way ____ When you're walking around you can see what they're doing—make sure they're paying attention to you, not playing a game on their cell phone now or on their calculators, or doing other homework".</i>	I
Number of Students	<i>"If I'm wanting them to do a computer assignment individually, I'll schedule the computer lab".</i>	I
Activity patterns	<i>"Although the tables spread out like this works really well, but I'll still say a couple of them move to the big end – they'll go spread out over there too".</i>	I
	<i>"I've never seen a sit down other than for a handicap sit down chemistry. You need to be standing up walking, moving. You usually go to the balances, you do this; you do that. I think there's more movement in a chemistry lab than there is than in a biology lab".</i>	I

Teacher (19)- Chemistry



N19-1S



N19-2S



N19-3S



N19-4S



N19-5S



N19-6S



N19-7S

Teacher (20)- Mathematics		
Access	<i>"the only thing about having the office is my computer is in there. My space is in there. And it's difficult to have everything that you need out here. I sometimes have to go in there and I'm away from my students. They're out of my vision when I'm in there. It might be nice if instead of that bulletin board there, there was a window. Or a window there for me to be able to see. And when I'm in there, if I'm having a parent conference, I can close blinds or a shade or something. But when I'm not... If I have to go in there I can at least look out the window and still be in the room with them... I can still see them and feel like it's open".</i>	G20
Support Spaces	<i>"I love having a private office for parent conferences and things like that".</i>	N20-1S
	<i>"I like having the prep room for storage ... the prep room in here. I can keep a lot of supplies in here ...I sometimes will send student in here to get supplies, but mostly it's for the teachers... They don't work in here. But this is where my sink is in here. So I have a sink that I use. I really don't need two sinks. But the students don't go in there so if the students need a sink, then they use that one".</i>	N20-2S
	<i>"This is the front of the room for me [where the projector is] because I keep my table. I like having enough room. It's a nice big classroom. It's huge, and I like having my teacher station up front".</i>	N20-3S
Space Layout/Proportions	<i>"I have in the past when I've had the long tables. I was rearranging it all the time. But this system seems to be working well. What I do rearrange is who sits with whom".</i>	I
	<i>"It [the window] can be very distracting...but the students, because of where I have the front board, they are pretty much focusing on me. When we go over here to the smartboard, then they do this. They're looking, but they can't help it... It's just a natural reaction to do that. Sometimes the students will get up themselves and close it because it's either too bright or they are distracted...".</i>	I
	<i>"[I'd like to have] Updated overhead projectors, and nicer overhead projectors. The screens are crooked and they don't... because the classroom is so big, I feel like I want to utilize that space and so I'd like to have the projector far enough out where it's not blocking anything. But I can't focus it well enough because of the location. So I have to constantly back and forth. It would be nice to have a permanent—something like that mounted or maybe something with a little more high tech than an overheard projector".</i>	I
	<i>"It's not enough room [for using the smart board]. It's not enough space. And I would be capturing and saying 'Excuse me while I capture.' And then I erase everything and start over".</i>	I
	<i>"I have fewer students this year ...Probably the average is 18 in a class. So I'm able to have the chairs in such a way that everyone has good vision towards the board or wherever I happen to be, which is usually here or over here. But I don't have... I have maybe 1 student with their back to me, so I like that".</i>	I
	<i>"The window is nice. It's large and lets in a lot of light, but I feel like it's a lot of wasted space. But it's still nice. If I had give a yes or a no, I would say keep the window... I can [put furniture next to the window] but it's distracting. If the kids sit there... I mean it's not bad. I guess overall it's a positive".</i>	N20-4S
Visibility/Lighting	<i>"It is difficult to get a good balance when I'm using the smartboard to get it where the students feel like they can still see the smartboard and be able to take notes. It needs to be dark enough to see the smartboard, but then it's kind of dark. But they adapt".</i>	I
	<i>"It doesn't have a dimmer. But I think that would be nice. I usually just have to turn one on and turn one off. But it would be nice to have a dimmer switch where you can just lower it right where it needs to be instead of on or off or right in the middle".</i>	I
	<i>"[I only have] On-off switches. So it would be nice to have switches...And we have to close the blinds. It's not great. It's OK, but it's not great".</i>	I
	<i>"We have some glare [from the window], but it's not often. The only thing that this does ... the board is not really illuminated as much as it could be".</i>	I
	<i>"[I'd like to have] Dimmer switches on the lights. And better lighting of the whiteboard. The window gives enough reflection or enough light on this board, but I'm not there most of the time. I'm there. And the shadows on the front board to me are just ... If I had my druthers, I'd like to have it illuminated. But as far as the overhead lighting, the dimmer switch would be nice".</i>	G20

Teacher (20)- Mathematics		
Furniture	"The research class that I teach is math research. It's nice to have a sink in your room, but I have one in my prep room. I really don't need another sink in my classroom".	N20-5S
	"I love having all this cabinet room and this counter for the computers. That is a plus".	I
	"this [kind of tables] is more conducive to the cooperative learning in the labs that we do. So this actually is working out better".	N20-6S
Activity patterns	"The cubbies are OK, but the students don't want to use them so that's wasted space. The cubbies could go and the screen could be there. I would much rather have a larger board and no cubbies".	N20-7S



N20-1S



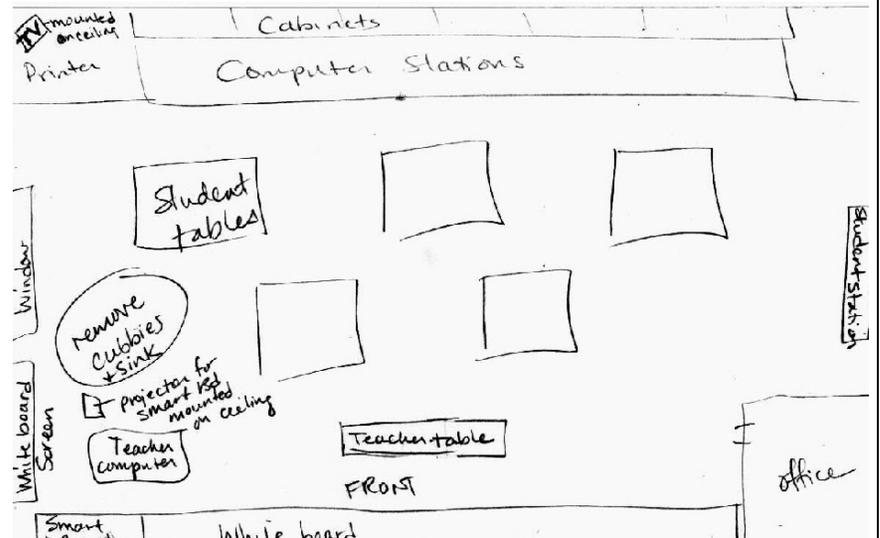
N20-2S



N20-3S



N20-4S



G20

Teacher (20)- Mathematics



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N20-5S



28/09/2005

N20-6S



28/09/2005

N20-7S

Teacher (21)- Mathematics		
Access	<i>"I use it [the door between the classrooms] a lot between [the teacher next door] and I because that way if I've got a student ... if I need to run to the restroom and I need somebody to watch my class, she's right there. So I use that door a lot... Not very often [for instructional purposes]. We would like to be able to do it, but it's not a perfect situation".</i>	I
Support Spaces	<i>"As far as the layout [for the faculty office], it's actually really nice because it's right here at the front of the room. I actually would love to have it over next to the window so I would have a window next to my desk. But it's convenient because it's right at the front of my classroom because my instruction is done up here...It makes it nice because I can see out into the classroom and that works quite well".</i>	N21-1S
Space Layout/Proportions	<i>"If I could get a portion of my window in my office, the rest of it could be used for the classroom. And actually, if I could put my board here, and the doorway to the room, I could go ahead and keep my prep room".</i>	G21
	<i>"the computer side of the room where we've got the computer. A bunch of cabinets up there. Actually, those cabinets are used for another class and are all filled with science stuff, which is fine—I've got plenty of room for it. But I'll take a second picture and get the whole row of computers. I'm actually missing a computer or two right now, but physically I do have the computers down there.</i>	N21-2S
	<i>"we needed to get long cords up where the ceiling does it's little larger-to-smaller ceiling. This is really nice for doing labs where they have to throw something upward and it would hit this ceiling, the lower piece of the ceiling. So it's nice having the higher part of the ceiling".</i>	N21-3S
	<i>"Unfortunately everything is too high in this room. It doesn't pay to be short. This is better than nothing. You still get some dead areas, but you do at least get a little bit of elimination there. This was really, really poor engineering".</i>	I
	<i>"This is what I call the front of my room [where the teacher's table is]. If this board were extended out where this bulletin board was, I would LOVE it because then I could have more space and I could put my tables in the center of the room. The truth is everything is kind of shifted over there to the left. If you were to actually put a wall right where the drop ceiling ends, that would keep everything to where I was kind of centered. But I deal with it OK, it's not a big issue".</i>	N21-4S
	<i>"we can move them together. Occasionally what we'll do is we'll pull 2 or three of them together and they'll work in a bigger group. But it does work really nicely. I HAVE had to do some twisting of them so that I don't have students with their backs to me. But they work out pretty well, I like them better than the long table because ... If I do use the long tables in the classroom, if I've got more students, I always put them at an angle and I only put people on one side of them so they're facing forward. These are OK if you tilt them a little bit. You can get everybody with some eye contact".</i>	I
	<i>"maybe like that with my tables facing the board. And then probably have maybe an additional board here just for extra stuff. Bulletin boards, and whiteboards. And I would probably keep this whiteboard on this wall... Actually I need to put room for my computers, so I would actually put my computers back here rather than a bulletin board. I think that's how I would probably do it".</i>	G21
	<i>"Each of the tables holds 4. I've got the extra two tables for testing purposes. I've fiddled around with my layout over and over and over, and this is best I've found for this year. One concern is that I do have to be able to pull that out if I want to use it so I have to keep that area open. But if they need to move that table forward to see, then it's not really a problem... I try to, if at all possible, to keep them centered more here because my board focused on this side of the room because this table sometimes does need to be shifted".</i>	N21-5S
Furniture	<i>"my basic instruction is done up here at the front. I do have my sink...this was included in all the room in the design when they built the building so that we would all have clean water, whether we wanted it or not ...So that's actually a really nice thing.</i>	N21-6S
Visibility/Lighting	<i>"WONDERFUL, nice windows that I love... It can be interrupting because they'll see something outside and they turn around and focus. But all I have to do is threaten to close it, and they're like 'Oh, no, no, no. We'll watch front.' ... They like it. Oh they love it".</i>	N21-7S
	<i>"It [the lighting] is awful...Even with the big window. It's better than without it, but there are actually times that I would rather close the blinds so I don't get my shadows on my board. But I love having the outside light. Everything is so fluorescent in here. I like having that regular sunlight in my classroom. It makes me a lot happier person and a lot more awake. But there definitely are ... I don't know if it's</i>	I

Teacher (21)- Mathematics	
	the way they're spaced. There definitely are dead areas above the boards. And there needs to be some kind of focus. I don't know if they could put flood lights or something... supplemental lighting to angle on to the boards—that would be really helpful".
	"I do not have any kind of zone lighting. It's either all or nothing. It would be really nice too because if I want to project and get a really good projection, I have to close the blinds and turn all the lights off. But then it's hard for the students to see at their tables. It would be really nice to ... of course that would mean my room would have to stay static, but it would be really nice if I had focused ... a second set of maybe just an incandescent or a small focused halogen above each table. Ideally they would be on a sliding track that I could move them, depending on where the tables were. But that would be really nice because then they could still see the board, but they'd have some focused lighting".
	"pretty much my lights are on all the time... I plug those [lights above the board] in when I get too irritated that I can't see what's going on".
	"My biggest issue is the lighting really, just because it does have those dead spots. And with the marker boards, we're limited on the colors of markers that we've got and the colors of markers that the students can see. If they're sitting in the back of the room they don't see the oranges and the browns very well. So, I need something and that's why I got those lights that do the job but they're not great".



