Computer Learning Behavior: Strategies For Learning And Behavior Improvement

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ABSTRACT

A survey of 124 students in computer applications classes was conducted to determine students' perceptions of computer learning in the following areas: promptness, listening, computer obsession, computer anxiety, anger, frustration, enjoyment of computers, importance of computer knowledge, and relative importance of computer skills and people skills. Results indicated that there were behavior problems involving promptness, listening, obsession, computer anxiety, anger, and frustration in the classroom. However, a majority of the students enjoyed working with computers. Additionally, they agreed that computer knowledge will be useful to them in the future; and most agreed that people skills and computer skills are equally important.

Keywords: Computer Behavior, Education, Behavior Improvement.

1. INTRODUCTION

Learning computer skills is no longer valuable only for students majoring in computer-related fields. All individuals in our society need computer skills to function successfully in their personal and professional lives. Despite the widespread use of technology in all parts of our society, the literature often reports high levels of anxiety and negative attitudes about using computers. Additionally, computer obsession, human interaction, and enjoyment of computers are other variables that must be understood. Studying computer behavior in learning environments and understanding the variables that affect computer behaviors will assist educators in developing appropriate learning strategies for improving learning and behaviors.

2. RELATED RESEARCH

Some of the challenges facing humanity as it strives to deal with information, computers, nature, and its own societal shortcomings are discussed by researcher Herbert A. Simon, 1978 Nobel Prize winner in Economic Sciences. Simon believed that what computer-generated information consumes is the attention of its recipients; i.e., a wealth of information creates a poverty of attention. Therefore, there is a need to allocate that attention efficiently among the overabundance of information that might consume it (Hardin 1998/99).

According to Klein (1999), the use of computer technology often has unpleasant side effects, some of which are strong, negative emotional states that arise in humans during interaction with computers. Frustration, confusion, anger, and similar emotional conditions can affect not only the interaction itself, but also productivity, learning, social relationships, and overall well being.

A number of investigations have focused on the association between previous computer usage, age, obsession, and computer attitudes, but the results have been mixed.

Upon measuring computer attitudes of college students enrolled in a required computer information systems course, Marcoulides (1988) concluded that computer

anxiety is still present regardless of prior computer experience. Additionally, two studies showed that even experienced computer users report symptoms of computer anxiety when they are confronted with learning new computer applications (Ostrowski, Gardner, and Motawi, 1986; Elder, Gardner, and Ruth, 1987). Other studies, however, reported that more positive attitudes toward computers were related to computer experience (Levine and Donitsa-Schmidt, 1998; Shashaani, 1997; Ayersman, 1996).

According to Leso and Peck (1992), the type of computer course can have some influence on the level of anxiety of graduating students. They found students taking a software tool course (including word processing, spreadsheets, databases, etc.) were more likely to come out with reduced anxiety than those students taking a programming course. However, the study did not explore the reason for this outcome.

"It is said that under certain circumstances anxiety may facilitate performance" (Schwarzer, 1986). This may be true for students of high ability where high anxiety can improve their performance on tasks of simple to moderate ability; however, "high anxiety will generally lead to performance decrements for individuals of low ability" (Gaudry and Spielberger, 1971). A moderate level of anxiety can be healthy in most students as it indicates an interest in what they are doing, and a low level of anxiety can indicate an apathetic attitude which can be just as detrimental as high anxiety it to a student's learning.

Maurer (1994), in a review of computer anxiety literature, concluded that amount of computer experience seems to have the clearest relationship to computer anxiety of any variable studied, but he cautions that further research needs to be conducted on how anxiety develops so that its development can be interrupted (Orr, Allen, and Poindexter, 2001).

