

The Smart Classroom: Measuring Student Satisfaction with a  
Technology-Enabled Classroom

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## I. Introduction

Management higher education is on the cusp of a sea change with its incoming class of students. Proserpio and Gioia (2007) call these new students the “virtual generation” as most of them have grown up online in a culture that emphasizes immediacy, curiosity, and intellectual openness. They are a group that shuns passive learning and instead expects full participation in their educational environment. Thus, effective learning is possible if educators can harness students’ new learning patterns and align teaching styles accordingly. It is an educational challenge where new technology is increasingly playing a larger role in the learning environment.

This study develops measures for students’ satisfaction with a technology-enabled classroom (“Smart Classroom”) used in an organizational behavior course at Boston University’s School of Management. OB221 (Organizational Behavior: The Dynamics of Leading Organizations and People ) is an undergraduate core course piloting the school’s new technology-enhanced space, also known as “SMG classroom 326.” This “Smart Classroom” is equipped with “team tables (each with their own LCD screen with built-in video capabilities), a professor’s web-ready interactive digital whiteboard, and the capability to throw problem sets and presentations from the professor to the student teams and vice versa” (Knight, 2012). The class uses the “Smart Classroom” to watch the professor’s telecasted live lectures as well as conduct discussion sections.

This report will utilize pre-test surveys from OB221 students using SMG Classroom 326 to quantify the reliability and validity of measures that answer the following research question: What are the predictors that influence college students’ satisfaction with technology-enabled classrooms? Because the technology is so new and constantly changing, there have been few

studies that evaluate the effects of using this kind of innovation in the classroom. Part of this dilemma is due to the lack of consistent and comprehensive measures for student satisfaction towards technology-enabled learning. This study is intended to provide an extensive, dependable measurement model for future studies in the field of educational technology.

Immersed in the world of social media and networked technologies, this generation arguably comes into the management classroom with the tools intact to facilitate their education in collaborative learning. Yet, business schools have yet to embrace new media tools into their traditional pedagogical methods. According to the Sixteenth Annual AACSB/UCLA Computer Usage Survey (2000), “one of the most compelling issues facing business schools is getting faculty and students to be as technologically savvy as their corporate counterparts.”

Not only is this shunning of new technology leaving the students at a disadvantage in terms of job skills, but it is also believed to be facilitating student disengagement with educational materials. Put simply, educators are not speaking to these students in a language they can understand. Waning student engagement has been an obstacle for educators who continue to reach out to students using traditional, passive methods of learning (e.g., “sage-on-the-stage” lecture formats). Therefore, there has been a push towards integrating technology into the classroom in hopes of increasing student satisfaction with their education and achieving better learning outcomes.

## II. Literature Review

### Theoretical Models of Learning with Technology

In the education field, there are two competing models of learning: objectivism and constructivism. Objectivism is the traditional, behavioral model that is the basis for lecture formats and supports the transference of knowledge from an expert to students. On the other hand, the constructivist model holds that knowledge is created by the learner, so the most effective teaching approach is learner-centered. Often this type of individualized learning actually emerges through collaboration or interaction with others (Leidner & Jarvenpaa, 1995).

The theory of engaged learning is rooted in this constructivist approach and can be used as a conceptual framework for technology-enabled education. The idea behind engagement theory is that students must be engaged in their course work for effective learning to occur (Kearsley & Shneiderman, 1999). The force behind engagement is to create an environment that fosters successful, collaborative teams working on meaningful projects. Collaboration in management courses, especially those focusing on organizational behavior, isn't a novel idea. However, technology can help facilitate experiential, engaged learning in groups on a much larger and innovative scale that can reach out to the "virtual generation."

In terms of students' satisfaction with using new technology, the technology acceptance model (TAM), proposed by Davis (1989), provides a framework for understanding drivers of technology usage. Davis' (1989) study found that perceived usefulness and perceived ease of use were significant factors in determining user acceptance of new technology (Figure 1.1).

Integrating both theories on engaged learning and technology acceptance, it is possible to hypothesize that effective learning with technology will occur when the students perceive the technology to be useful and easy to use. Once the students accept the technology into their

education, the ability to collaborate and create a meaningful learning experience will lead to successful outcomes.

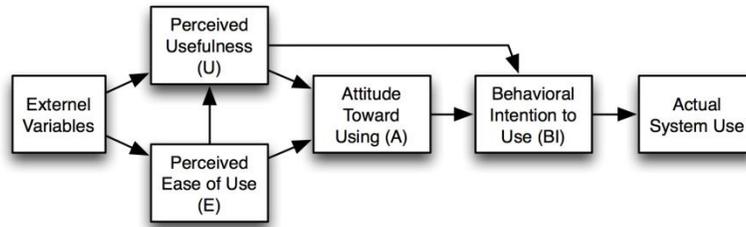


Figure 1.1 Technology acceptance model (1989)

To measure the learner’s engagement using technology, the next section will cover the literature and relevant predictors for student satisfaction with technology-enabled courses. Considering this is a relatively new pedagogical field, previous research will be derived from fields ranging from distance education, e-Learning, Internet education, and technology in management education.

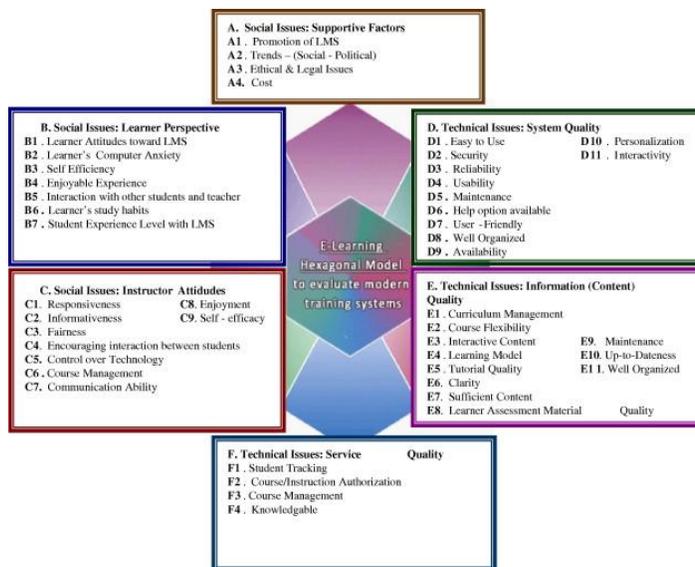


Figure 1.2 Hexagonal e-Learning assessment model (HELAM) (2009) course, and environment.

In order to organize the predictors, this study combines the Hexagonal e-Learning assessment model (HELAM) used by Ozkan and Koseler (2009) (see Figure 1.2) and measurement model for perceived e-Learning satisfaction proposed by Sun, Tsai, Finger, Chen, and Yeh (2008) (see Figure 1.3). Both use a six dimension approach that includes dimensions relating to the student, instructor, design, technology,

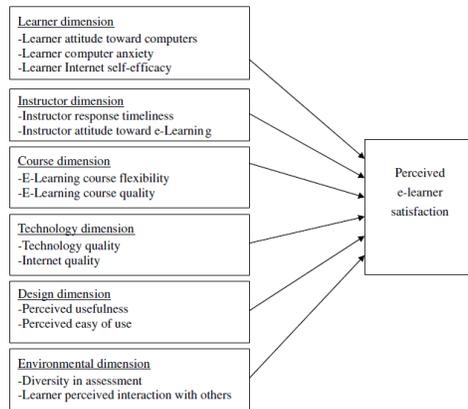


Figure 1.3 Dimensions and antecedents of perceived e-Learner satisfaction (2008)

## Social Factors Contributing to Satisfaction

### Student dimension.

In Ozkan and Koseler's (2009) evaluation of U-Link, an educational web tool that supplements face-to-face learning ("blended learning"), the researchers found that a learner's perceived enjoyment was a powerful predictor of satisfaction with e-Learning. Other studies (Tang & Austin, 2009; Gomez et al., 2010) confirm their results that there is a positive relationship between perceived enjoyment using educational technology and overall satisfaction.