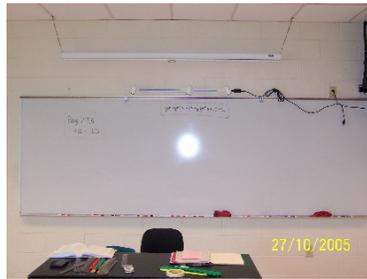
N21-1S



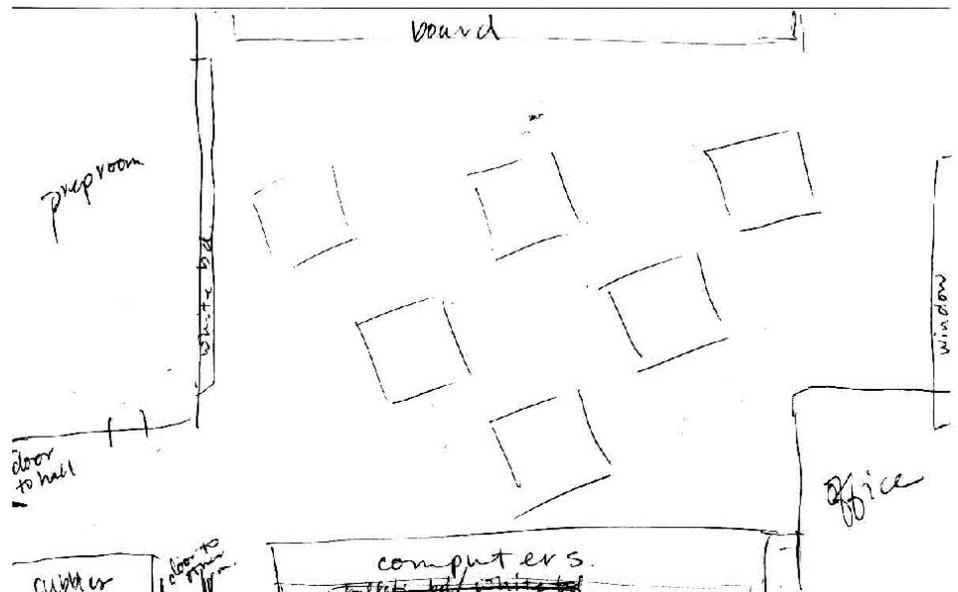
N21-2S



N21-3S



N21-4S



G21

Teacher (21)- Mathematics



N21-5S



N21-6S



N21-7S

Teacher (22)- Mathematics		
Furniture	<i>"I guess I have mixed feelings about the tables. I kind of like the idea when I first came here, but when we're having a test or something, I really don't like having them sit at the table. I don't like to have two sitting at a table. So if they're at a square table... fortunately this year I can move them around so that I only have one of the square tables. At the long tables I can sit them at the ends, so think that that... I mean I want to have a space around me that's not somebody else's".</i>	N22-1S
Visibility/Lighting	<i>"I don't open the window. It just [is disturbing]... If there's activity outside the room, the kids are distracted. I want them to watch me."</i>	I
	<i>"Actually the room is very bright and so I don't know if it's because I started in that room".</i>	I
	<i>"I haven't even had it [the shades] open this year. So that would be a distraction... [So totally relying on the fluorescents all the time]".</i>	I
	<i>"The only problem that I see visually is just the location of the student in relation to either the smartboard or the whiteboard. Lighting-wise...the problems that we have with lighting really is when I turn on the smartboard and whatever we're trying to see is either too light or too small with the light dimmed. And generally what we do is turn it off... turn all the lights off. And because of the windows, the room isn't too dark or so dark that the kids can't take a few notes if that's what they want to do. I guess that's one of the things that I would like to be able to fix. And you don't think about it until I'm doing a presentation and then it's like... "OK, what can I do?" Some of the work can be done on the PowerPoint itself, but I don't know otherwise".</i>	N22-2S
Activity patterns	<i>"But the kids will come in and they'll open the shades and if they're open for a little while I notice that they're not really paying attention... I haven't even had it open this year. So that would be a distraction".</i>	N22-3S
	<i>"Usually... I mean a group of 5 would be the biggest group that we would have and they would probably fit at one table. I think another problem – I try to steer people away from that corner table back there because I feel like it's hard to see the smartboard. And even this far away...I instruct the students – if you can't see from where you're sitting you need to move. Some are willing to do that and some of them".</i>	I
 <p style="text-align: center;">N22-1S</p>		
 <p style="text-align: center;">N22-2S</p>		
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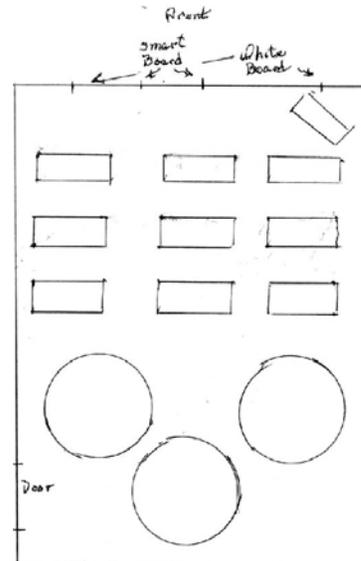
Teacher (23)- Mathematics		
Flexibility	<p>“anything can be changed. I mean we can re-orient the LCD, although it’s set up for the focal length of the projector... well we can move the tables around any time that we want to. And I have that very large table up front, which I’ve kept over the years because that’s a good table for us to do projects on. And it’s the only table in the room that doesn’t warp, so I know that it’s flat”.</p>	I
Size of Learning Group	<p>“this year I have small classes. I have 11 in one and 16 in the other. And then in my Fundamentals of Research classes I’ve got about 16 and about 12, roughly. But last year I had much larger sections. I had 22 in one section. In fact, I was maxing the room out. I was almost out of chairs. So it was very difficult space-wise”.</p>	I
Space Layout/Proportions	<p>“This being the smallest classroom in the building, I have tried various layouts. When I first moved into this building, when they first did the extension to the building, this was the old part of the building. This particular space here used to be a conference room, the director’s office, the secretary’s office, and the counselor’s office. Everything”.</p>	I
	<p>“If I could move any of these walls about 4 feet in any direction that would be perfect”.</p>	G23
	<p>“I have a big whiteboard here, and a smartboard, and I also need to have a whiteboard down the side. I need to put that in there too. But I do have a smartboard here. Somewhere up here you’ve got a teacher workstation. And I just put it off to the side here, sort of out of the way. Student seating—I used rectangular tables. We could probably accommodate anything if you’ve got the space. And then different seating back here. I used circular tables for activities, big enough to accommodate fairly good-sized groups. Or small groups.”</p>	G23
	<p>“When you have that many kids in the room you were just very, very tight. So I had looked at various ways of doing it. When they bought furniture, they gave us the option of buying the square tables,...And I looked at the square tables and recognized that probably the square table wouldn’t work in here because then I would end up with half the class sitting with their back to me in a very narrow space. And that wouldn’t work too well. And I probably wouldn’t be able to get what I needed out of it. I started looking for tables that would work. The full size tables took up too much space, and so I was able to come up with these narrow tables that I have in here now that seem to work pretty well for the space that I have. And I can move them around and put them in different shapes and things. I tried going length-wise, but then that leaves me with one board at the back, and one board at the end of the room, so everybody has to turn and look down the end of the room, or they have to look straight ahead and then they’ve got a board behind them if I ever wanted to use that board. Whereas if I keep them all oriented toward the length of the room, they can see both sideboards and the front board. So it’s just a very difficult room to work in from that perspective. Now that we have the overhead, we have to be oriented to the front board to use the overhead LCD projector. So it does pose problems”.</p>	I
Furniture	<p>“I have that very large table up front, which I’ve kept over the years because that’s a good table for us to do projects on. And it’s the only table in the room that doesn’t warp, so I know that it’s flat”.</p>	N23-1S
	<p>“I’m happy with tables because usually you need table space to do other things. Individual desks don’t support projects, labs, and things like that when you have to do hands-on activities”.</p>	I
	<p>“Well I just have the one window and that’s probably not in the most opportune place anyway”.</p>	I
Visibility/Lighting	<p>“Usually you have to keep that window shade drawn for projection purposes and because by the afternoon the light coming through there puts a glare... it’s in the kids’ eyes that sit on the tables opposite the windows. It’s not a helpful thing”.</p>	I
	<p>“The fluorescent lights are set up such that I can turn off one bank of lights and dim the center row so that when I turn on the LCD, I get a good screen, a good quality projection. When we designed that we set that up; we got them to do that for us. So that was a good thing”.</p>	I
	<p>“I can turn off... there’s a two-switch control over there. I can turn off one of the switches that turn off half of the lights. And sometimes I turn off all of the lights for a demo so you can see the screen better. And then turn them back on...I usually do that. I mean it would be nice to have a remote control to do that or be able to control it easier... so I can turn off one switch and get partial lighting, enough to dim it out... But it works well for the LCD projector. I don’t have any problems like glare or anything like that”.</p>	I
	<p>“I’m happy with tables because usually you need table space to do other things. Individual desks don’t support projects, labs, and things</p>	I
Activity patterns	<p>“I’m happy with tables because usually you need table space to do other things. Individual desks don’t support projects, labs, and things</p>	I

Teacher (23)- Mathematics

like that when you have to do hands-on activities. And we do a fair number of those things. Some of them can be done on the floor, but many of them need tables to work on. And you can't do them that way. And sometimes you push two tables together and get a bunch of kids together and work. It gives you flexibility, I think, to have it the way it is. If I could think of a better way to do it that would be grand, but I haven't been able of a better way to do it".