In addition to the previous experience variable, the age of computer users has also been examined as a possible predictor of computer attitudes. The assumption is that younger students have more positive attitudes and less anxiety towards computers than older students because they have had more exposure to technology. Some research tends to show, however, that age is not a significant factor in computer attitudes. In his study of undergraduate business administration students enrolled in a required introductory computer course in Norway, Busch (1995) reported that age had no significant effect on computer attitude. On the other hand, Massoud (1991) and Pope-David and Twing (1991), using Loyd's and Gressard's (1984) Computer Attitude Scale, both found significant positive relationships between age and the Liking subscale of the Computer Attitude Scale, indicating that older students have a greater liking of computers.

Another variable in computer learning is computer obsession or addiction; psychologists disagree as to whether computer obsession is really an addiction. Many therapists have added "computer addiction" to their lists of offered treatment (What Constitutes an Addiction? 2002). There are extreme cases of attachment to computers, but as in all addictions, the problem is where to draw the line between normal enthusiasm and abnormal preoccupation. Addictions defined very loosely, can be healthy, unhealthy, or a mixture of both. If a person is fascinated by a hobby, feels devoted to it, would like to spend as much time as possible pursuing it, this could be an outlet for learning, creativity, and self-expression (Computer and Cyberspace Addiction, 2002).

Computer usage also involves enjoyment and fun. "It is an under-investigated issue which nevertheless recurs as a subject of research. It also recurs in education as a possible mode of promoting learning. It is certainly true that we cannot account for some user behavior with machines without allowing for fun" (Johnson, Draper, and O'Donnell 2002). According to Lockheed (1988), the attraction of the computer is the attraction of power. There are two features of power that the computer offers us—the first is the possibility it offers for control and the second is that we become beguiled by the almost magical possibilities that the computer offers us.

In light of the importance of computers in society and the abundance of information, how can educators best prepare students for lives in this ever-changing world? Alter (1999) said that educators need to be realistic. Computers will not be effective unless behaviors change. Schools are forgoing books, repairs, and arts programs to buy computers. Schools should be encouraged to teach the skills that make people effective at deploying and using computers. These skills include analytical skills, reading, mathematics, listening, and leadership.

Similarly, Gal-Ezer and Harel (1998) said that while a practitioner or researcher in a scientific field must have extensive knowledge and skills in the field itself, an educator must have the additional ability to convey this knowledge to others correctly and reliably, to teach the said skills, to provide perspective, and to infuse students with interest, curiosity, and enthusiasm.

The study of learning behavior in the computer classroom and the possible implications for behavior in personal and professional lives are extremely important to all involved in the educational process. Additionally, strategies need to be developed to provide resources for teachers to cope with behaviors in the classroom.

3. PURPOSES

The purposes of this study were (a) to investigate the behaviors and perceptions of students in computer applications classes and (b) to present some possible solutions for changing or coping with these behaviors.

This research was intended to study the classroom behaviors of students with the added dimension of computers in classroom environment. Additionally, this study sought to develop strategies for improvement of learning behaviors because the behaviors shown in the classroom can possibly carry over into personal and professional lives where problems with computer usage may interfere with interactions with people. Demographic information on major, rank, GPA, age, and microcomputing background was collected from each student. Other objectives were to determine students'

1. Promptness when completing assignments.
2. Listening effectiveness.
3. Obsession with computer work.
4. Computer anxiety.
5. Anger and frustration in the classroom.
6. Enjoyment of computers
7. Perceptions of the value of computer knowledge.
8. Perceptions of the relative importance of computer skills and people skills.

4. PROCEDURES

In order to study students' behavior in computer applications classes, a questionnaire was administered to students in six classes. The questionnaire focused on demographic information (major, rank, age, GPA, previous course) as well as the following areas of student behavior: promptness, listening, obsession, anxiety, frustration, anger, and enjoyment. Additionally, the questionnaire sought to determine students' perceptions of the value of computer knowledge and their perceptions of the importance of people skills versus computer skills.

The proposal for this research was submitted to and approved by the University's Committee for Screening Research Projects That Use Human Subjects. Each student was given a form to complete, giving permission to use the results. The form explained the purposes of the research and assured anonymity.