Education technology that can facilitate interaction with other students has also been discovered to increase satisfaction. In digital learning environments, collaboration and problem-solving as a team is made much easier using asynchronous technologies (e.g., wikis, Google Docs, etc.). Therefore, technology that can increase perceived student-to-student interaction is likely to increase learner satisfaction (Arbaugh, 2009; Ozkan & Koseler, 2009; Sun et al., 2008). Related studies involving group cases (Alavi, 1994) and perceived team-member valuable contributions (Gomez et al., 2010) also demonstrate that interactivity is an important driver for the success of education technology.

The perceived learning outcomes achieved through use of education technology is

another important predictor for student satisfaction. In Gomez, Wu, and Passerini's (2010) evaluation of a "Team-Based Learning" (TBL) process mediated by computers, the authors found those who perceive high-levels of team interaction will enjoy and experience higher learning outcomes. Technology that enhances interactivity and enjoyment in learning can increase learning effectiveness, which in turn, increases satisfaction (Chen, et al., 2010; Tang & Austin, 2009; Alavi, 1994; Gomez et al., 2010; Leidner & Jarvenpaa, 1995).

The Gomez, et al. (2010) study also noted that perceived motivation can influence the relationship between student interactions and perceived learning. Tang and Austin (2009) verify that technology which can motivate learning in students will increase learning outcomes and satisfaction. A related concept is learning interest, or the extent to which the student is interested in his or her education (Alavi, 1994).

On a more practical level, students want to see that using technology in the classroom will help them in their future careers. As mentioned previously in the technology acceptance model, perceived usefulness is essential in integrating technology into the classroom (Davis, 1989). In this case, it is perceived usefulness in the long-run that can increase satisfaction. Tang and Austin (2009) presented information using multiple instructional modalities (e.g., powerpoint, video, etc.) and found that perceived career application was a predictor in choosing the modality that had a high learning effectiveness. Perceived skill development (Alavi, 1994) also relates to a student's belief in the pragmatic value of learning technologies and satisfaction with those technologies.

Self-efficacy, or an individual's belief that he or she can achieve an objective, is also cited as a driver in satisfaction. Learners with high self-efficacy are more confident of using

education technology to accomplish learning tasks, and thus improve their satisfaction (Ozkan & Koseler, 2009; Sun et al., 2008).

Studies conducted by Ozkan and Koseler (2009) and Sun et al. (2008) show that a learner's computer anxiety can influence satisfaction with education technology. The more an individual is uncomfortable or fearful of computers, the more he or she will be dissatisfied with using technology in learning. While this predictor might have been relevant to an older population, it may not be as crucial of a factor for the "virtual generation" that has been exposed to computer technology throughout their lives.

### **Instructor dimension.**

In Ozkan and Koseler's (2009) assessment, the researchers found a strong positive relationship between instructor quality and satisfaction with education technology. Instructor quality was made up several factors including instructor responsiveness, competence, management of the course and communication ability. If the instructor responds to students' questions and comments rapidly, is knowledgeable in the subject he or she teaches, and explains things clearly by using the technology, student satisfaction will increase. Satisfaction can come down to an educator's ability to utilize classroom technology appropriately. Encouraging interaction between students and demonstrating control over education technology will also increase the quality of the instructor (Ozkan & Koseler, 2009).

As Tang and Austin (2009) demonstrated, perceived teaching effectiveness is associated with satisfaction. The more a student believes his or her instructor does a better job at teaching when using technology, the student is more likely to be satisfied with the education technology. Teaching effectiveness can also be a function of instructional medium (Skylar et al., 2005; Tang

& Austin, 2009), so choosing the appropriate technology for delivery is just as important as the content itself.

The instructor's utilization of the technology is one aspect of satisfaction; another is the instructor's attitude toward using the technology (Sun et al., 2008). If the instructor shows enjoyment (Ozkan & Koseler, 2009) or self-efficacy (Ozkan & Koseler, 2009) while using the technology, it can affect how positively or negatively a student views that piece of technology in his or her learning.

### **Environmental dimension.**

Societal factors outside of the teacher-student relationship can also affect satisfaction with education technology. For example, the "newness," or innovative image of certain education trends can garner favorable attitudes (Alavi, 1994; Leidner, & Jarvenpaa, 1995; Ozkan & Koseler, 2009). The trendiness of sleek-looking iPads and Smart boards in a classroom versus a standard chalkboard can affect the students' attitude toward education. The promotion of e-learning or educational technology around campus or in the academic sphere is another possible route for increasing student satisfaction with learning technology (Ozkan & Koseler, 2009). Ethical and legal issues, as well as cost, are mentioned by Ozkan and Koseler (2009), but are more relevant for web-only courses.

### **Technical Factors Contributing to Satisfaction**

#### **Design dimension.**

The design elements of a piece of educational technology play a significant role in its acceptance and satisfaction. In the Technology Acceptance Model (TAM), there are two main drivers of technology usage: ease of use and perceived usefulness. When a technology can accommodate those two factors, there will be a behavioral intention to use the technology that

leads to its actual use and acceptance of the technology into society (Davis, 1989). Therefore, acceptance of new technology into the pedagogical environment can be achieved if said technology is perceived to be easy to use and useful in the lives of the students. Ozkan & Koseler (2009), Sun et al. (2008), and Lin and Wang (2012) also found ease of use and usability to be important predictors of satisfaction. Ozkan and Koseler (2009) ran tests for security, maintenance, user-friendliness, organization, and availability, all of which can fall under the ease of use and usability factors.

### **Technology dimension.**

Technical difficulties are a challenge that instructors will deal with when using new technologies to facilitate learning, therefore the quality of the technology and the technical support behind them can affect student satisfaction. Internet Quality and audio/video quality can hinder the learning process if not fixed right away (Sun et al., 2008). Thus, having reliable technologies and providing knowledgeable people to support it when the system crashes is vital to sustaining satisfaction (Ozkan & Koseler, 2009).

### **Course dimension.**

Course quality, as enhanced by technology, is a significant predictor for satisfaction (Sun et al., 2008). For Ozkan and Koseler's (2009) dimensions of course quality, the researchers discovered courses that are easily understandable, have a degree of breadth, are up-to-date, have rich content, contain clear examples/illustrations, and encourage interaction, are more likely to earn positive ratings for technology-integration from students. Course clarity and flexibility are the two big themes in determining course quality (Ozkan & Koseler, 2009; Sun et al., 2008). Diversity in educational assessments using technology is another important factor for satisfaction ratings (Sun et al., 2008).

**Demographic Factors**

Sun et al. (2008) and Tang & Austin (2009) demonstrated a significant difference between males and females in terms of perceptions and technology preferences, so gender is a possible demographic predictor. Tang and Austin (2009) saw a significant relationship between GPA and satisfaction; those who had higher GPAs showed an increased satisfaction with education technology. Stoke's (2001) research proposed that personalities can also affect the way different technologies are received by varying temperaments. However, her results didn't show significant findings. Previous experience with e-Learning technology can increase the likelihood of satisfaction of educational technology (Ozkan & Koseler, 2009; Arbaugh, 2009). For example, if the individual had good experiences using technology in his or her learning (e.g., received a good grade from an online course, etc.) the more likely he or she will be satisfied with the technology.