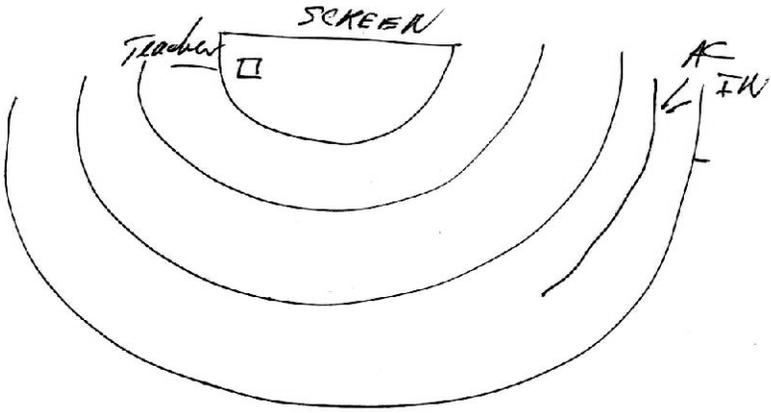


N23-1S



G23

Teacher (24)- Computer Sciences			
Flexibility	<i>"I could rearrange if I wanted to. I'm not the only computer teacher so we would have to agree on that, but nobody's asked to do that. I don't see given the size of the room and the number of computers needed that there's a better way to do it".</i>		I
Space Layout/Proportions	<i>"The bottom line is that this room ... as a computer lab it's OK. I mean it may not be usable for a long, long time. But I'm not saying that it doesn't work, but it would be better if it would be bigger. And I think if I had a circular, semi-circular kind of seating, and a more powerful projector".</i>		I
	<i>"The posts had to be put in later to supply electricity to this central part of the room, since it wasn't built into the floor... this is the old part of the building. So, yeah, the posts are not ideal, but there's no other way to do it".</i>		N24-1S
	<i>"We don't have enough space right now. What I would like, ideally, and it would involve a complete redesign of the room...is something like an amphitheater... and the idea is that the screen would be here, and the teacher would be here on a lower level. You have to sort of envision this as a three-dimensional space. And the teacher could be over here to the side perhaps. And then the students would sit in circular rows that would be built up in tiers. Maybe three of them...And the seats swiveled. And at each desk was an electrical plug, an AC outlet, and also an internet or network outlet. And the student brought his own or her own computer".</i>		G24
	<i>"For the computer class I need a projector and a screen and of course this classroom is rectangular and the screen is maybe 5 feet square. And the projector is mounted on the ceiling, which an improvement over last year when it was mounted down here. But really, if you go to the back of the classroom, if we go back here, the view of the screen, say from this particular seat, is not a very good view. And also the quality of the projector is not that good. So a person seating in this seat or in this part of the room really has to strain to read the screen. I don't think I could read it at all, even with my glasses. So that's a problem".</i>		N24-2S
Visibility/Lighting	<i>"I don't especially like not having windows, but these two rooms here and here added along with the addition to the building. So it's possible that I could have had some windows there, but I didn't get them. It's OK though... And within the computer-lab space...The lighting is OK."</i>		I
	Activity patterns	<i>"the layout of the room is good for that [circulating with the students, monitoring, moving around the screen and working at the same time]".</i>	I
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>N24-1S</p> </div> <div style="text-align: center;">  <p>N24-2S</p> </div> </div>			



G24

Teacher (25)-Physics and Computer Applications		
Flexibility	<i>"I've got too many students this year to allow me that flexibility [moving the chairs]. In the past year, I've had maybe 15 students—where I could get rid of this row—and then I could rearrange it a lot more easily. I just think that's very important".</i>	N25-1S
	<i>"A colleague and I put rollers on these tables to be able to use them as demo kinds of things, and to be able to put them out here in the front of the room and be able to do demos and all of that kind of thing".</i>	N25-2S
	<i>"Not very often [when students need to move their chairs]. Every once in a while when I'm doing a demo and they need to see some things, usually they'll just stand up to watch".</i>	I
Access	<i>"you open the door so that they can roll their wheelchair underneath it. Well, nobody else is allowed to do that. Like I said, not every student would ever use the sink anyway. So why does that handicapped student HAVE to be able to use the sink. And so the rules end up creating more headaches than problems that they ever solve. But the law is the law".</i>	I
Support Spaces	<i>"We were trying to get lots of storage space in these rooms, and that is reasonably there. Unfortunately, everything is wide open so it's not a very secure place to put equipment. So we've ended up doing most of our equipment storage in a big storage room. And that most of the things that are in here are books, materials, catalogs, things of that nature. But at one point the intention was to try to put the equipment out here, but then when we started looking at trying to get lockable things and everything, it just didn't fit exactly".</i>	N25-3S
	<i>"The whole set-up for the school is that there is an office for each teacher, and that this was originally a concept of a workspace for projects and things. It has worked out extremely well for two teachers to be able to share office space. That concept has worked extremely well".</i>	I
	<i>"This space has worked out fairly well. Again, this was a fixed space so that if the walls were not moved it would have been very helpful... And so this is our physics storage area... But this again has worked out very well from the standpoint of having space to be able to do storage when we have 2 physics classrooms. So sharing that works out extremely well".</i>	N25-3S
	<i>"my concept was to have a floor-to-ceiling kind of storage that would be a big cabinet. And in there you would have bins and you'd keep your equipment ... and be able to plug the things in module kinds of ideas. But there would still be need for some storage space, large space, for bigger things that wouldn't fit there, but the majority of stuff could be put into bins and be pulled out and then be put back in as a unit. And so I still like that concept; we just never found a way to get it implemented very easily... I still like the idea of... yeah, lots of storage. But it needs to be probably fairly unique from the standpoint it needs to be deep enough that it does you any good. And it needs to be lockable and you still need to be able to get networks and all of that stuff around".</i>	G25
Space Layout/Proportions	<i>"This is a physics lab, and the intention is that serves both purposes—the lab and the classroom at the same time. To do both effectively, this room ought to be bigger. It's trying to do too much in what was pre-existing walls. And so we were stuck with the walls, so we then had to try to optimize that space".</i>	I
	<i>"So part of what we're talking about is needing to move these things out a little bit more so that if I've got to have room for 20 students, then it would help to have this room maybe a little bit wider but not deeper, because I don't want them farther way, but I do want them so that we would rearrange the seating".</i>	G25
	<i>"I'm OK with the labs around the room... The problem is just needing to have more flexibility in the middle of it. So to talk about extending this ... widening the room a little bit so that this doesn't encroach on the instructional area. So this is workable".</i>	G25
Visibility/Lighting	<i>"For physics, we really like to darken the room at times... For light experiments, and color and things of that nature. Our intention is come along here this year and be able to put a curtain up in addition to the shade. Now, when we planned this room we were told that they would have blackout shades. Well, we didn't get them".</i>	I
	<i>"We do [open the shades] at times. Most of the year we can open it. Tilt it open so that they can see or whatever. When I'm using the projector, that's probably too much light because this is a medium projector".</i>	I
	<i>"that light [at the lab benches].t.. I have not had any problem with that at all. In other words, there has been plenty of light".</i>	I

Teacher (25)-Physics and Computer Applications	
	<p>"I like the concept of the large window, but it needs to be light controlled".</p> <p style="text-align: right;">G25</p>
Furniture	<p>"this was intended as a handicapped space, so that's the reason for the lowered thing there, that we were then reusing some of the old tables and so I have three different thicknesses of table surfaces. That was not a very good way to do it either, in trying to save money. But that's why things look so irregular. If you look at the surfaces there, it's up and down... At the same time if I ever try to do something along that ,then I can't because.... The handicapped areas are disruptive as well. And it's like is there... I haven't had to deal with wheelchair in the room...to deal with that. The sink is awkward because of the handicapped accessibility".</p> <p style="text-align: right;">N25-4S</p>
	<p>"these desks are too small for high school students".</p> <p style="text-align: right;">I</p>
	<p>"Desks...in this arrangement. I think the interaction in important... I still like the small... the individual table because it lets me do whatever I want – work individually, work in pairs, work in any size group you want. And if would have ever gotten decent desks—because like I said, these are metal school desks. So I think you'll understand what I'm saying there. Then this should be a demo desk, and then the question is where... Maybe there is a teacher's station".</p> <p style="text-align: right;">G25</p>
	<p>"That if I had a little bit more money I'd probably end up putting the demo desk on one of those rolling tables more in the center in the room and that I would move this over to the side. But see—because my projector has to be there, and it's got a camera on it, I have to leave that sitting here and this ends up having to come up here when we really use it".</p> <p style="text-align: right;">G25</p>
Activity patterns	<p>"I have ended up moving my office to here [at the projection table] rather than using the office very much. But that's because I've been fortunate in the fact that this room has not been used by other teachers... So I'm able to work in this space all the time. That's a luxury, and I know that. But there's always a need for me for more space".</p> <p style="text-align: right;">I</p>