The questionnaire was administered to students at the end of the semester. It was answered by 145 students, yielding 124 usable questionnaires.

Frequency distributions and Pearson's Correlation Coefficients were used to analyze all variables. Analysis of Variance was used to determine variance in anxiety from beginning of use of the computer to anxiety at the end of the semester.

5. ANALYSIS OF DATA

5.1 Demographics

Major. The 124 students who completed the questionnaire were both business (52 percent) and non-business (48 percent) majors.

Rank. There were freshmen (35 percent), sophomores (32 percent), juniors (19 percent), and seniors (14 percent).

Age. A majority of the students were 18-21 years of age. Fourteen percent were 18 years of age; 22 percent were 19; 21 percent were 20; 24 percent were 21; 5 percent were 22; and the remaining 14 percent were 23-31.

GPA. Most of the students had GPAs ranging from 2.5 to 3.4. The GPAs were distributed as follows: 12 percent were in the 4.0-3.5 range; 29 percent, the 3.4-3.0 range; 35 percent, the 2.9-2.5 range; 22 percent, the 2.0-2.4 range; and 2 percent, under 2.0.

Previous course: Thirty-five percent of the students had taken a computer course before, and 65 percent had not.

5.2 Correlations of Demographic and Behavior Variables

The table in the Appendix shows the following correlations among the demographic and behavior variables:

1. Major and Rank (correlation coefficient of 0.543, .0l level of significance). Non-business majors were higher ranked.
2. Major and Age (correlation coefficient of 0.220, .05 level of significance). The business majors were younger.
3. Major and Promptness (correlation coefficient of –0.209, .05 level of significance). Non-business majors completed assignments more promptly than business majors.
4. Major and Listening (correlation coefficient of –0.245, .01 level of significance). Non-business majors listened more carefully than did business majors.
5. Major and Beginning Anxiety (correlation coefficient of –0.231, .01 level of significance). The non-business majors experienced more anxiety at the beginning of the course.
6. Major and Frustration (correlation coefficient of 0.177, .05 level of significance). Business majors

were more frustrated with assignments than non-business majors.

7. Age and Rank (correlation coefficient of 0.603, .01 level of significance). Older students were higher ranked.
8. Rank and Listening (correlation coefficient of –0.222, .05 level of significance). The lower the rank, the less likely students were to listen carefully.
9. Rank and Beginning Anxiety (correlation coefficient of –0.239, .01 level of significance). The higher the rank, the more likely students were to experience anxiety when first using computers.
10. GPA and Promptness (correlation coefficient of –0.304, .01 level of significance) The higher the GPA, the more likely students were to hand in work on time.
11. GPA and Listening (correlation coefficient of –0.247, .01 level of significance). The higher the GPA, the more likely they were to listen to carefully to the teacher.

5.3 Behaviors

As Table 1 shows, 64 percent of the students said they were prompt in handing in their assignments. Fifty-three percent of the students said they listened carefully when the teacher is talking. A majority of the students (77 percent) said they were obsessive about finishing computer assignments. Forty-six percent of the students said they experienced computer anxiety when they first started working on computers, but only 23 percent said they were still experiencing anxiety at the end of the semester. Fifty-one percent of the students got frustrated with the computer assignments. Thirty-one percent of the student said they became angry more easily in a computer classroom than in a traditional lecture classroom.

Students' comments showed that they became angry and frustrated in computer class because they do not understand assignments, sometimes computers did not function properly, there were time constraints, they could not keep up with the work, they did not understand or listen to teacher instructions, and they felt that the volume of work was greater than in other three-hour classes.

In spite of all the problems, 92 percent of the students said they enjoy working with computers. Seventy-seven percent felt that computer skills and people skills are equally important. Of those that said the skills were not equally important, 22 percent felt that people skills are more important and 1 percent said computer skills are more important.