### III. Predictors

The literature review yielded a number of potential predictors of student satisfaction with educational technology. These predictors have been organized into the dimensions of the HELAM Model (Ozkan and Koseler, 2009) that can be found below (Figure 1.1). However, due to time and resource constraints, only the top predictors that have consistently shown statistically significant results in the literature were chosen. The final set of selected predictors that will be measured can be found in Figure 1.2.

#### Figure 1.1: Proposed Predictors

##### Social Factor

##### **Student Dimension**

- **Student Attitude (Satisfaction)-DV**
- Computer anxiety (Ozkan & Koseler, 2009; Sun et al., 2008)
- Self-Efficacy/Self-Efficiency (Ozkan & Koseler, 2009; Sun et al., 2008)
- Enjoyable Experience (Ozkan & Koseler, 2009; Tang & Austin, 2009; Gomez et al., 2010)
- Interaction with other students and teacher (Arbaugh, 2009; Ozkan & Koseler, 2009; Sun et al., 2008)
- Student's study habits (Ozkan & Koseler, 2009)
- Learning outcomes/Effectiveness (Chen, et al., 2010; Tang & Austin, 2009; Alavi, 1994; Gomez et al., 2010)
- Motivation (Tang & Austin, 2009; Gomez et al., 2010)
- Career Application (Tang & Austin, 2009)
- Perceived Skill Development (Alavi, 1994)
- Learning interest (Alavi, 1994)
- Group Cases (Alavi, 1994)
- Perceived team-member valuable contributions (Gomez et al., 2010)

##### **Instructor Dimension**

- Instructor Responsiveness (Ozkan & Koseler, 2009; Sun et al., 2008)
- Instructor Competence (Ozkan & Koseler, 2009)
- Instructor Fairness (Ozkan & Koseler, 2009)
- Encouraging interaction between students (Ozkan & Koseler, 2009)
- Attitudes toward e-Learning (Sun et al., 2008)

- Control Over Technology (Ozkan & Koseler, 2009)
- Course Management (Ozkan & Koseler, 2009)
- Communication Ability (Ozkan & Koseler, 2009)
- Enjoyment (Ozkan & Koseler, 2009)
- Self-efficacy (Ozkan & Koseler, 2009)
- Method of Instructional delivery (Skylar et al., 2005; Tang & Austin, 2009)
- Teaching Effectiveness (Tang & Austin, 2009)

#### **Environmental Dimension**

- Promotion of e-Learning (Ozkan & Koseler, 2009)
- Trends-Social (Newness) (Ozkan & Koseler, 2009; Leidner, & Jarvenpaa, 1995; Alavi, 1994)
- Ethical and Legal Issues (Ozkan & Koseler, 2009)
- Cost (Ozkan & Koseler, 2009)

#### **Technical Factors**

#### **Design Dimension**

- Ease of Use (Ozkan & Koseler, 2009; Sun et al., 2008; Davis, 1989)
- Security (Ozkan & Koseler, 2009)
- Usability (Ozkan & Koseler, 2009; Sun et al., 2008; Lin & Wang, 2012, Davis, 1989)
- Maintenance (Ozkan & Koseler, 2009)
- User-Friendly (Ozkan & Koseler, 2009; Davis, 1989)
- Well-Organized (Ozkan & Koseler, 2009)
- Availability (Ozkan & Koseler, 2009)

#### **Technology Dimension**

- Course management (Ozkan & Koseler, 2009)
- Knowledgeable (Ozkan & Koseler, 2009)
- Reliability (Ozkan & Koseler, 2009)
- Internet Quality (Sun et al., 2008)
- Audio and Video Quality (Self-developed)

#### **Course Dimension**

- Course Quality (Sun et al., 2008)
- Curriculum Management (Ozkan & Koseler, 2009)
- Course Flexibility (Ozkan & Koseler, 2009; Sun et al., 2008)
- Interactive content (Ozkan & Koseler, 2009)
- Learning model (Ozkan & Koseler, 2009)
- Clarity (Ozkan & Koseler, 2009)
- Sufficient Content (Ozkan & Koseler, 2009)
- Up-to-date (Ozkan & Koseler, 2009)
- Well-Organized (Ozkan & Koseler, 2009)

- Diversity in assessment (Sun et al., 2008)

### Demographics

- Gender (Sun et al, 2008; Tang & Austin, 2009)
- GPA (Tang & Austin, 2009)
- Learner Temperament (Stokes, 2001)
- Previous Experience Level with e-Learning technology (Ozkan & Koseler, 2009; Arbaugh, 2009)
- Age

### **Figure 1.2: Selected Predictors**

#### **Social Factors**

- 1. Attitude (Satisfaction)**
- 2. Perceived Interactivity**
- 3. Perceived Learning**
- 4. Attitude (Satisfaction)**
- 5. Perceived Contribution to Enjoyment**
- 6. Perceived Competence**
- 7. Perceived Encouragement of Interaction**
- 8. Perceived Enjoyment**
- 9. Perceived Teaching Effectiveness**

#### **Technical Factors**

- 10. Perceived Usefulness**
- 11. Perceived Ease of Use**
- 12. Perceived Reliability**
- 13. Perceived System Maintenance**
- 14. Perceived Course Clarity**
- 15. Perceived Course Quality Enhanced by IT**
- 16. Perceived Course Flexibility**

#### **Demographic Factors**

- 17. Past Experience with IT Technology for Education**
- 18. Age**
- 19. Class Level**
- 20. GPA**
- 21. Section Instructor**
- 22. Gender**

#### IV. Constructs and Measures

The researcher developed a pre-test survey that can identify the factors that influence a college student's satisfaction with technology-enabled classrooms. From the selected predictors, the research developed 16 multiple-item measures and 6 single-item measures. Most of the multiple-item measures were adapted from studies found in the literature review and modified to fit the purpose of this study in measuring OB221 students' satisfaction with "SMG Classroom 326." The final constructs, corresponding measures, and sources can be found below.

##### Final Constructs and Corresponding Measures

Construct & Definition	Measures	Author(s)
<b>SOCIAL FACTORS</b>		
<b>GENERAL</b>		
<b>STUDENT DIMENSION</b>		
<b>Student Attitude toward OB221 Course (Satisfaction):</b> Student's negative or positive feeling about the OB221 course	<ol style="list-style-type: none"> <li>Overall, I was satisfied with the OB221 course</li> <li>I was disappointed with the way this course worked out (R)</li> <li>If I had an opportunity to take OB221 again, I would gladly do so</li> </ol>	<ul style="list-style-type: none"> <li>Ozkan &amp; Koseler, 2009; Sun et al., 2008</li> </ul>
<b>Student's Perceived Course Interactivity:</b> extent to which students believe the OB221 course facilitates interactivity	<ol style="list-style-type: none"> <li>The OB221 sections were interactive</li> <li>Student-to-student interaction was more difficult than in other courses (R)</li> <li>OB221 discussions were more difficult to participate in than other courses (R)</li> <li>I learned more from my fellow students in this class than in other courses</li> </ol>	<ul style="list-style-type: none"> <li>Ozkan &amp; Koseler, 2009; Sun et al, 2008</li> </ul>
<b>Student's perceived learning outcomes:</b> Degree to which students believe he/she achieved learning outcomes in the OB221 course	<ol style="list-style-type: none"> <li>I learned a great deal in OB221</li> <li>Because of OB221, I gained a good understanding of concepts in the field of organizational behavior</li> <li>I was able to identify the</li> </ol>	<ul style="list-style-type: none"> <li>Chen, et al., 2010</li> </ul>