N25-1S



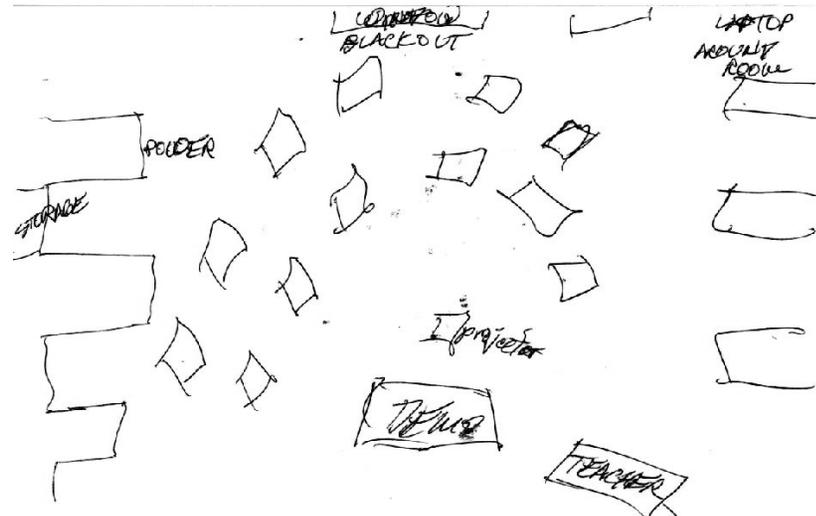
N25-2S



N25-3S



N25-4S



G25

Appendix I: Participant-by-Occupancy Data Matrix

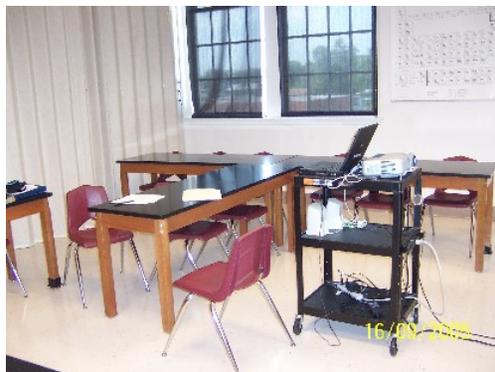
Data Sources:	W= Web-based Survey ,	I= Interview,	N= Image Narration,	G=Graphic Illustration,
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Category	Participant-by-occupants	Data
Teacher (1)- Computer Programming		
Individual Preferences	<i>"I wanted to show the mentality of the work force when they leave us and start working for a company... they're going to know that they work as part of the group..."</i>	I
	<i>"I would make [the lighting] softer, that would add to the ambiance and the learning atmosphere too."</i>	I
Teacher-Student Interactions	Teacher as a facilitator	W
	<i>"...., differentiating the curriculum for all learners."</i>	W
	Nurture students to concept formation	W
	Nurture attention to logic	W
	Arrange for learning experiences that help students discover for themselves logical connections.	W
Student-Student Interactions	The teaching learning experience should encourage students' interaction	W
	An effective teaching model should develop alternative patterns for students' personal and social development.	W
	<i>"I wanted to show the mentality of the work force when they leave us and start working for a company... they're going to know that they work as part of the group..."</i>	I
	<i>"I have seen net meetings on the computer, I have tried that one time but it became too social for the kids because they would be interacting with each other rather than their actual lesson as a whole."</i>	I
	<i>"I don't like calling them learning groups, I call them flexible grouping where students have the choice who will be in that group, and its never a group that stays together for the full year,... and they get to see different personalities and different group dynamics."</i>	I

Teacher (2)- Mathematics		
Teacher-Student Interactions	Teacher as an <i>instructor</i>	W
	Nurture attention to logic	W
	help students acquire subject matter	W
	provide learning experiences that give the student practice with particular operations	W
	<i>"I don't do group work as much I should... what I basically do is individual work and me teaching... I get my teaching style tends a little bit more towards lecture style."</i>	I
	<i>"Generally with new material, what I tend to do is presenting notes, working through some practice problems, working a problem or two for them, and model that on the board, usually getting one of the students working it step by step through."</i>	I
Student-Student Interactions	Students must construct their own knowledge	W
	An effective teaching model is one which produces a group of persons trained to work with others.	W
	The group can serve as a learning medium	W
	<i>"At the very beginning of class, during the warm up exercise time they can talk to each other if they need help or something, at the end of class they got few minutes reinforcing what we've done starting with the homework if they didn't get it done in class, during that time the students are talking to each other to see if they are on the same page."</i>	I

Teacher (3)- Anatomy/Microbiology		
Individual Preferences	<i>"I do appreciate natural lighting. If you pull down the shades you lose a lot of light... I like the windows".</i>	I
	<i>"I like them to see each other speak".</i>	I
Student-Student Interactions	<i>"I do group work, they can change seats... most of the times they do group work back there [the lab area]."</i>	I
	<i>"They are in both areas all the time".</i>	I

Teacher (4)- Chemistry		
Teacher-Student Interactions	Teacher as a <i>facilitator</i>	W
	"... by helping the individual student perceive concepts by actually experiencing them."	W
	provides support and balance between hypothetical discussions and free dialogue between students	W
	Assists students in discussing and evaluating their thinking strategies	W
	Instructs students in concept formation	W
	Teaching is the creation of environments in which students' cognitive structures can emerge and change	W
	Through improving the concept of self, education can lead students towards greater mental and emotional health.	W
Student-Student Interactions	"I use the [lecture area] normally everyday".	I
	"I got the general layout of the room is not the standard with desks in a row,... you have the chance to look at each other".	N4-10
	"Students work in groups... the tables come up and down."	N4-20
	"The MACs that we have are built in the lab tables... they can go back there and do it. It is Ok for them to walk between the class area and the lab".	I



N4-10



N4-20

Teacher (5)- Mathematics		
Individual Preferences	"I would like to use the TV more in order to be able to use the computer more and do the animations and so on, but I have to plan those because there is no connection between the TV and any computer, so in order to use that I have to generate everything I need on our school lab top in order for them to schedule it for me on that day ... And if I wanted to do anything on the internet, they have to hook up a cord that goes across over here and over to one of the computers, so it is very complicated for me to use the TV."	I
	"I prefer to have at least some connection to the outside world."	I
	"I prefer more natural light because there is not much glare with it."	I
Teacher-Student Interactions	Teacher as a facilitator	W
	Nurture attention to logic	W
	provide students with familiar materials to link with unfamiliar items	W
	Provide learning experiences that give students practice with particular operations	W
	"Primarily, I lecture, I think that's what they're used to, there is kind of resistance to change. I do try to do some group activities, so they move the desks together and work together in small group work. Occasionally I give them some lab work to do with MATLAB and so they go to these computers or there are computers in another room that they go to, and complete their work either in pairs or individually".	I
Student-Student Interactions	"I do some group activities, put them [students] together, and move the desks and so on."	I
	Students must construct their own knowledge.	W
	An effective teaching model is one which produces a group of persons trained to work with others.	W
	"I find that they get distracted by the window up above... if it was not above the board or on what we are supposed to be doing [that would be better]."	N5-10
	"Another problem that we have is that students on this side of the room can't see this board, because there are students sitting in front of the board, so I can only usually write halfway down the board... they would stand up and so on. I usually write only on one side of the board"	N5-20
	"I actually like that classroom is wider than it is long, and that way all the students are near the front of the room, and they can easily slide together and do things together."	I
	"They would have to share computers. Ideally, these tables would not be here any longer [on the perimeters], this is a converted lab room, and so if these tables are gone, I would have computers on the back and I would be able to keep everyone in the same room."	N5-30
"if they need to move entirely they are welcome to do that, I let them sit wherever they want. I had a student who sits on his desk most of the time."	I	
		
N5-10	N5-20	N5-30

Teacher (6)- Physics

Individual Preferences

[Covers the windows entirely to control the lights, for lab work purposes].
"Because of lab work we need more control, studying optics, polarization, photoelectric effect, all kind of electrical stuff, modern physics if you like.... I have to have complete control of light, off and on, it's not really everyday."

N6-10



N6-10

Teacher (7)- Anatomy/Psychology		
Teacher-Student Interactions	teacher as a <i>facilitator</i>	W
	provides support and balance with hypothetical discussions and free dialogue between students	W
	instruct students to concept formation	W
	nurture attention to language and meanings of words	W
	provide students with familiar materials to link with unfamiliar items	W
	Allow experimentation with common real-life problems	W
	<i>"I am real active, I never sit, and I do that for several reasons; so I can keep eye contact with the students, so the students will pay attention."</i>	I
	<i>"If I had more space I would [rearrange the room], because I love to do group work and I like to rearrange, and it makes your mind alert to every change".</i>	I
Student-Student Interactions	<i>"If they are doing lab exercise they would put the tables together and set up their exercise at the table, and they do lots of group work because you see leadership developing. I use this kind of activity, especially group work, if I am writing them a letter of recommendation, like leadership qualities, or compassion, or understanding, or patience, all of those are qualities they take with them into their career world".</i>	I
	the teaching/learning experience should encourage students' interaction	W
	An effective teaching model is one which produces a group of persons trained to work with others.	W
	<i>"They move from station to station, with a different objective at each station that I am testing for. They stay at each station probably for a minute or two, and when they finish they can go back and review anything. And there are several stations set up on the computers around the room with a website that I have that links them to atomic structures and physiological ideas that they can apply what they are learning."</i>	I
	<i>"They move about very much. The thing with a structure like that I find that it causes much chatter".</i>	I

Teacher (8)- Mathematics		
Teacher-Student Interactions	Teacher as a <u>presenter</u>	W
	helps students acquire subject matter	W
	adjusts instruction to the learners' stage of development	W
	provides learning experiences that give the student practice with particular operations	W
	"... <i>one of my goals is to help them enhance their logic and thinking skills.</i> "	W
	Teaching is the creation of environments in which students' cognitive structures can emerge and change	W
Student-Student Interactions	" <i>If they are working individually I am walking around the room checking on them. Sometimes they are working in groups. They do group work to solve problems as well.</i> "	I
	The teaching/learning experience should encourage students' interaction.	W

Teacher (9)- Mathematics		
Teacher-Student Interactions	Teacher as an <u>instructor</u> .	W
	" <i>I provide direct instruction, as well as facilitating the learning of concepts through activities/labs that help them discover ideas through hands on experiences which usually done in small groups.</i> "	W
	Instructs students in concept formation.	W
	Helps students acquire subject matter.	W
	Arranges for learning experiences that help students discover for themselves the logical connections between objects and events.	W
	Teaching is the creation of environments in which students' cognitive structures can emerge and change	W
	" <i>Definitely when it comes to their science fare time I am talking to them individually. In a regular class, by the virtual time, I have to do more group [work] than I like. I think the more hands-on they can get working in small groups, the more they remember, so I try to set up small group work as much as I can.</i> "	I
	" <i>It's pretty crowded, you can hardly walk around.</i> "	I
Student-Student Interactions	The teaching/learning experience should encourage students' interaction.	W
	The group can serve as a learning medium.	W
	" <i>Obviously, there is lecture in most of the classes. Today we had a lab, and they were doing things at their table together in groups... and the desks we could put together like in fours, so we have one big table in the middle. So we do this type of thing.</i> "	I
	" <i>Students often work together on assignments, and we encourage the kids to work together on assignments here, because a lot of them are coming from a long distance away and they can't stay to get help from us or something.</i> "	I

Teacher (10)- Aviation and Aerospace			
Teacher-Student Interactions	Teacher as a <u>facilitator</u> :		W
	Helps students acquire subject matter		W
	Provides students with familiar materials to link with unfamiliar items		W
	Provides learning experiences that give the student practice with particular operations		W
	An effective teaching model should develop alternative patterns for students' personal and social development		W
	<i>"Sometimes we can do the modeling ourselves and that works perfectly fine, sometimes we let them find out for themselves."</i>		I
	<i>"We generally start every class over here in the instruction area, where we have a math review question which we go over with every class...this is not intended to be instructional time, but it is intended to be review time."</i>		I
Student-Student Interactions	<i>"we might send them on a web site to do a web quest or pretty soon we will start flight simulators, and that's going to be a big deal when we start going over principles of what controls an airplane... We generally at the end of time can bring them back together again. Often times the one thing that we have that kind of takes up a little bit of time, we would read an article or something that pertains to whatever we're doing."</i>		I
	An effective teaching model is one which produces a group of persons trained to work with others.		W