5.4 Correlations of Behavior Variables

A correlation study of the behavior variables showed the following results (See Appendix):

Table 1
Frequency Distribution of Variables
N = 124

Variable	Yes %	No %
Promptness—Do you hand in your work on time?	64	36
Listening—When the teacher is talking, do you listen carefully?	53	47
Obsession—When you are working on a computer assignment, are you obsessive about finishing it?	77	23
Beginning Anxiety—When you first started working on computers, did you experience any anxiety?	46	54
Ending Anxiety—When you work on computers now, do you experience any anxiety?	23	77
Frustration—Do you get frustrated with computer assignments?	51	49
Anger—Do you find you become angrier in computer class than in a traditional lecture classroom?	31	69
Enjoyment—Do you enjoy working with computers?	92	8
Value—Do you think computer skills will be useful to you in the future?	98	2
Computers vs. People—Do you think computer skills and people skills are equally important?	77	23

1. Listening and Promptness (correlation coefficient of 0.196, .05 level of significance). Those who were prompt with their assignments tended to listen more carefully when the teacher was talking.
2. Listening and Ending Anxiety (correlation coefficient of 0.176, .05 of significance). Students who did not listen carefully were still anxious about using computers at the end of the semester.
3. Obsession and Beginning Anxiety and Ending Anxiety Students who were obsessed with completing assignments experienced anxiety when first using computers (correlation coefficient of 0.326, .01 level of significance). Additionally, they were still experiencing anxiety at the end of the course (correlation coefficient of 0.368, .01 level of significance).
4. Beginning and Ending Anxiety (correlation coefficient of 0.607, .01 level of significance). There was a positive correlation between the two anxiety questions: (a) experiencing anxiety when first using computers and (b) still experiencing anxiety at the end of the semester.
5. Frustration and Beginning and Ending Anxiety

(correlation coefficient of 0.250, .01 of significance).

6. Students who experienced anxiety when first using computers became frustrated with assignments. Also, those who were still feeling computer anxiety at the end of the semester were frustrated with assignments (correlation coefficient of 0.200, .01 level of significance).
7. Frustration and Anger (correlation coefficient of 0.245, .01 level of significance). Students who became angry more easily in the computer classroom also became frustrated with computer assignments
8. Frustration and Enjoyment (correlation coefficient of –0.232, .01 level of significance). Students who were frustrated with assignments had less enjoyment of computer class.
9. Anger and Beginning Anxiety and Ending Anxiety. Students who became angry more easily in the computer classroom experienced anxiety when first using computers (correlation coefficient of 0.296, .01 level of significance) and were still experiencing anxiety at the end of the semester (correlation coefficient of 0.286, .01 level of significance).
10. Anger and Enjoyment (correlation coefficient of –0.250, .01 level of significance). Those students who said they did not become angry more easily in computer class than lecture class tended to enjoy the computer class more.
11. Enjoyment and Beginning Anxiety (correlation coefficient of –0.189, .05 level of significance). Students who experienced anxiety when first using computers had less enjoyment of computers.

5.5 Correlations of Perceptions of Usefulness and Interaction

As the table in the Appendix shows there were no significant correlations for the value of computer skills variable and all of the other variables. Similarly, there were no significant correlations for the importance of people skills and computer skills variable and all of the other variables.

5.6 Analysis of Variance of Anxiety Variables

An analysis of variance of the anxiety of students when first using computers and anxiety at the end of the semester yielded a probability of .001, indicating significant variance between the two variables.

6. DISCUSSION

Non-business majors who showed significant correlations with the higher age and higher rank variables were more prompt with their assignments and listened more carefully than business majors. Students of higher rank had more beginning anxiety. This is contrary to the findings of Busch (1995), who reported that age had no effect on attitude.

As may be expected, students with higher GPAs were also more prompt with their assignments and also listened more carefully than those with lower GPAs.