	central issues of the OB221 course	
	4. Expected Grade in the course	
<b>INSTRUCTOR DIMENSION</b>		
<b>Student Attitude toward OB221 Section Instructor (Satisfaction):</b> Student's negative or positive feeling about the OB221 section instructor	<ol style="list-style-type: none"> <li>1. Overall, my OB221 section instructor was an excellent teacher</li> <li>2. The comments from my OB221 section instructor in class discussions are constructive</li> <li>3. If I had an opportunity to take another class with my OB221 section instructor, I would gladly do so</li> <li>4. Overall, I am satisfied with my OB221 section instructor</li> </ol>	<ul style="list-style-type: none"> <li>• Chen et al., 2008; Sun et al., 2008</li> </ul>
<b>Student Attitude toward OB221 Lecturer (Satisfaction):</b> Student's negative or positive feeling about the OB221 lecturer (Professor McCarthy)	<ol style="list-style-type: none"> <li>1. Overall, Professor McCarthy was an excellent lecturer</li> <li>2. If I had an opportunity to take another class with Professor McCarthy, I would gladly do so</li> <li>3. Overall, I am satisfied with Professor McCarthy as the OB221 Lecturer</li> <li>4. The lectures presented by Professor McCarthy were better than other lectures I've attended (Self)</li> </ol>	<ul style="list-style-type: none"> <li>• Chen et al., 2008; Sun et al., 2008</li> </ul>
<b>Perceived discussion section instructor contribution to enjoyment:</b> Extent to which students believed the discussion section instructor created a fun environment conducive for learning	<ol style="list-style-type: none"> <li>1. My discussion section instructor created a learning environment that was fun</li> <li>2. My discussion section instructor helped to make learning an enjoyable process.</li> <li>3. The discussion section instructor made the course more interesting</li> <li>4. I enjoyed attending my OB221 instructor's sections (Self)</li> </ol>	<ul style="list-style-type: none"> <li>• Ozkan &amp; Koseler, 2009</li> </ul>
<b>Perceived Instructor Competence in course content:</b> Extent to which students believed the discussion section instructor was knowledgeable/competent in course	<ol style="list-style-type: none"> <li>1. My discussion section instructor was proficient with all the content used in the OB221 course</li> <li>2. My discussion section</li> </ol>	<ul style="list-style-type: none"> <li>• Ozkan &amp; Koseler, 2009</li> </ul>

content	instructor was knowledgeable about course content	
	3. I was confident my discussion section instructor was competent with course material (self)	
<b>Perceived instructor encouragement of interaction:</b> Degree to which students believed the instructor encouraged interaction among students	<ol style="list-style-type: none"> <li>1. The discussion section instructor encouraged us to interact with other students</li> <li>2. The discussion section instructor attempted to stimulate student interaction</li> <li>3. The section instructor created an environment where I felt comfortable providing input in class discussions</li> </ol>	<ul style="list-style-type: none"> <li>• Ozkan &amp; Koseler, 2009; Chen et al., 2010</li> </ul>

**SOCIAL DIMENSION  
SPECIFIC**

**STUDENT DIMENSION**

<b>Student Attitude toward SMG Classroom 326 (Satisfaction):</b> Student's negative or positive feeling about SMG Classroom 326	<ol style="list-style-type: none"> <li>1. Overall, I was satisfied with SMG Classroom 326</li> <li>2. I was disappointed with the way SMG Classroom 326 worked out (R)</li> <li>3. If I had an opportunity to take the class in SMG Classroom 326, I would gladly do so</li> <li>4. Taking this course via SMG Classroom 326 made it more difficult than other courses I have taken (r)</li> </ol>	<ul style="list-style-type: none"> <li>• Ozkan &amp; Koseler, 2009; Sun et al., 2008</li> </ul>
<b>Student's Perceived Enjoyment using the SMG Classroom 326:</b> Extent to which a student's use of SMG Classroom 326 is enjoyable in its own right	<ol style="list-style-type: none"> <li>1. I enjoyed attending SMG Classroom 326 sessions overall</li> <li>2. SMG Classroom 326 made the course more interesting</li> <li>3. SMG Classroom 326 made the course more fun</li> <li>4. The SMG Classroom 326 made the course more enjoyable</li> </ol>	<ul style="list-style-type: none"> <li>• Ozkan &amp; Koseler, 2009; Tang &amp; Austin, 2009</li> </ul>
<b>Student's perceived interaction with classmates using the SMG Classroom 326:</b> The degree to which a student believes that using SMG Classroom 326 will help him or her in interacting with classmates	<ol style="list-style-type: none"> <li>1. SMG Classroom 326 made communication easier with my classmates</li> <li>2. SMG Classroom 326 created an environment for high-quality discussions.</li> </ol>	<ul style="list-style-type: none"> <li>• Ozkan &amp; Koseler, 2009; Sun et al., 2008</li> </ul>

<p><b>Student’s perceived learning outcomes with the SMG Classroom 326:</b> Degree to which students believe SMG Classroom 326 facilitates learning in OB221</p>	<ol style="list-style-type: none"> <li>3. SMG Classroom 326 made it easier for me to interact with my peers.</li> <li>4. SMG Classroom 326 allowed me to easily follow class discussions.</li> <li>1. SMG Classroom 326 helped me learn a great deal about organizational behavior.</li> <li>2. SMG Classroom 326 helped me understand the concepts of organizational behavior</li> <li>3. SMG Classroom 326 enhanced my ability to identify central concepts in organizational behavior</li> <li>4. SMG Classroom 326 helped me to recognize important issues in the field of organizational behavior</li> </ol>	<p>Chen et al., 2010; Tang &amp; Austin, 2009</p>
<p><b>INSTRUCTOR DIMENSION</b></p>		
<p><b>Perceived instructor encouragement of interaction between students using the SMG Classroom 326:</b> Degree to which students believed the instructor encouraged interaction using SMG Classroom 326 among students</p>	<ol style="list-style-type: none"> <li>1. My instructor emphasized the value in communicating with students via SMG Classroom 326.</li> <li>2. The instructor encouraged us to interact with other students by using SMG Classroom 326</li> </ol>	<ul style="list-style-type: none"> <li>• Ozkan &amp; Koseler, 2009</li> </ul>
<p><b>Perceived Teaching effectiveness using the SMG Classroom 326:</b> Extent to which students believed the SMG Classroom 326 helped the instructor teach effectively</p>	<ol style="list-style-type: none"> <li>1. SMG Classroom 326 helped the instructor be a better teacher.</li> <li>2. SMG Classroom 326 helped the discussion section instructor demonstrate knowledge for the subject matter.</li> <li>3. SMG Classroom 326 helped the instructor present materials clearly.</li> <li>4. SMG Classroom 326 enhanced my instructor’s teaching in discussion sections (self)</li> </ol>	<ul style="list-style-type: none"> <li>• Tang &amp; Austin, 2009</li> </ul>

**TECHNICAL FACTORS**

**SPECIFIC**

**DESIGN DIMENSION**

<p><b>Perceived Usefulness:</b> Degree to which student believes that using the SMG Classroom 326 will help him or her achieve learning outcomes/gains in academic performance</p>	<ol style="list-style-type: none"> <li>1. I enhanced my efficiency in the OB221 course by using SMG Classroom 326</li> <li>2. I improved my performance in the OB221 course by using SMG Classroom 326</li> <li>3. SMG Classroom 326 was useful in the OB221 course</li> <li>4. I enhanced my productivity by using SMG Classroom 326</li> </ol>	<ul style="list-style-type: none"> <li>• Sun et al., 2008; Ling &amp; Wang, 2012</li> </ul>
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<p><b>Perceived Ease of Use:</b> The degree of ease of use associated with SMG Classroom 326</p>	<ol style="list-style-type: none"> <li>1. Learning to operate SMG Classroom 326 was easy for me</li> <li>2. I found it easy to get SMG Classroom 326 to do what I want it to do</li> <li>3. I found SMG Classroom 326 easy to use</li> </ol>	<ul style="list-style-type: none"> <li>• Sun et al., 2008</li> </ul>
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**TECHNOLOGY DIMENSION**