Teacher (11)- Aviation and Aerospace (Note: Shared classroom with Teacher 10)			
Teacher-Student Interactions	Teacher as a <u>facilitator</u>		W
	Nurtures attention to logic and the nature of knowledge		W
	Provides students with familiar materials to link with unfamiliar items		W
	Arranges for learning experiences that help students discover for themselves the logical connections between objects or events		W
	through improving the concept of self, education can lead students towards greater mental and emotional health		W
	<i>"We give them the basic information. And then we always try to demonstrate or model something. They are usually making a cutting or making something towards the final goal of understanding the lesson.... So, we gradually...we give them information and then gradually work toward application..... So by the end of the period, they've written down their notes, they understand the vocabulary involved, and then they take something and then they make it happen."</i>		I
Student-Student Interactions	<i>"some activities lean towards group work, team work. We start out the beginning of the year with an awful lot of teamwork, um. And then some of it's individual. Probably more team than anything. We'll model something and then we'll let them build on it. And sometimes we'll give them basic information and let them figure it out from there. It varies. I don't like to stand up and lecture because we want them to be physically involved with a project."</i>		I
	An effective teaching model is one which produces a group of persons trained to work with others.		W
	<i>"So by the end of the period, they've written down their notes, they understand the vocabulary involved, and then they take something and then they make it happen"</i> .		I
	<i>"Well for some, some activities learn towards group work, team work. We start out the beginning of the year with an awful lot of teamwork, um. And then some of it's individual. Probably more team than anything. We'll model something and then we'll let them build on it. And sometimes we'll give them basic information and let them figure it out from there. It varies. I don't like to stand up and lecture because we want them to be physically involved with a project"</i> .		I

Teacher (12)- Health and Human Services		
Individual Preferences	<i>"I'm a big believer in everyone seeing each other... I, the traditional in a row, all facing the board goes against every grain. It never worked for me when I was a student. I don't think it works now. If you're trying to get them to be little soldiers I think that may work, but as far as exchanging ideas and being more approachable and open to one another, I don't think that that aids any kind of communication at all".</i>	I
Teacher-Student Interactions	Teacher as a <u>facilitator</u>	W
	<i>"... I see myself as a springboard for ideas, projects, discussion, research endeavors, etc...but the work and finished product is 'student-driven'."</i>	W
	Provides support and balance with hypothetical discussions.	W
	helps students acquire subject matter	W
	Allows experimentation with common real-life problems	W
	Through improving the concept of self, education can lead students towards greater mental and emotional health.	W
	<i>"If you come into my classroom you would rarely see any direct instruction. The more input students are allowed on a project, the more investing they become."</i>	W
	<i>"I like to just be rotating and send them on."</i>	I
	<i>"So part of, I feel like my job is, in this class to make sure they at least do enough to keep themselves healthy. Now am I trying to make them be an Olympic athlete, definitely not but by maintaining your heart and also maintaining your arteries and everything else you need to be up and moving every day".</i>	I
<i>"If I've got extra time I try to get them outside and moving because a lot of students don't do that otherwise.... So part of, I feel like my job is, in this class to make sure they at least do enough to keep themselves healthy."</i>	I	
<i>"A lot of my projects are individual or small group. Meaning usually groups of two or three, no larger than that. In that case I direct groups that if they need help or they're stuck."</i>	I	
Student-Student Interactions	The teaching/learning experience should encourage students' interaction.	W
	<i>"Basically the students will come in and we greet each other and they know that they're to sit at the table where they're all facing one another. I have assigned seats. I do this purposely so that students who wouldn't normally interact with each other have the opportunity and sometimes I kind of push a little bit for that to happen.".... "I enjoy kind of, what I call a family setting...it kind of....everyone kind of works with one another and they all know that, um, that although we're all individuals working on things we all have something in common that we need to make happen as a class."</i>	I

Teacher (13)- Sciences		
Individual Preferences	<i>“Students in my class learn to propagate plants. This helps them develop another connection to the natural world. If they are connected to the real world, they are more likely to protect it.”</i>	I
Teacher-Student Interactions	Teacher as a <i>facilitator</i>	W
	<i>“I would say that I am more of a guide.”</i>	W
	Adjusts instruction to the learner’s stage of development.	W
	Provides learning experiences that give the student practice with particular operations.	W
	Allows experimentation with common real-life problems.	W
Student-Student Interactions	The teaching/learning experience should encourage students’ interaction.	W
	<i>“The lab tables were chosen to be originally for the 9th grade program to set up independent lab experiments but with how we kind of saw it in the future that’s not how it’s worked out. It’s worked out that the 9th graders kind of have that other lab room across the hallway and there’s no really a time for them to set up individual projects as much.”</i>	I
	<i>“We do nature sketches outside. We often times have the kids sitting around and drawing things for looking at observation skills. When we are potting plants, students can often choose to work inside the greenhouse or outside the greenhouse, so we offer that openness.”</i>	I

Teacher (14)- Engineering and Architectural Design		
Individual Preferences	"We'd like it [the room] to be more...better lit. I would appreciate more day lighting".	I
	"I'd like different places so if I want to use this as an instructional area, I've got a screen that will drop, a screen that will drop, a screen that will drop so that I don't have to stand up at one place every day which I don't. I try to mix it up so that I can teach from back here, from back here and I have a screen I can drop. Three different places...I would learn better like that and that's just the way I feel that we need to not get stuck in a uniform configuration. I just think we really need...these children thrive on change. They don't sit down and watch...they don't read a book. They're very motion oriented, the visual, audiovisual aids".	G14
Teacher-Student Interactions	Teacher as a facilitator	W
	"Facilitate problem-based learning opportunities. Provide students with knowledge and materials that are essential to the research or task at hand."	W
	Nurtures attention to logic and nature of knowledge.	W
	Provides learning experiences that give the student practice with particular operations.	W
	Arranges for learning experiences that help students discover for themselves the logical connections between objects and events.	W
	Through improving the concept of self, education can lead students towards greater mental and emotional health.	W
	Teaching is the creation of environments in which students' cognitive structures can emerge and change.	W
	"I'll teach from the back one day and then I'll teach from the front one day".	I
"when you give them an assignment, you can tell when they have been working at it too long and it's time to change up. Sometimes when I see them get started to get restless or not doing their work, I say, 'Okay, store your work. Put your boards away or put your...close your computers up. Let's do something different'".	I	
Student-Student Interactions	"I do a lot of individual and actually that can change from class to class. Some classes can't work in teams. They just don't do well."	I
	I open it [the shades between the room and the commons] up about once a week and I come in and it's closed. And the reason I think they do that is because the lunchrooms right here and there's a lot of waving and back and forth. But I consider this more as an early experience at a workplace. And there are tons of distractions in your workplace and getting pulled in different directions to do different things, this is no different. This is probably a skill they need to experience earlier on."	I
	"it doesn't bother me a bit to see them look out the window...I like for them to look around and be aware and that's another thing we try to teach here, be aware of your surroundings and the children this age are"..	I
	"Sometimes it's just simply they like or don't like or stubborn or spoiled or whatever that is but some classes cannot work and some children do not want to work with partners, because they've done that before and these are the type of students, and they find out that the partner figures out that they're going to do all the work so they let them. So it's important, what I do when I do team activities all team members grade themselves and the other team members. And they are brutally honest. They grade their partners".	I

Teacher (15)- Environmental Sciences		
Individual Preferences	"adjacent in between these two classrooms is a preparation area and again, um, sometimes teachers other than science teachers don't appreciate the need for a room for what we call lovingly, junk. Your junk room, that stuff that you have...projects that are half finished or laboratory equipment that's semi setup or not setup".	N15-10
	"I like to have my doors open to air, you know to me it's like an open, more airy feel".	I
	"I'm kind of a nut about it [changing the light level]. I mean I go with the minimum amount because I'm an energy nut ...and I think there are applications when we need all this light and there are a lot of applications where we don't need all this light. So we do have some flexibility and for example, we have one of them, will turn off two lights versus one which only turns off one light".	I
Teacher-Student Interactions	Teacher as a <u>facilitator</u>	W
	"...but one of creating learning environments and activities that call on a student to not only learn subject matter, but to synthesize meaning and direction from that subject matter."	W
	Helps students acquire subject matter.	W
	Provides learning experiences that give the student practice with particular operations.	W
	Arranges for learning experiences that help students discover for themselves the logical connections between objects and events.	W
	The central role of education is to prepare citizens to perpetuate a democratic social order.	W
	"I don't really use it [the podium] much. I walk around when I discuss and I think it's good because not only it is boring but classroom control to me is like a proximity thing too. If I'm over here and you start to not pay attention and then I can walk over here and all of the sudden you do... and to me that's a good thing. it's too dynamic. I think it's really important as a teacher".	I
	"if the teacher's not going to watch the video, the kid's not going to watch the video. And if you want them to gain something from that you know, even though they're the TV generation, you got to point it out to them. You got to like, you know, use that again as a teaching tool not as the teacher".	I
Student-Student Interactions	"as a matter of fact I do [have kids working at lab section while working with others in here in the middle section]...a lot of times they'll be working on their models back there while the other part of the class is working on, you know, some of the research aspects ... And it tends to work out real well".	I
	The teaching/learning experience should encourage students' interaction.	W
		
N15-10		

Teacher (16)- Sciences		
Individual Preferences	<i>"And the whiteboard's fine, because you know it's nice to have a traditional whiteboard... part of it is kind of like habit ...I've been teaching for ten years and I just not used to writing on the screen. I more used to writing on the board type thing. Um and also, again, I feel like I'm more in the classroom and less tied to the computer when I'm writing on the board"</i> .	I
Teacher-Student Interactions	Teacher as an <i>instructor</i>	W
	Instructs students in concept formation	W
	Helps students acquire subject matter.	W
	Arranges for learning experiences that help students discover for themselves the logical connections between objects and events	W
	Teaching is the creation of environments in which students' cognitive structures can emerge and change.	W
Student-Student Interactions	The teaching/learning experience should encourage students' interaction.	W