Forty-six percent of the students experienced anxiety when first using computers and 23 percent were still experiencing anxiety at the end of the semester. Sixty-five percent had not taken a previous computer course. There were no significant correlations between the previous course variable and all other variables, including the anxiety variables. This is similar to the findings of Marcoulides (1988) who concluded that computer anxiety is still present regardless of prior computer experience. This may be due to the fact that, although some students indicated that they had taken a computer course previously, none of the students had taken the exact course. There was new material to be learned so that taking a previous course may not have had a great impact, as described by Ostrowski, Gardner, and Motawi, 1986, and Elder, Gardner, and Ruth, 1987.

Business majors, who were younger and have a lower academic rank, were more frustrated with their assignments. Business majors were of a lower rank than non-business majors because business majors are required to take the computer application course in the freshman semester. Non-business students take the course later in their program.

Students who were obsessed with finishing their work, who experienced frustration and anger, experienced more anxiety when first using computers and were still experiencing anxiety at the end of the semester.

A majority of the students said that they enjoyed working on computers. Students who did not experience enjoyment were anxious when first using computers, became frustrated with assignments, and got angry more easily in the computer class than in a traditional lecture class.

There were no significant correlations at the .0l or .05 levels for (a) the perceived value of the usefulness of computers or (b) the importance of computer skills vs. people skills. This perhaps indicates that most of the students know the value of computers (98 percent) and the relative importance of interaction of people and computers (77 percent) although they may be having problems.

7. STRATEGIES

The teacher's own attitude and behavior in the teaching

process is key in conveying the necessary information as well as demonstrating good interaction among people and computers. Compeau (2002) in a study of 53 computer software teacher behaviors identified six primary categories of behavior: knowledge, communication, course design, sympathy, training techniques, and class management. In all phases of instruction, the teacher is of utmost importance, whether acting as a lecturer or coach.

From the planning phase of instruction through organization, implementation, and follow-up, special attention should be given to computer obsession and enjoyment. Students in computer courses may be highly motivated and obsessed with assignments so that motivation and obsession should be channeled in the right direction. Additionally, carefully structuring the course may help diffuse computer anxiety, anger, and frustration. Since most students realize the value of the computer course and the importance of the interaction of people and computers, teachers are well on their way to improving learning and behavior.

A presentation of strategies for teaching computer classes should begin with Thorndike's Laws of Learning (Thorndike, 1914; Thorndike, 1932). Edward Lee Thorndike, an American educational psychologist, made many contributions to the study of learning, teaching, and mental testing. He taught at Teachers College, Columbia University, for 41 years. His laws provide insight into the learning process.

1. The Law of Readiness--People learn best when they are ready to learn (motivated).
2. The Law of Exercise--Things most often repeated are best remembered.
3. The Law of Effect—Learning is strengthened when accomplished by a pleasant or satisfying feeling.
4. The Law of Primacy--Primacy, the state of being first, often creates a lasting impression. Therefore, learning must be correct the first time because reteaching to correct errors is very difficult.
5. The Law of Intensity--An exciting, dramatic, vivid learning experience teaches more than a routine or boring experience.
6. The Law of Recency--Other things being equal, the thing most recently learned is best remembered.

Keeping the above laws in mind while planning, organizing, implementing, and following-up should lead to effective instruction. Additionally, a primary objective must be to integrate good human interaction into the computer class.

7.1 Planning

Planning involves knowledge assessment, textbook selection, equipment selection, software selection, classroom layout, and supplementary materials development.

In the planning phase, an assessment must be conducted to determine students' strengths and weaknesses. The assessment can be simply a questionnaire inquiring about previous computer knowledge. This assessment informs teachers of students' prior knowledge and helps the teachers get to know the students.

Tutorial textbooks and other instructional media should be selected for format and content, naturally, but also for the ability to hold the students' interest. Additionally, the tutorials should contain clear and accurate steps, and the cases that are to be assigned to reinforce the learning that takes place in the tutorials should be unambiguous.