<p><b>Perceived SMG Classroom 326 Reliability:</b> Extent to which students believe the SMG Classroom 326 technology is reliable</p>	<ol style="list-style-type: none"> <li>1. I did not face any system errors while using SMG Classroom 326</li> <li>2. I felt satisfied with the speed of the SMG Classroom 326 technology</li> <li>3. I felt the communication quality of SMG Classroom 326 was not good (R)</li> <li>4. While using SMG Classroom 326, I encountered many technical difficulties (self)</li> </ol>	<ul style="list-style-type: none"> <li>• Ozkan &amp; Koseler, 2009; Sun et al., 2008</li> </ul>
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<p><b>Perceived System Maintenance:</b> Extent to which student believes he or she can get help when presented with an error in SMG Classroom 326 system</p>	<ol style="list-style-type: none"> <li>1. When I encountered an error in SMG Classroom 326 system, I got immediate help</li> <li>2. When I used SMG Classroom 326, I received assistance if I faced a technical problem(self)</li> <li>3. I felt comfortable using SMG Classroom 326 technology because someone was always around to help me (self)</li> <li>4. Technical problems with the SMG Classroom 326 didn't get addressed (R) (Self)</li> </ol>	<ul style="list-style-type: none"> <li>• Ozkan &amp; Koseler, 2009</li> </ul>
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**COURSE DIMENSION**

<p><b>Perceived Course Clarity:</b> Extent to</p>	<ol style="list-style-type: none"> <li>1. Being in SMG Classroom 326</li> </ol>	<ul style="list-style-type: none"> <li>• (Ozkan &amp;</li> </ul>
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<p>which students believe SMG Classroom 326 helped conduct the course in a clear manner that was easy to follow</p>	<p>helped to illustrate abstract concepts in OB221.</p> <ol style="list-style-type: none"> <li>SMG Classroom 326 helped explain OB221 assignments clearly.</li> <li>SMG Classroom 326 helped to make the OB221 learning objectives clear.</li> </ol>	<p>Koseler, 2009)</p>
<p><b>Perceived course quality enhanced by IT:</b> Extent to which students believed the course quality was enhanced by SMG Classroom 326</p>	<ol style="list-style-type: none"> <li>The SMG Classroom 326 experience improved the quality of the course</li> <li>SMG Classroom 326 made OB221 better than other courses I've taken</li> <li>The quality of the OB221 course was largely unaffected by the SMG Classroom 326 experience (R)</li> </ol>	<ul style="list-style-type: none"> <li>Sun et al, 2008</li> </ul>
<p><b>Perceived Course Flexibility:</b> Degree to which students believed SMG Classroom 326 allowed him/her academic flexibility</p>	<ol style="list-style-type: none"> <li>Taking this class via SMG Classroom 326 allowed me to arrange my work for the class more effectively.</li> <li>The advantages of taking OB221 via SMG Classroom 326 outweighed any disadvantages</li> <li>Taking OB221 via SMG Classroom 326 allowed me to take a class I otherwise had to miss</li> <li>Taking this class via SMG Classroom 326 should allow me to finish my degree more quickly</li> </ol>	<ul style="list-style-type: none"> <li>Sun et al, 2008</li> </ul>

<p style="text-align: center;"><b>DEMOGRAPHICS</b></p>		
<p><b>Student's Past experience Level with IT technology for education</b></p>	<p>How much experience have you had with distance learning technology (such as podcasts, video casts, online courses, etc.)?</p>	<ul style="list-style-type: none"> <li>(Ozkan &amp; Koseler, 2009)</li> </ul>
<p><b>Age</b></p>	<p>Age</p>	
<p><b>Class Level</b></p>	<p>Freshman, Sophomore, Junior, Senior</p>	
<p><b>GPA</b></p>	<p>GPA (on 4.0 scale)</p>	
<p><b>Section Instructor</b></p>	<p>Section instructor</p>	
<p><b>Gender</b></p>	<p>Gender</p>	

## **V. Survey Development**

### **Qualitative Review**

The researcher took into account the principles of measurement and made steps to choose carefully or modify statements that could violate any of its rules. Language was structured to be simple, straightforward, and in spoken language. Attempts were made to keep the length of the questions as short as possible, but there were certain instances when the indicator was lengthened to clarify meaning (e.g., “discussion section instructor” vs. instructor). The measures contained one theme at a time by avoiding double-barrel measures that can construe meaning. It is best practice to assume the respondent has no prior knowledge about educational technology or self-awareness, but it can be assumed that college students will have higher levels of comprehension than the average man or woman on the street. Word choice was carefully monitored to avoid vague meanings and the order of the questions was reviewed for possible order biases. To prevent such biases, the survey was organized from general to specific attitudes and was fit into the HELAM model. A neutral stance option was given on the five-point Likert scale to ensure maximum variation and that the data would encapsulate an accurate variety of feelings. There was one open-ended question included at the very end of the survey to capture anything the researcher missed. Priming strategies were also used to aid recall by respondents in the instructions for each section.

### **Quantitative Review**

The pre-tests were administered on April 5<sup>th</sup> and 6<sup>th</sup>, 2012, in the only two discussion sections of OB221 that regularly meet in SMG Classroom 326. Data was collected from a sample of 52 undergraduate School of Management students.

Immediately following the data collection, the research assigned each questionnaire a unique identification number and developed a coding strategy for each variable measured. Using a five-point, Likert-type scale, the researcher assigned to each multiple-item measure the levels of agreement. 1 represented individuals on the lowest scales of agreement and 5 represented the individuals on the highest end of the scale. The researcher developed a separate coding strategy for the single-item measures, with each numeral representing a specific answer category (e.g. gender: female=1, male=2). The reverse-coded measures are indicated in the *Final Constructs and Corresponding Measures* section above. These measures were initially entered using the same coding measures, but when data collection was complete, the researcher re-coded these measures in SPSS.

After data entry into SPSS, there was one case containing missing data on half of the questions. Since this was a just a pre-test for reliability and validity, the researcher deemed it was important to include that case as it wouldn't have adversely affected the results and goals of this study.

### **Assessment of Content Validity and Reliability**

The validity of the multiple-item measures was tested using inter-item correlations and principal components factor analysis with Varimax rotations. Prior to running the analyses, frequency distributions were run for each measurement item in order to detect any coding errors or outliers, and the results yielded reasonable frequencies.

After evaluating the inter-item correlation matrices, measures yielding high correlations were noted. For measures that resulted in odd or unexpected correlations (indicating a possible violation in measuring the common meaning within proposed groupings), the researcher red-

flagged these indicators and was conscious of the possible problematic measures going into factor analysis.

The inter-item correlation matrix provided a basic structure for the proposed groupings to be used in factor analysis. Multiple factor analyses were run along the dimensions of the HELAM model: social-student, social-instructor, technical-technology, and technical-course. The total variance explained for each analysis had to be over 50% for it to be acceptable; otherwise, the factor analysis would be run again with different groupings. Afterwards, the measures that loaded together strongly were input into reliability analyses to check if the measures were consistent in meaning with other measures in the same construct. The “scale if deleted” option of SPSS was used to determine if the overall Cronbach’s alpha would increase if the measure was deleted from the construct. If the alpha did increase, it would indicate to the researcher that the measure was unreliable, and thus should be taken out or not used in calculation of true scores. The following sections will elaborate on the results.