Teacher (17)- Mathematics		
Individual Preferences	<i>"I would prefer a room with more windows in it"</i> .	I
Teacher-Student Interactions	Teacher as an <i>instructor</i>	W
	<i>"I feel that it is necessary to be a roll model to students"</i>	W
	Provides support and balance with hypothetical discussions and free dialogue between students.	W
	Provides students with familiar materials to link with unfamiliar items to be learned.	W
	Adjusts instruction to the learners' stage of development.	W
Student-Student Interactions	The teaching/learning experience should encourage students' interaction.	W
	The group can serve as a learning medium.	W
	The school must teach citizens to reflect on values and to participate with others in the reconstruction of society.	W
	<i>"on long class days I have them work together in twos or in entire rows to solve a problem. I'll give them three different problems and then each team has to come up with a solution and then they select one or two representatives to come up and present that problem. That's a great thing. That really makes the class more dynamic. Makes it more interesting"</i> .	I

Teacher (18)- Biology & Biotechnology (Note: Sharing space with teacher 16)		
Individual Preferences	Lab work is of particular importance to induce students to investigate problems.	W
Teacher-Student Interactions	Teacher as a <u>facilitator</u> .	W
	Instructs students in concept formation.	W
	Helps students acquire subject matter	W
	Provides students with familiar materials to link with unfamiliar items to be learned.	W
	<i>“the classroom by and large will be relatively informal because we don’t have a lot of discipline issues and anything that needs correcting usually can be done with pretty minor kind of comments... So in a Science class like mine there’s always a lot of discussion and lecture kind of thing using PowerPoint, using writing on the board but there’s a lot of dialogue and back and forth with the kids. It’s not just standing up and talking at them for an hour. Uh, I’m trying to train them on note taking for college.”</i>	I
	<i>“Either using PowerPoint or writing on the screen. I find that if I’m writing on the screen I’m watching the kids at the same time or talking with them. If you’re writing on the board you turn your back to them. Not that these kids are going to do anything but your back’s to them so you’re not talking directly”.</i>	I
Student-Student Interactions	The teaching/learning experience should encourage students’ interaction.	W
	An effective teaching model is one which produces a group of persons trained to work with others.	W

Teacher (19)- Chemistry		
Individual Preferences	<i>“I like having the windows to see out, but all I see mostly here is a bank—a green bank. So there’s not much of a view there”.</i>	I
	<i>“It’s not bad having the students on the perimeter. Just sometimes over here to there – if the kids were ... our kids are good. If the kids were like problem students like I’ve had in some schools, this would probably not work as well. We wouldn’t want as much separation”.</i>	I
Teacher-Student Interactions	Teacher as a <u>presenter</u> .	W
	Instructs students in concept formation.	W
	Helps students acquire subject matter	W
	Provides students with familiar materials to link with unfamiliar items to be learned.	W
	<i>“If it’s a lab day I always go over the lab first. I show them where all... I have the equipment out for them. They don’t have a little of everything. I have everything out for them. I go over what they’ve got out and what each thing is going to be used for. I go over disposal—what can go down the drain and what can’t. I go over all that stuff. We pick out partners. They have to change partners each lab. We select partners, and then if there’s any other cautions or whatever. And then they work. And while they’re working I have a checklist that I go around.... Like here’s this morning’s. I have a checklist and I’ll look for these things that I check off. All these things each time. Who they work with and where in particular”.</i>	
Student-Student Interactions	The central role of education is to prepare citizens to perpetuate a democratic social order.	W
	An effective teaching model is one which produces a group of persons trained to work with others.	W
	<i>“they usually work in pairs. Like this is a station and that is a station. And sometimes I have to have groups of three. And I usually try to put them over there on that side of the room”.</i>	I
	<i>“The kids are working here [at the perimeters] in the labs then in the middle for class”.</i>	I

Teacher (20)- Mathematics		
Individual Preferences	<i>"I'm more of a traditional in that I like the individual desks".</i>	I
Teacher-Student Interactions	Instructs students in concept formation.	W
	Helps students acquire subject matter.	W
	Provides learning experiences that give the student practice with particular operations.	W
	Teaching is the creation of environments in which students' cognitive structures can emerge and change.	W
	An effective teaching model should develop alternative patterns for students' personal and social development.	W
	<i>"What I do rearrange is who sits with whom. I will move them around and not let them work with the same people every time they do a lab. They have to switch around. Sometimes I let them pick and sometimes I do it for them. Sometimes it's random, but sometimes it's... I'll try to group a really, really strong student or a really, really weak student in the same area and then a student that's strong in both. Or try to put them in groups that they can help each other".</i>	I
Student-Student Interactions	<i>"Sometimes [students work in pairs] it'll be pairs; sometimes three—no more than three is my typical. But each person is responsible for contributing to the final product, and one of the ways that I can monitor that is they will do a self evaluation and a peer evaluation for the members of the group. So that they know their group members are watching what they're doing and they try to contribute as much as they can because that is graded and counts as part of the lab grade".</i>	I
	An effective teaching model is one which produces a group of persons trained to work with others.	W

Teacher (21)- Mathematics		
Individual Preferences	<i>"Everything is so fluorescent in here. I like having that regular sunlight in my classroom. It makes me a lot happier person and a lot more awake".</i>	I
	<i>"Like this back wall. I'm lucky in that this is part of the old building, so I've got the neat colored bricks and the design. And I like that because it's got some character to it. And I'm kind of glad they incorporated those types of design elements".</i>	I
Teacher-Student Interactions	Teacher as a <u>facilitator</u>	W
	<i>"I encourage students to ask questions and form connections between concepts."</i>	W
	Instructs students in concept formation	W
	Helps students acquire subject matter	W
	Provides learning experiences that give the student practice with particular operations.	W
	<i>"I'll often give extensions to activities that require the student to research a concept, or read up on a particular topic...this helps encourage those students who may lack confidence in their math skills by giving them another venue to explain what they have learned."</i>	W
	<i>"I want the students to have experience in thinking for themselves and developing strategies for solving problems, so I attempt to develop and use activities that support those goals."</i>	W
Student-Student Interactions	<i>"they do go down to the machine shop and work, and they work on things and do their testing in here so I think we'll be fine. It's nice because we've got the tables and they can set up and work through. As far as my normal classes on a daily basis, I've got my calculus and my pre-calculus. The calculus I do a good amount of direct instruction, but I also do a lot of group work –actually in both classes I do. I like for them to work in group projects. I typically like to have 3 to a group, at the most 4 to a group".</i>	I
	The teaching/learning experience should encourage students' interaction.	W
	An effective teaching model is one which produces a group of persons trained to work with others.	W
	<i>"I typically like to have 3 to a group, at the most 4 to a group...so that's anywhere between 4 and 6 groups. It works out really well if everyone is here in my 18 students classes and I have 6 groups of three. It's wonderful. And then I've got the 6 square tables. They all sit at their tables and for some reason they like to gather at one table as far from me as possible. But I do force them to sit at individual tables and work. But it's nice because they sit here and they're focused on each other, but they can also turn around and talk to other groups if they need to. I like that better than having individual desks. And I also like it probably better than most because you sit more people around those and they're more tempted to jumble up and work—two groups together than each individual group".</i>	I

Teacher (22)- Mathematics		
Individual Preferences	<i>"If there's activity outside the room, the kids [get distracted] I want them to watch me...No, [I am not missing more daylight]. Actually the room is very bright and so I don't know if it's because I started in that room. I mean I like the idea of having a window, and I do have a class...when we have the research class my students have plants. And I had some plants last year, so it was nice to open the shades a little bit. But there's a fair amount of activity on my side of the street, because that's where the high school is and cars are coming and going... we had people coming to the building, and my students would be seeing who's coming for the most part".</i>	I
	<i>"You know, it's like I'm an adjuster. I'm like, "This is the way it is. It's not going to be different," so I deal with it. And so consequently, changing things is sometimes ... if it's up to me to change, everything is OK the way it is".</i>	I
	<i>"I kind of figure things are not going to change and I really don't think about how things could be. Because – why? If somebody came in and said, "OK, we're going to do this to your room. How would you like to have it done?" Again, if I thought it was going to happen, I probably would try to think of something, but just on a day-to-basis, I'm probably not thinking about how I would want the classroom to be because I'm the only one who can affect that change. It works OK".</i>	I
Teacher-Student Interactions	Teacher as an <i>instructor</i>	W
	<i>"My goal is to build on or expand the knowledge of mathematics that each student already has."</i>	W
	Instructs students in concept formation.	W
	Provides students with familiar materials to link with unfamiliar items to be learned.	W
	Provides learning experiences that give the student practice with particular operations.	W
	Teaching is the creation of environments in which students' cognitive structures can emerge and change.	W
	Students must construct their own knowledge.	W
	<i>"I enjoy it [having 4 room fronts]. The problem is with the students. Some of them are sitting so that they're oriented towards this board, and if I go over ... I'd say more so they're oriented so that they can see the smartboard. But really, I probably spend more time up here than I do over there. And when I'm up here talking, I have one or two students who just don't even turn around. It's like...I'm over here talking. They might just twist a little bit in their seats. But if I were in their position, I would move my chair around so that I didn't have to twist or turn. Maybe move to the end of the table or something".</i>	I
<i>"some of the classes really like the smartboard. My afternoon students are freshmen and when we first did the smartboard they thought was really... They would even say, "This is the neatest thing." And they all wanted an opportunity to work on the smartboard. And then when I turn it on, they'd say, "Oh, I just loved it." And they'll say "Oh use the smartboard." Some of the other kids... as they get older they're not as enthusiastic about things like that. They don't really have opinions – they'd just rather not do anything".</i>	I	
<i>"they might ask each other questions or I would walk around the room and ask them if somebody had a question. And then I asked somebody "What did you do?" And then would show them at the board what we were talking about".</i>	I	
Student-Student Interactions	The teaching/learning experience should encourage students' interaction.	W
	<i>"Usually on a lab day, which is one day a week, they need a computer. And sometimes the activity is two people on a computer. But most of the time I really like to have them do the activity ...each person to experience it so if they can have their own computer".</i>	I

Teacher (23)- Mathematics		
Individual Preferences	<i>"Windows ... I don't worry about windows. Windows are fine, but I've been without a window for so long it doesn't really bother me".</i>	I
Teacher-Student Interactions	Teacher as an <i>instructor</i>	W
	<i>"My role is to instruct, assess, facilitate, and diagnose."</i>	W
	Helps students acquire subject matter.	W
	Provides learning experiences that help students discover for themselves the logical connections between objects or events.	W
	Teaches students how to reflect on significant teaching problems.	W
	<i>"I don't necessarily say, "Be sure to use this particular feature." It's just that we ask them to do a report, then they are free to use whatever they want to use. And so they may end up using Math Tab or MiniTab. They may end up using Excel Spreadsheet. It's really kind of up to them. We just turn them loose and let them fly and see what they come up with".</i>	I
Student-Student Interactions	<i>"Most of the time homework and things like that are done of course individually. Labs and when we have specific things that we design for them to do in groups, in pairs. Don't normally get involved in groups larger than 2 or possibly 3 because it tends to dilute down the participation of the individual. And we want everybody to be fully engaged in the process, and not just be standing there watching the other 2 or 3 people do all the work. We want everybody to be involved. And usually there's enough work in a project like that for 2 people to be fully engaged, possibly 3. If you go beyond that it doesn't work too well".</i>	I