Equipment should be adequate to run the software that is needed for the course. Funding is an extremely important part of the planning for this course. Teachers must take an active role in acquiring the needed resources. Sources of funding are the school system budget and other state and federal funds. Funding may be also obtained from foundation grants, community fund raising, and special allowances given by textbook, hardware, and software manufacturers.

Demonstration equipment and classroom layout are also extremely important. Demonstration equipment must be of high quality so that all students can see the screen. In order to eliminate the barrier of having computer monitors blocking the view between the teacher and students, computers may be sunken inside desks, allowing a larger work area for students.

All handouts should be prepared in advance, if possible, and may be placed in a packet to be purchased at the university print shop or bookstore. The packets should contain the course syllabus and calendar, rules for using the computer labs and the Internet, special instructions for logging on and off the system, instructions for assignments, rules for classroom behavior, and anything else necessary to put the students at ease.

7.2 Organizing

When organizing a course, one must consider (a) the objectives of the course, (b) lessons for the course, (c) learning theories and teaching strategies, and (d) learning assessment.

Teachers should know the material well before beginning to teach and should write objectives and keep objectives in focus from planning to follow-up. They should determine the learning styles of students before teaching, educating students on their own learning style and showing them how to improve their learning.

Unit plans for the course must be developed. Elements for the unit plan are as follows: the objectives, time frame, teaching procedures, activities, materials, evaluation methods, etc., for the entire course. Next, lesson plans must be prepared. A lesson plan includes the following parts: (a) Motivation—Introduction; (b) Objectives—Stated to students and written in terms of student behavior changes; (c) Review of prior lessons or knowledge; (d) Materials to be used; (e) Activities to teach the content of the lesson; (f) Evaluation process to determine whether students have learned; (g) Summary; (h) Assignment to prepare for next lesson; and (i) Remotivation—Closing. All of these lesson and unit plans should be kept in a course manual.

When preparing lessons, careful consideration must be given to the learning that will take place and at what levels. Bloom's Taxonomy of Educational Objectives (2002) provides excellent guidelines. Bloom's levels of learning are, from lowest to highest, Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation. There should be some work at the higher levels of learning—learning that will allow for critical thinking.

An excellent strategy for including all of Bloom's levels of learning and also providing a valuable vehicle for teaching appropriate behavior is cooperative learning. Cooperative learning, as defined by Cooper, et. al., 1994, is a structured, systematic instructional strategy in which small groups of students work together toward a common goal. The authors list six features of this approach: positive interdependence, individual accountability, appropriate assignment to groups, the teacher as a coach or facilitator, explicit attention to social skills, and face-to-face problem solving. The format of this approach is to assign a problem or case, have the class form into small groups, allow a specific amount of time, and require the groups to report back to the class. Groups should be instructed to determine the problem, decide on a method of reaching a consensus, choose a leader or let a leader emerge when necessary, involve all members in the decision making, and select an observer to record interaction and results of the group's decision. This observer will report group functions to the group and will report decisions made by the group to the entire class.

In addition to group activities, further personalization of instruction can be accomplished by studying individual learning styles and personality types. There are some online inventories that may be useful in helping teachers and students analyze learning preferences, while at the same time "breaking the ice" in becoming acquainted. Three of the inventories that are scored online are as follows:

1. An Inventory of Multiple Intelligences—http://www.ldrc.ca/projects/miinventory/miinventory.php. This 80-item test is based on Gardner's theory and includes eight intelligences: linguistic, logical-mathematical, visual-spatial, musical, body-kinesthetic, interpersonal, intrapersonal, and naturalist.
2. The Keirsey Temperament Sorter II—http://www.advisorteam.com/user/login.asp. This 70-item test is an adaptation of Carl Jung's theory. It is based on the following personality types: extraversion-introversion, sensing-intuition, thinking feeling, and judging perceptive.
3. Learning Styles Inventory—http://www.howtolearn.com/personal.html. This 36-item test assesses visual, auditory, and kinesthetic styles of learning.