## VI. Results

### Student Dimension

Analyzing the quantitative validity and reliability of the constructs in the student dimension section of the questionnaire revealed two problematic constructs: Student’s Perceived Course interactivity and Student’s Perceived Learning Outcomes. Specifically, the measure “I learned a great deal in OB221” (P1Q8) correlated and loaded very well with the Course Satisfaction construct in the inter-item correlation, so it was moved into that respective construct (Table 1.4). When reviewing the measure’s meaning, it made sense that learning would overlap with satisfaction.

“I learned more from my fellow students in this class than in other courses” (P1Q4) was also a problematic measure (Table 1.1), that didn’t correlate or load with its proposed groupings, so this measure were deleted from the construct during reliability testing. “The OB221 sections were interactive” (P1Q1) was deemed unreliable based on an overall Cronbach’s alpha that would increase if the measure was deleted (Table 1.4).

“Expected Grade in the course” (P1Q11) didn’t correlate or load well with any construct, and in retrospect it should be a single-item measure instead of included in the Perceived Learning Outcomes construct because the scales are not exactly equal. The factor analysis total variance explained by these measures was 59.53%.

**Table 1.1**

*Inter-item Correlations Matrix for Perceived Course Interactivity Construct*

		The OB221 discussion sections were interactive	Student-to-student interaction in OB221 discussion sections was more difficult than in other courses	OB221 discussion sections were more difficult to participate in than other courses
The OB221 discussion sections were interactive	Correlation			
	Sig.			
Student-to-student interaction in OB221 discussion sections was more difficult than in other courses	Correlation	.229		
	Sig.	.134		

OB221 discussion sections were more difficult to participate in than other courses	Correlation	.136	.459	
	Sig.	.379	.002	
I learned more from my fellow students in my OB221 discussion sections than in other courses	Correlation	-.018	.109	.043
	Sig.	.907	.481	.780

Note: Highlighted indicates significant finding (p<.05)

**Table 1.2**

*Inter-item Correlations Matrix for Perceived Learning Outcomes Measure (PIQ8)*

		Overall, I was satisfied with the OB221 course	I was disappointed with the way the OB221 course worked out	If I had an opportunity to take OB221 again, I would gladly do so
I learned a great deal in OB221	Correlation	.492	.382	.424
	Sig.	.001	.010	.010

Note: Highlighted indicate significant findings

**Table 1.3**

*Inter-item Correlations Matrix for Problematic Perceived Learning Outcomes Measure (PIQ11)*

		I learned a great deal in OB221	Because of OB221, I gained a good understanding of concepts in the field of organizational behavior	I was able to identify the central issues of the OB221 course
Expected Letter grade in the OB221 course	Correlation	-.001	-.272	-.020
	Sig.	.993	.993	.899

**Table 1.4**

*Factor Loadings for Exploratory Factor Analysis With Varimax Rotation of Student Dimension General Scales*

Indicator	Construct		
	Satisfaction	Learning Outcomes	Interactivity
Overall, I was satisfied with the OB221 course	.708	.388	-.013
I was disappointed with the way the OB221 course worked out	.776	.004	.182
If I had an opportunity to take OB221 again, I would gladly do so	.728	.080	-.151
I learned a great deal in OB221	.609	.462	.167
OB221 discussion sections were more difficult to participate in than other courses	.324	.111	.701
Student-to-student interaction in OB221 discussion sections was more difficult than in other courses	.150	.209	.774
The OB221 discussion sections were interactive	-.160	.852	.132
Because of OB221, I gained a good understanding of concepts in the field of organizational behavior	.453	.668	-.243
I learned more from my fellow students in my OB221 discussion sections than in other courses	.233	-.038	.076
I was able to identify the central issues of the OB221 course	.140	.789	.111
Expected Letter grade in the OB221 course	-.182	-.124	.757

Note: The highest factor loadings in each row are in boldface.

**Table 1.5**  
*Reliability Analysis of Constructs for Student Dimension: General*

Item	Alpha if item Deleted
<b>Student Attitude toward OB221 Course (Satisfaction) (Cronbach's Alpha=.715)</b>	
Overall, I was satisfied with the OB221 course	.613
I was disappointed with the way the OB221 course worked out	.670
If I had an opportunity to take OB221 again, I would gladly do so	.696
I learned a great deal in OB221	.640
<b>Student's Perceived Course Interactivity (Cronbach's Alpha=.568)</b>	
OB221 discussion sections were more difficult to participate in than other courses	.324
Student-to-student interaction in OB221 discussion sections was more difficult than in other courses	.245
The OB221 discussion sections were interactive	<b>.647</b>
<b>Student's Perceived Learning Outcomes (Cronbach's Alpha=.563)</b>	
Because of OB221, I gained a good understanding of concepts in the field of organizational behavior	**
I was able to identify the central issues of the OB221 course	**

Note: Bolded alphas indicate that if the measure is deleted, the reliability will increase the overall alpha of the construct. \*\* Indicates only two measures were calculated for Cronbach's Alpha, so there is no "alpha if item deleted."

### **Social Dimension: Instructor**

The inter-item correlation matrix showed slight correlations between the measures for instructor contribution to Satisfaction and Enjoyment. This demonstrates that these two concepts are related. The researcher decided to run factor analysis two different times to separate these two constructs. However, in the future, these constructs might be better combined into one all-encompassing construct regarding satisfaction with the instructor.

The only problematic construct in this section was Student Attitude toward Section Instructor (P2Q8). This measure correlated (Table 2.1) and loaded (Table 2.2) better with the Instructor Encouragement of Interaction construct. It also increased the reliability of Instructor Encouragement of Interaction as well when P2Q8 was included the calculation of Cronbach's alpha (Table 2.3). In fact, when re-evaluating the measure's meaning, it's much better matched with Encouragement of interaction instead of Enjoyment (See Table 2.1)

During the reliability testing stage, there were a few measures that, when deleted, would've increased Cronbach's alpha, but because the reliability was already so high (alpha>.80), it was not necessary to delete these items (Table 2.3).

**Table 2.1**  
*Inter-item Correlations Matrix for Student Attitude Toward Section Instructor Measure (P2Q8)*

		The discussion section instructor encouraged us to interact with other students.	The discussion section instructor encouraged us to interact with other students.	The discussion section instructor encouraged us to interact with other students.
The comments from my instructor during discussion sections were constructive	Correlation	.491	.491	.491
	Sig.	.000	.000	.000

Note: Highlighted indicate significant findings

**Table 2.2**  
*Factor Loadings for Exploratory Factor Analysis With Varimax Rotation of Instructor Dimension Scales*

Indicator	Construct		
	Satisfaction (Lecturer)	Satisfaction (Instructor)	Interactivity
Overall, my instructor for my discussion section was an excellent teacher	-.091	<b>.862</b>	.269
The comments from my instructor during discussion sections were constructive	.063	.446	<b>.661</b>
If I had an opportunity to take another class with my discussion section instructor, I would gladly do so	.060	<b>.833</b>	.154
I was satisfied with my discussion section instructor	.047	<b>.857</b>	.269
Overall, Professor McCarthy was an excellent lecturer	<b>.856</b>	-.064	.057
If I had an opportunity to take another class with Professor McCarthy, I would gladly do so	<b>.831</b>	.027	-.089
Overall, I was satisfied with Professor McCarthy as the OB221 lecturer	<b>.914</b>	-.006	.079
The lectures presented by Professor McCarthy were better than most lectures I've attended by other professors	<b>.754</b>	.056	-.051
The discussion section instructor encouraged us to interact with other students.	.242	.133	<b>.823</b>
The discussion section instructor stimulated student interaction	-.099	.409	<b>.665</b>
The discussion section instructor created an environment where I felt comfortable providing input in class discussions	-.223	.146	<b>.839</b>

Note: The highest factor loadings in each row are in boldface.