Teacher (24)- Computer Science		
Student-Student Interactions	<i>"I let students help each other if... One of the things about the students here is that they're computer... the experience that they bring to the school is very varied. Some students know a lot about computers, and some don't. So to make it a more level playing field, I let the students help each other. But I don't do usually do group work as such. Each student has his own computer".</i>	I

Teacher (25)- Physics and Computer Applications		
Individual Preferences	<i>"I'm the type person that every once in a while gets organized, and put things away. And just as soon as I finish getting organized, the next piece of paper comes in, doesn't fit what I've just gotten though".</i>	I
	<i>"I've been around these technologies to know some of the strengths and weaknesses and know what the priorities are".</i>	I
Teacher-Student Interactions	Teacher as an <i>instructor</i>	W
	<i>"I want to challenge what the student thinks s/he knows and refine the thinking to include more situations that often to have not been considered."</i>	W
	Provides support and balance with hypothetical discussions and free dialogue between students.	W
	Instruct students in concept formation.	W
	Provides students with familiar materials to link with unfamiliar items to be learned.	W
	Students must construct their own knowledge.	W
	<i>"I'm always somebody who does not like PowerPoints because they are too cryptic. They should not be every note. PowerPoints...I use them just for a few things to keep me on task. They're supposed to remind me of the other things I wanted to talk about kind of thing. And therefore, often to hand those out as notes is misleading because they need to add a lot more detail than what's on there. So I don't use PowerPoints very often".</i>	I
	<i>"there's typically a lot of interaction. In terms of discussion, in terms of trying to get them to discuss things. And in discussions sometimes we're dealing with problems. Hey, here's a situation – tell me what you know about it quantitatively, how are we going to solve it if this is the unknown we're looking for – a lot of interactions along those lines".</i>	
Student-Student Interactions	<i>"If that row were not there, then they can see each other; they can hear each other better. More interaction. And like I said, I can be more in the center of things to help play off of things instead of people looking at the back of everybody's head and all that kind of stuff, and can't hear what they're saying and that type of thing".</i>	I
	The teaching/learning experience should encourage students' interaction.	W
	<i>"I am the type of teacher that would really like not to be the way the room is arranged, but that the students are arranged almost in a semi-circle coming around here so that I can be here, if at all possible, right in the middle of them for some discussions. And they can see each other to talk".</i>	N25-10
	<i>"They probably work more individually than I should. But I encourage them to talk to each other, to ask questions of each other. To remind each other about things... And I'm saying—don't be afraid to interact. Don't be afraid to verbalize questions rather than try to figure... especially when you're staring at the paper and thinking, I think I can figure this out. Well maybe you need to ask a question and that question could be asked of your neighbor, as opposed to it's gotta be the teacher that answers the question. So that's why this arrangement to me is important. That they've got to recognize that physics is just like any course. You communicate about it, and some people start communicating sooner than others".</i>	I

Teacher (25)- Physics and Computer Applications



N25-10

References

- Alexander, C. (1979). *The timeless way of building*. New York: Oxford University Press.
- Alexander, C., Ishikawa, S., & Silverstein, M. (1977). *A pattern language: Towns. Buildings. Construction*. New York: Oxford University Press.
- Anfara, V., Brown, K. & Mangione, T. (2002). Qualitative Analysis on Stage: Making the Research Process More Public. *Educational Researcher*, 31(8), 28-38.
- Arkin, H. & Paciuk M. (1997). Evaluating intelligent buildings according to level of services systems integration. *Automation in Construction*, 6 (5/6), 471-479.
- Avery, M. (1981). *Building united judgment: A handbook for consensus decision making*. Madison, WI: The Center for Conflict Resolution.
- Bachman, L. R. (2003). *Integrated Buildings: the Systems Basis of Architecture*. New York: John Wiley & Sons.
- Baird, G. (Ed.) (1996). *Building evaluation techniques*. New York: McGraw Hill.
- Bingler, S., Quinn, L., & Sullivan, K. (2003). *Schools as centers of community: A citizen's guide for planning and design*. Washington D.C.: National Clearinghouse for Educational Facilities.
- Bliss, L. (1996). 6 keys to the 22nd century high school. *School Planning and Management*, 35(5), 22-27.
- Blum, B. I. (1996). *Beyond programming: To a new era of design*. New York: Oxford University Press.
- Borich, G. D. (2003). *Effective teaching methods*. New York: Prentice-Hall.
- Bovill, C. (1991). *Architectural Design: integration of structural and environmental systems*. New York: Van Nostrand Reinhold.

- Bransford, J., Brown, A. & Cocking, R. (Eds.) (1999). *How people learn: Brain, mind, experience, and school*. Washington D.C.: National Academy Press.
- Brown, M. B. & Lippincott, J. K. (2003). Learning spaces: More than meets the eye. *Educause Quarterly*, 1, 14-16.
- Brubaker, C. W. (1998). *Planning and Designing Schools*. New York: McGraw Hill.
- Bruhns, H. (1996), CPBR List of Techniques, In G. Baird (Ed.), *Building evaluation Techniques*, (pp. 63-67). New York: McGraw Hill.
- Burge, E. J. (Ed.) (2000). The strategic use of learning technologies [Special issue]. *New Directions for Adult and Continuing Education*, 88.
- Byron, M. (Ed.) (2004). *Satisficing and maximizing: Moral theorists on practical reason*. New York: Cambridge University Press.
- Carlini, J. (1988). *The intelligent Building Definition Handbook*. Washington D.C.: IBI.
- Cash, C. S., Earthman, G. I. & Hines, E. W. (1997). Environment tied to successful learning. *School Planning & Management*, 36(1), 12-14.
- Center for Educational Technologies at Virginia Tech (2004). *Teaching Models*. Retrieved November 21, 2004, from <http://www.edtech.vt.edu:8080/edtech/id/models/>
- Churchman, C. W. (1971). *The design of inquiring systems: Basic concepts of systems and organization*. New York: Basic Books.
- Cole, R. J. & Larsson, N. K. (1999). GBC '98 and GBTool: Background. *Building Research & Information*, 27(4/5), 221-229.
- Comerio, M. C. (1987). Design and empowerment: 20 years of community architecture. *Built environment*, 13(1), 15-28.

- Cuban, L. (1984). *How teachers taught: Constancy and change in American classrooms 1890-1980*. New York: Longman.
- Cuban, L. (1985). *Teachers and machines: The classroom use of technology since 1920*. New York: Teachers College Press.
- Davis, B., Sumara, D. & Luce-Kapler, R. (2000). *Engaging minds: Learning and teaching in a complex world*. London: Lawrence Erlbaum Associates.
- De Corte, E., Verschaffel, L., Entwistle, N. & van Merriënboer, J. (Eds.) (2003). *Powerful learning environments: Unraveling basic components and dimensions*. New York: Pergamon.
- Dede, C. (2002). Vignettes about the future of learning technologies. In U.S. Department of Commerce, *2020 visions: Transforming Education and Training through Advanced Technologies* (pp.18-25). Washington D.C.: Technology Administration.
- Donovan, M. S. & Bransford, J. D. (Eds.) (2005). *How students learn: History, mathematics, and science in the classroom*. Washington D.C.: The National Academies Press.
- Earthman, G. I. (1985). Evaluating the impact of the building environment on the individual. *CEFP journal*, 23(4), 15-17.
- Earthman, G. I. (1997). The best possible environment for the most productive learning. *School business affairs*, 63(7), 21-24.
- Ehrenkrantz, E. D. (1989). *Architectural Systems: A Need, Resources, and Design Approach*. New York: McGraw Hill.

- Ehrenkrantz, E. D. (1999). Planning for Flexibility, Not Obsolescence. Keynote address at the UEF-21 Conference. Retrieved June 13, 2004, from <http://www.designshare.com/Research/EEK/Ehrenkrantz1.htm>
- Fenstermacher, G. D. & Soltis, J. F. (1992). Approaches to teaching. New York: Teachers College Press.
- Foliente, G. C., Leicester, R. H. & Pham, L. (1998). Development of the CIB Proactive Program on Performance Based Building Codes and Standards. Victoria, Australia: the International Council for Research and Innovation in Building and Construction (CIB).
- Freiberg, H. J. & Driscoll, A. (1992). Universal teaching strategies. London: Allyn and Bacon.
- Gray, John and Baird, George (1996), How to plan and conduct evaluations. In G. Baird (Ed.), Building evaluation Techniques (pp. 3-14). New York: McGraw Hill.
- Gredler, M. E. (1997). Learning and instruction: Theory into practice. Columbus, Ohio: Prentice Hall.
- Gregerson, J. (1994). Smart buildings go back to school: Researchers at Carnegie Mellon University aim for more integration of enclosure, interiors, HVAC and communications systems. *Building Design & Construction*, 35(4), 53-55.
- Groat, L. & Wang, D. (2002). Architectural research methods. New York: John Wiley & Sons.
- Guise, D. (1991). Design and Technology in Architecture. New York: Van Nostrand Reinhold.

- Hartkoft, V. et al. (1997). An Integrated Approach to Design and Engineering of Intelligent Buildings- The Intelligent Workplace at Carnegie Mellon University, *Automation in Construction*, 6, 401-415.
- Hartkopf, V., Loftness, V. E. & Mill, P. A. D.(1986). Integration for Performance. In R. D. Rush (Ed.), *The Building Systems Integration Handbook* (pp. 231-240). New York: John Wiley & Sons.
- Hawkes, D., McDonald, J., & Steemers, K. (2002). *The Selective Environment: An Approach to Environmentally Responsive Architecture*. New York: Spon Press.
- Heller, S., & Vienne, V. (Eds.). (2003). *Citizen designer: Perspectives on design responsibility*. New York: Allworth.
- Hinrichs, R. (2002). A vision for life-long learning: Year 2020. In U.S. Department of Commerce, *2020 visions: Transforming education and training through advanced technologies* (pp.1-12). Washington D.C.: Technology Administration.
- Hirata, S. & Fisher, D. (2003). Students' and teachers' perceptions of actual and preferred classroom environments in Japanese junior high school: The potential of psychological measures in the classroom. In M. S. Khine & D. Fisher (Eds.), *Technology-rich learning environments: a future perspective* (pp. 369-383). London: World scientific publishing.
- IES Daylighting Committee (1979). *Recommended Practice of Daylighting*. New York: Illuminating Engineering Society of North America.
- Jacobson, D. (2001). *Methods for teaching: Promoting student learning*. New York: Prentice Hall.
- Joyce, B. & Weil, M. (1986). *Models of teaching*. Englewood Cliffs, NJ: Prentice-Hall.