Finally, teachers should begin work on assessments as a part of the construction of learning experiences. Assessments should be consistent with learning approaches; i.e., individual or group learning. In order to alleviate anxiety, students should be notified at the beginning of the course of the types of assessment that will be used. Assessments can be made by observation, objective testing, hands-on testing, and individual or group case study.

7.3 Implementing

Implementing the course requires orientation, interaction, learning outcomes, and feedback. Implementing the program should be easy if the planning and organizing phases have been completed properly.

An orientation class should present the mission and goals of the course in light of the curricula and missions of the college and university, stressing that this course is the first course in the sequence of courses that prepare students for working in a technology-oriented society. Students should be given a course syllabus and a calendar/schedule of the timeline of the course. Test dates and due dates for completion of assignments should be clearly stated. Additionally, students should be given the objectives for each lesson, as well as for the course as a whole. They should know, in advance, the topic of each lesson, reading assignments, and class time allotted for hands-on computer work. Additionally, guidelines must be set so that students will know the format and rules of the course.

After the orientation, the class can begin. Teachers should present the lesson and be readily available for questions. Each communication with students, including feedback on learning outcomes, should be timely and should contain motivators to stimulate and encourage students to learn.

7.4 Follow-up

The follow-up phase includes maintenance and evaluation, leading to accountability and productivity improvement. In technology-related courses, maintenance is a fact of life. Equipment and software must be maintained and upgraded constantly. The course must be continually evaluated through observations, questionnaires, and assessment of student learning. The mission and objectives must be considered in light of what the students have learned. Are the missions of the course being accomplished? Are the objectives being met? The information gathered from observations, questionnaires, and assessments of learning must be used to improve the course. It is not good enough to collect information and do nothing with it. It must be used to improve learning and productivity.

8. SAMPLE CASES

Three sample cases that use the questions in Table 1 of this study, cooperative learning, and the online inventories previously discussed are presented below:

8.1 Computer Learning Behavior Case

The questions listed in Table 1 can be used for cooperative group work. Students should answer each question individually, adding reasons after each yes/no response. Then in groups, students should discuss their respective responses and discuss the reasons for responding the way they did. Students will then prepare a report on the behavior responses of the group.

8.2 Entrepreneurship Case

Students, working in groups, plan to open a business. They should consider the following:

1. What type of business would be successful?
2. What is the market for that type of business?
3. How will they raise funds?
4. Will it be an online business, a community business, or both?
5. What type of employees will they need?
6. Who are the competitors?
7. What types of financial statements will they need?
8. What type of database will they need?

This project could include all software learned in the course and could be used as a culminating project. They should use word processing, spreadsheet, database, and presentation software. They could use the whole semester to complete the project, completing specific parts as the software for that part is learned.

Individually, they should prepare a resume. This will make them think of their own qualifications and also allow the teacher to know more about each of them.

As a group, they should

1. design a web page if the business will be online or an advertisement for their business if it is to be a community business.
2. prepare samples of their financial statements using the spreadsheet program
3. develop a sample database, including customers, employees, and orders tables.
4. create a PowerPoint presentation promoting their business.

To clarify what should be included in the project, students should be given a checklist. The teacher in the project evaluation process should use this checklist.

8.3 Learning Styles Case

Learning inventories can be used for group work. Each student should take one of the inventories discussed previously; i.e., the Keirsey Temperament Sorter, which is an indicator of personality types. After the inventory has been scored online, the student should look up definitions of their own personality types, including learning strategies for their types. Then in groups, students should discuss each of their types and the prescribed strategies for learning. After discussion, each student should write a report to be submitted to the teacher, suggesting ways of improving their learning from the information collected about their personality types.