**Table 2.3**  
*Reliability Analysis of Social Dimension: Instructor*

Item	Alpha if item Deleted
Student Attitude toward OB221 Section Instructor (Satisfaction): (Cronbach's Alpha=.876)	
Overall, my instructor for my discussion section was an excellent teacher	.801
If I had an opportunity to take another class with my discussion section instructor, I would gladly do so	<b>.903</b>
I was satisfied with my discussion section instructor	.775

Student Attitude toward OB221 Lecturer (Satisfaction) (Cronbach's Alpha=.856)	
Overall, Professor McCarthy was an excellent lecturer	.814
If I had an opportunity to take another class with Professor McCarthy, I would gladly do so	.823
Overall, I was satisfied with Professor McCarthy as the OB221 lecturer	.759
The lectures presented by Professor McCarthy were better than most lectures I've attended by other professor	<b>.874</b>
Perceived Instructor Competence in course content (Cronbach's Alpha=.849)	
My discussion section instructor was proficient with all the content used in the OB221 course	.805
My discussion section instructor was knowledgeable about OB221 course content	.759
I was confident my discussion section instructor was competent with course material	.799
Perceived discussion section instructor contribution to enjoyment (Cronbach's Alpha=.872)	
My discussion section instructor created a learning environment that was fun	.824
My discussion section instructor helped to make learning an enjoyable process	.795
The discussion section instructor made the course more interesting	.855
I enjoyed attending my instructor's discussion section	<b>.877</b>
Perceived instructor encouragement of interaction (Cronbach's Alpha=.812)	
The discussion section instructor encouraged us to interact with other students.	.769
The discussion section instructor stimulated student interaction	.771
The discussion section instructor created an environment where I felt comfortable providing input in class discussions	.747
The comments from my instructor during discussion sections were constructive	.771

Note: Bolded alphas indicate that if the measure is deleted, the reliability will increase the overall alpha of the construct.\*\*

### Student Dimension: SMG Classroom 326 Specific

Four constructs were evaluated within this dimension. The inter-item correlation matrix was wildly dispersed in all categories, indicating related meanings between the items. Logically, it seemed better to run separate correlation and factor analysis, two constructs at a time to distinguish the categories.

When running correlations of Enjoyment and Satisfaction, there was much correlation between the measures indicating overlap in meaning, but unlike the top section with the Instructor dimension, the researcher decided to combine the Enjoyment and Satisfaction constructs to run factor analyses. Between these two constructs, the measure, "Taking this course via SMG Classroom 326 made it more difficult than other courses I have taken" (P3Q5) wouldn't load correctly with the proposed construct, so the researcher took it out to see if the measures would load differently. Factor analysis was run again, but the results proved to be very peculiar because the item, "Overall, I was satisfied with SMG Classroom 326" (p4q7) loaded

equally well with both Satisfaction and Enjoyment (See Table 3.1). Thus, the researcher decided to combine the two constructs during reliability testing, and the Cronbach’s alpha ended up being very high (See Table 3.2).

**Table 3.1**  
*Factor Loadings for Exploratory Factor Analysis With Varimax Rotation of Student Dimension Specific*

Indicator	Construct	
	Satisfaction	Enjoyment
Overall, I was satisfied with SMG Classroom 326	<b>.570</b>	<b>.570</b>
I was disappointed with the way SMG Classroom 326 worked out	<b>.760</b>	.145
If I had an opportunity to take another class in SMG Classroom 326, I would gladly do so	<b>.871</b>	.183
I enjoyed attending SMG Classroom 326 sessions overall	<b>.890</b>	.187
SMG Classroom 326 made the course more interesting	<b>.547</b>	<b>.601</b>
SMG Classroom 326 made the course more fun	.038	<b>.911</b>
SMG Classroom 326 made the course more enjoyable	.239	<b>.820</b>

Note: The highest factor loadings in each row are in boldface.

Indicator	Construct	
	Interaction	Learning Outcomes
SMG Classroom 326 made communication easier with my classmates	<b>.900</b>	.013
SMG Classroom 326 created an environment for high-quality discussions	<b>.751</b>	.354
SMG Classroom 326 made it easier for me to interact with my peers	<b>.754</b>	.187
SMG Classroom 326 allowed me to easily follow class discussions	.321	.745
SMG Classroom 326 helped me learn a great deal about organizational behavior	<b>.596</b>	<b>.481</b>
SMG Classroom 326 helped me understand the concepts of organizational behavior	.153	<b>.903</b>
SMG Classroom 326 enhanced my ability to identify central concepts in organizational behavior	<b>.598</b>	<b>.439</b>
SMG Classroom 326 helped me to recognize important issues in the field of organizational behavior	.161	<b>.838</b>

Note: The highest factor loadings in each row are in boldface.

**Table 3.2**  
*Reliability Analysis of Student Dimension Specific Constructs*

Item	Alpha if item Deleted
Student Attitude toward SMG Classroom 326 (Satisfaction): (Cronbach’s Alpha=.860)	
Overall, I was satisfied with SMG Classroom 326	.832

I was disappointed with the way SMG Classroom 326 worked out	.853
If I had an opportunity to take another class in SMG Classroom 326, I would gladly do so	.833
I enjoyed attending SMG Classroom 326 sessions overall	.830
SMG Classroom 326 made the course more interesting	.830
SMG Classroom 326 made the course more fun	.859
SMG Classroom 326 made the course more enjoyable	.846
Student's perceived interaction with classmates using the SMG Classroom 326 (Cronbach's Alpha=.799)	
SMG Classroom 326 made communication easier with my classmates	.703
SMG Classroom 326 created an environment for high-quality discussions	.792
SMG Classroom 326 made it easier for me to interact with my peers	.738
SMG Classroom 326 allowed me to easily follow class discussions	<b>.815</b>
Student's perceived learning outcomes with the SMG Classroom 326 (Cronbach's Alpha=.807)	
SMG Classroom 326 helped me learn a great deal about organizational behavior	.747
SMG Classroom 326 helped me understand the concepts of organizational behavior	.748
SMG Classroom 326 enhanced my ability to identify central concepts in organizational behavior	.787
SMG Classroom 326 helped me to recognize important issues in the field of organizational behavior	.748

Note: Bolded alphas indicate that if the measure is deleted, the reliability will increase the overall alpha of the construct

### **Instructor Dimension: SMG Classroom 326 Specific**

This dimension measured the specific contributions of the instructor's use of the technology-enabled classroom to Student Interaction and Teaching Effectiveness. The inter-item correlation matrix indicated "SMG Classroom 326 helped my discussion section instructor be a better teacher" (P4Q9) did not correlate very highly with the proposed construct. During factor analysis, it confirmed the researcher's belief that there must've been an order effect with the preceding question, P4Q8, which prompted the following answer to be similar. Looking back at the meaning of P4Q9, perhaps it asked too much of the respondent in being self-aware of the effect that the technology and instructor had on them. The researcher decided to delete P4Q9 before running reliability analysis (Table 4.1) and the reliability turned out to be very strong for both constructs, Teaching Effectiveness (alpha=.869) and Encouragement of interaction (alpha=.612).