- Kalay, Y. (Ed.). (1992). *Evaluating and Predicting Design Performance*. NY: John Wiley & Sons.
- Kaufman, J. E. & Christensen, J. F. (Eds.) (1987). *The IES Lighting Handbook- Application Volume*. New York: Illuminating Engineering Society of North America.
- Khine, M. S. & Fisher, D. (2003). *Technology-rich learning environments: a future perspective*. London: World scientific publishing.
- King, S., Conley, M., Latimer, B., & Ferrari, D. (1989). *Co-design: A process of design participation*. New York: Van Nostrand Reinhold.
- Kliment, S. A. (Ed.). (2001). *Building type basics for elementary and secondary schools*. New York: John Wiley & sons.
- Kozma, R. B. (2003). *Technology and classroom practices: An international study*. *Journal of Research on Technology in Education*, 36(1), 1-14.
- Labplan. (n.d.). Retrieved November 15, 2004, from [ftp://www.labplan.com](http://www.labplan.com)
- Lackney, J. (1999). *Changing patterns in educational facilities*. Retrieved January 5, 2005, from www.designshare.com/Research/ChangingPatterns/ChangingPatterns1.htm
- Larsson, N. (1999). *Development of a building performance rating and labeling system in Canada*. *Building Research and Information*, 27(4/5), 332-341.
- Magolda, M. B. (1999). *Creating contexts for learning and self-authorship: Constructive-developmental pedagogy*. Nashville: Vanderbilt University Press.
- Marcus, T.A. et al. (1972), *Building Performance*. London: Applied Science Publishers.

- Meek, A. (Ed.). (1995). *Designing places for learning*. Scottsdale, AZ: The Council of Educational Facility Planners International.
- Merriam, S. B. (1998). *Qualitative research and case study applications in education*. San Francisco: Jossey-Bass.
- Miller, S. (1995). *Design process: A primer for architectural and interior design*. New York: Van Nostrand Reinhold.
- Mitchell, W. J. (1990). *The logic of architecture: Design, computation and cognition*. Cambridge, MA: The MIT Press.
- Mizukura, I. (1990). A Conceptual Design of System integration for Intelligent Building Systems and Services. *Mitsubishi Electric ADVANCE*, 50, 2-7.
- Moore, G. T. & Lackney, J. A. (1994). *Educational facilities for the twentieth century: research analysis and design patterns*. Milwaukee, WI: University of Wisconsin.
- Moore, G. T. & Lackney, J. A. (1995). *Design patterns for American schools: Responding to the reform movement*. In A. Meek (Ed.), *Designing places for learning* (pp. 11-22). Scottsdale, AZ: The Council of Educational Facility Planners International.
- Moore, G. T. & Lackney, J. A. (1995). *Design patterns for American schools: Responding to the reform movement*. In A. Meek (Ed.), *Designing places for learning* (pp. 11-22). Scottsdale, AZ: The Council of Educational Facility Planners International.
- Morrison, J. & Dede, C. (2004, October). *The future of learning technologies: An interview with Chris Dede*. *Innovate*, 1(1). Retrieved November 21, 2004, from <http://www.innovateonline.info/index.php?view=article&id=1>

- Nair, P. (2003a). 30 strategies for education reform. Retrieved November 21, 2004, from www.fieldingnair.com/edreformnair1.pdf
- Nair, P. (2003b). Planning technology friendly school buildings. *School Planning and Management*, 42(1), 12.
- Nair, P. (2004). Utilizing a school design pattern language for tomorrow's schools. Retrieved November 21, 2004, from <http://fieldingnair.com/Publications/NairCEFPI2004.ppt>
- Negroponte, N. (1975). *Soft architecture machines*. London: The MIT Press.
- Papamichael, K. (1999). Application of Information Technologies in Building Design Decisions. *Building Research & Information*, 27(I), 20-34.
- Pepchinski, M. (1995). The Building Breathes. *Architectural Record*, 183(10), 70-85.
- Phillips, G. M., & Wood, J. T. (Eds.). (1984). *Emergent issues in human decision making*. IL: Southern Illinois University Press.
- Powell, J. A. (1988). Towards the integrated environment for intelligent buildings, In B. Atkin (Ed.) *Intelligent buildings* (pp. 345-251). Sydney: Avebury Technical.
- Rea, M. S. (Ed.) (2000). *The IESNA Lighting Handbook- Reference and Application-9th Ed.* New York: Illuminating Engineering Society of North America.
- Reitman, W. (1965). *Cognition and thought*. New York: John Wiley & Sons.
- Richardson, W. M. & Wheeler, L. B. (2003). New and renovated schools: Design of “instructionally high performance learning spaces”. *Educational Facility Planner: Integrating Technology in the 21st Century Classroom*, 39(1), 11-14.
- Rickards, T. (2003). Technology-rich learning environments and the role of effective teaching. In M. S. Khine & D. Fisher (Eds.), *Technology-rich learning*

environments: a future perspective (pp. 115-132). London: World scientific publishing.

Rossmann, G. B. & Rallis, S. F. (2003). Learning in the field: An introduction to qualitative research. Thousand Oaks, CA: Sage Publications.

Rubin, A. (1988). What Building Users Want, In B. Atkin (Ed.) Intelligent Buildings (pp. 28-41). Sydney: Avebury Technical.

Rush, R. D. (Ed.). (1986). The building systems integration handbook. New York: John Wiley & Sons.

Rush, R. D., & Stubbs, M. S. (1986). Integration Theory, In R. D. Rush (Ed.) The building systems integration handbook (pp. 317-330). New York: John Wiley & Sons.

Saint, S., & Lawson, J. (1994). Rules for reaching consensus: A modern approach to decision making. San Francisco: Pfeiffer.

Sanoff, H. (1970). Techniques of evaluation for designers. Raleigh, NC: Design Research Laboratory, School of Design, North Carolina State University.

Sanoff, H. (1991). Visual research methods in design. New York: Van Nostrand Reinhold.

Sanoff, H. (1992). Integrating programming, evaluation and participation in design: A theory Z approach. Brookfield, VT: Avebury.

Sanoff, H. (1996). Designing a responsive school. School Administrator, 53(6), 18-23.

Sanoff, H. (2000). Community participation methods. New York: John Wiley & Sons.

- Sanoff, H. (2001). A visioning process for designing responsive schools. Washington D.C.: National Clearinghouse for Educational Facilities. Retrieved November 21, 2004, from <http://www.edfacilities.org/pubs/sanoffvision.pdf>
- Sarasin, L. C. (1999). Learning style perspectives: Impact in the classroom. Madison, WI: Atwood Publishing.
- Schein, E. (1969). Process consultation. Reading, MA: Addison-Wesley.
- Schmidtz, D. (2004). Satisficing as a humanly rational strategy. In M. Byron (Ed.), Satisficing and maximizing (pp. 30-58). New York: Cambridge University Press.
- Schon, D. (1971). Beyond the stable state. London: Temple Smith.
- Schwandt, T. (1998). Qualitative inquiry: A dictionary of terms. Thousand Oaks, CA: Sage Publications.
- Scott-Webber, L. (2004). In sync: Environmental behavior research and the design of learning spaces. New York: Society for College and University Planning.
- Shibley, R. G. & Schneekloth, L. H. (1996). Evaluation as placemaking: Motivations, methods, and knowledges. In G. Baird (Ed.), Building evaluation Techniques (pp. 15-23). New York: McGraw Hill.
- Simon, H. A. (1973). The structure of ill-structured problems. *Artificial Intelligence*, 4, 181-201.
- Stake, R. E. (1995). The art of case study research. Thousand Oaks, CA: Sage Publications.
- Stuebing, S., Celsi, J. G. & Cousineau, L. K. (1994). Apple classroom of tomorrow: Environments that support new modes of learning-the results of two interactive design workshops. NJ: New Jersey Institute of Technology.

- Tagliere, D. (1992). *How to meet, think, and work to consensus*. San Diego, CA: Pfeiffer.
- Taylor, A. (1993). How schools are redesigning their space. *Educational Leadership*, 51(1), 36-41.
- U.S. Department of Commerce (2002). *2020 visions: Transforming education and training through advanced technologies*. Washington D.C.: Technology Administration.
- Valenti, Mark S. (2002), *The Black Box Theater and AV/IT Convergence: Creating the Classroom of the Future*, *Educause review*, 37(5), 52-62.
- Watson, D. (Ed.) (1993). *The Energy Design Handbook*. Washington D.C.: The American Institute of Architects Press.
- Wigginton, M. & Harris, J. (2002). *Intelligent skins*. Oxford: Butterworth.
- Williams, C. (2003). How wireless will transform school design. *Educational facility planner: Integrating technology in the 21st Century Classroom*, 39(1), pp.7-10.
- Wittl, R. (2003). *Educated Walls*. *School planning and management*, 42(1), 17-18.
- Wolfgang, F.E. (Ed.). (1989). *Building evaluation*. New York: Plenum Press.
- Wood, J. T. (1984). Alternative methods of group decision making. In G. M. Phillips & J. T. Wood (Eds.), *Emergent issues in human decision making* (pp. 3-18). IL: Southern Illinois University Press.
- Worthington, J. (1988). *Retaining Flexibility for Future Occupancy Changes*, In B. Atkin (Ed.) *Intelligent Buildings* (pp. 55-63), Sydney: Avebury Technical, pp.55-63.

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Sarah Elmasry has earned her Doctoral Degree in Architecture Design and Research at the college of Architecture and Design, Virginia Tech in Fall 2007. She has started the doctoral program at Virginia Tech in January 2003. Sarah has been actively involved in design and research activities at the Center for High Performance Learning Environments (CHPLE) at the same college since its initiation in 2004.

In this experience, she has worked in collaboration with partners from the corporate and the academic worlds, as well as end-users of buildings towards the introduction of innovative design and construction solutions for contemporary learning environments; these experiences involve technology integration, modular structure and user-based design solutions.

Sarah has earned her B.Sc. and M.Sc. degrees at the Department of Architectural Engineering, Faculty of Engineering, Alexandria University, Egypt in 1996 and 2001 consecutively. She is currently an Assistant Teacher on leave at the same department with five-years teaching experiences in undergraduate architecture programs, as well as research in the fields of architecture and urban planning. Between 1997 and 2002, Sarah was primarily involved in teaching design and working drawing studios as well as architectural systems and theory courses.