9. CONCLUSIONS

Student responses to the questionnaire indicate that there is a need for careful attention to students' learning behaviors in computer classes. Some students in these classes were having problems with completing assignments, listening to instructions, obsessive behavior, anxiety, anger, and frustration. At the same time, there were positive factors. A majority of the students enjoyed the computer class and knew that what they were learning would be useful to them in the future. They also realized that people skills are equally important or more important than computer skills. Improvement of instruction, using the positive factors, with special attention to learning behavior problems will go a long way toward making the learning process more effective.

Finally, teachers and students in beginning computer classrooms must keep in mind that this beginning computer class is an introduction to the situations that will be present in their professional and personal lives, and all must be totally cognizant that computer skills must be compatible with people skills.

10. RECOMMENDATIONS FOR FUTURE RESEARCH

Several limitations of this study suggest opportunities for future research. First, no information was collected on students who withdrew from the course. Knowing why these students dropped out could generate a profile of dropouts. Second, there was no question on class attendance, which could provide more information on reasons for learning problems. Third, no information was collected on the reading ability of the students. Since reading is an extremely important component of the course due to students' having to read tutorials, the reading ability of the students is important in learning the material. Finally, the anxiety of students must be continually monitored to discover new strategies to cope with learning and behavioral problems.

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APPENDIX
Correlations
N=124

	Major	Rank	Age	GPA	Previous Course	Promptness	Listening	Obsession	Beginning Anxiety	Ending Anxiety	Frustration	Anger	Enjoyment	Value	Computers vs. People
Major	1.00	.543*	.220**	.099	.111	-.209**	-.245*	-.045	-.231*	-.060	.177**	-.037	-.109	.048	.088
Rank	.543*	1.00	.603*	-.051	.027	-.158	-.222**	-.059	-.239*	.019	.048	.029	-.065	.014	.077
Age	.220**	.603*	1.00	-.121	-.033	-.031	-.163	-.012	-.071	.124	.006	.137	-.119	.010	.083
GPA	.099	-.051	-.121	1.00	-.010	-.304*	-.247*	.121	-.001	.129	.127	-.113	-.025	-.059	-.087
Previous Course	.111	.027	-.033	-.010	1.00	.116	.008	-.083	-.052	-.062	-.046	.066	.034	-.019	.056
Prompt-ness	-.209**	-.158	-.031	-.304*	.116	1.00	.196**	.004	.019	-.057	-.155	-.045	.018	-.073	-.097
Listening	-.245*	-.222**	-.163	-.247*	.008	.196**	1.00	-.021	.038	-.176**	-.066	-.136	.083	.058	.062
Obsession	-.045	-.059	-.012	.121	-.083	.004	-.021	1.00	.326*	.368*	.098	.081	.023	-.022	.085
Beginning Anxiety	-.231*	-.239*	-.071	-.001	-.052	.019	.038	.326*	1.00	.607*	.250*	.296*	-.189**	.010	-.072
Ending Anxiety	-.060	.019	.124	.129	-.062	-.057	-.176**	.368*	.607*	1.00	.200**	.286*	-.174	.001	-.028
Frustra-tion	.177**	.048	.006	.127	-.046	-.155	-.066	.098	.250*	.200**	1.00	.245*	-.232*	-.038	.039
Anger	-.037	.029	.137	-.113	.066	-.045	-.136	.081	.296*	.286*	.245*	1.00	-.250*	.042	.162
Enjoy-ment	-.109	-.065	-.119	-.025	.034	.018	.083	.023	-.189**	-.174	-.232*	-.250*	1.00	-.061	-.050
Value	.048	.014	.010	-.059	-.019	-.073	.058	-.022	.010	.001	-.038	.042	-.061	1.00	.015
Computers vs. People	.088	.077	.083	-.087	.056	-.097	.062	.085	-.072	-.028	.039	.162	-.050	.015	1.00

*.01 level of significance; **.05 level of significance

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