**Table 4.1**

*Factor Loadings for Exploratory Factor Analysis With Varimax Rotation of Instructor Dimension Specific Constructs*

Indicator	Construct	
	Encouragement of Interaction	Teaching Effectiveness
My instructor emphasized the value in communicating with students via SMG Classroom 326	.151	<b>.894</b>
The instructor encouraged us to interact with other students by using SMG Classroom 326	<b>.646</b>	.481
SMG Classroom 326 helped my discussion section instructor be a better teacher	.413	<b>.619</b>
SMG Classroom 326 helped my discussion instructor demonstrate knowledge for the subject matter	<b>.843</b>	.351
SMG Classroom 326 helped my discussion instructor present materials clearly	<b>.891</b>	.132
SMG Classroom 326 helped enhanced my instructor's teaching in discussion sections	<b>.782</b>	.296

Note: The highest factor loadings in each row are in boldface.

### **Technology Dimension**

The correlations for the measure, “SMG Classroom 326 was useful in the OB221 course” (P5Q10) raised some red flags as it didn’t quantitatively share meaning within the proposed groupings. The factor analysis also confirmed this oddity (Table 5.1). Re-looking at the construct, the researcher determined that the term “useful” was probably too vague in meaning for respondents to understand. The researcher took out P5Q10 before running reliability tests.

“I felt the communication quality of SMG Classroom 326” (P5Q11) also was red-flagged during the correlation and factor analysis stages because it did not associate with the expected construct, Reliability of Technology. When reliability tests were conducted, it was shown that Cronbach’s alpha increased if this item was deleted (Table 5.2), so it’s best to either delete the p5q11 measure from the true calculations or revise the measure to better fit the construct.

**Table 5.1***Factor Loadings for Exploratory Factor Analysis With Varimax Rotation of Technology Dimension*

Indicator	Construct			
	Usefulness	System Maintenance	Ease of Use	Reliability
I enhanced my efficiency in the OB221 course by using SMG Classroom 326	<b>.656</b>	.339	.157	.045
I improved my performance in the OB221 course by using SMG Classroom 326	<b>.762</b>	.383	.258	-.183
SMG Classroom 326 was useful in the OB221 course	.101	.369	<b>.680</b>	.096
I enhanced my productivity by using SMG Classroom 326	<b>.719</b>	.122	.332	-.036
Learning to operate SMG Classroom 326 was easy for me	.176	.308	<b>.799</b>	.132
I found it easy to get SMG Classroom 326 to do what I wanted it to do	.425	.092	<b>.734</b>	.057
I found SMG Classroom 326 easy to use	.325	.101	<b>.685</b>	.288
I did not face any system errors while using SMG Classroom 326	<b>.833</b>	-.044	.152	.198
I felt satisfied with the speed of the technology in SMG Classroom 326	<b>.575</b>	.513	.170	.338
I felt the communication quality of SMG Classroom 326 was not good	-.100	-.094	.179	<b>.705</b>
While using SMG Classroom 326, I encountered many technical difficulties	.387	.102	.248	<b>.744</b>
When I encountered an error in the SMG Classroom 326 system, I got immediate help	.141	<b>.760</b>	.259	-.028
When I used SMG Classroom 326, I received assistance if I faced a technical problem	.186	<b>.784</b>	.163	.202
I felt comfortable using SMG Classroom 326 technology because someone was always around to help me	.159	<b>.793</b>	.200	.051
Technical problems with SMG Classroom 326 didn't get addressed	.008	.436	-.040	<b>.768</b>

Note: The highest factor loadings in each row are in boldface.

**Table 5.2***Reliability Analysis of Technology Dimension Constructs*

Item	Alpha if item Deleted
<b>Perceived Usefulness (Cronbach's Alpha=.811)</b>	
I enhanced my efficiency in the OB221 course by using SMG Classroom 326	.788
I improved my performance in the OB221 course by using SMG Classroom 326	.717
I enhanced my productivity by using SMG Classroom 326	.709
<b>Perceived Ease of Use (Cronbach's Alpha=.823)</b>	
Learning to operate SMG Classroom 326 was easy for me	.756
I found it easy to get SMG Classroom 326 to do what I wanted it to do	.701
I found SMG Classroom 326 easy to use	.811

Perceived SMG Classroom 326 Reliability (Cronbach's Alpha=.598)	
I did not face any system errors while using SMG Classroom 326	.566
I felt satisfied with the speed of the technology in SMG Classroom 326	.469
I felt the communication quality of SMG Classroom 326 was not good	<b>.735</b>
While using SMG Classroom 326, I encountered many technical difficulties	.322
Perceived System Maintenance (Cronbach's Alpha=.750)	
When I encountered an error in the SMG Classroom 326 system, I got immediate help	.691
When I used SMG Classroom 326, I received assistance if I faced a technical problem	.623
I felt comfortable using SMG Classroom 326 technology because someone was always around to help me	.665
Technical problems with SMG Classroom 326 didn't get addressed	<b>.793</b>

Note: Bolded alphas indicate that if the measure is deleted, the reliability will increase the overall alpha of the construct

### Course Dimension

The course dimension was included to measure the perceived course enhancement by technology. It included three constructs: Course Clarity, Enhancement, and Course Flexibility.

The measure, "The quality of the OB221 course was largely unaffected by the SMG Classroom 326 experience" (P6Q6) was highly correlated with Course Clarity measures. To confirm this finding, the researcher ran factor analysis and it loaded into Course Clarity, but with a relatively lower loading. The reliability analysis confirmed once and for all that the item should be deleted. It was reasonable because when reviewing the measure again, it became clear that the intended meaning of the item did not overlap with other measures in the construct, nor any of the other constructs in the section.

The measures, "Taking this class via SMG Classroom 326 allowed me to arrange my work for the class more effectively" (P6Q7) and "The advantages of taking OB221 via SMG Classroom 326 outweighed any disadvantages" (P6Q8), were also taken out after factor analysis because those two belonged in a separate construct and didn't load with its proposed grouping, Course Flexibility. After reviewing those two measures, it was obvious that the meanings did not overlap enough with the other items in the construct, so P6Q7 and P6Q8 were deleted.

After these above items were deleted, correlation matrices and factor analysis was run again, but this time using two factors instead of three. The researcher suspected that course Clarity and Enhancement could possibly combine to form a more robust construct. Reliability analysis showed that this was true, so those two concepts should be combined in the future.

**Table 6.1**

*Factor Loadings for Exploratory Factor Analysis With Varimax Rotation of Course Dimension*

Indicator	Construct		
	Course Clarity	Course Quality enhanced	Course Flexibility
Being in SMG Classroom 326 helped to illustrate abstract concepts in OB221	<b>.911</b>	.204	-.079
SMG Classroom 326 helped explain OB221 assignments clearly	<b>.890</b>	.028	-.027
SMG Classroom 326 helped to make the OB221 learning objectives clear	<b>.829</b>	.250	.036
The SMG Classroom 326 experience improved the quality of the OB221 course	<b>.889</b>	.030	.018
SMG Classroom 326 made OB221 better than other courses I've taken	.265	-.181	<b>.660</b>
The quality of the OB221 course was largely unaffected by the SMG Classroom 326 experience	.629	-.081	.172
Taking OB221 via SMG Classroom 326 allowed me to arrange my work for the class more effectively	.037	.409	<b>.748</b>
The advantages of taking OB221 via SMG Classroom 326 outweighed any disadvantages	-.148	-.043	<b>.752</b>
Taking OB221 via SMG Classroom 326 allowed me to take a class I otherwise had to miss	.089	<b>.912</b>	.035
Taking OB221 via SMG Classroom 326 should allow me to finish my degree more quickly	.117	<b>.927</b>	-.033

Note: The highest factor loadings in each row are in boldface.

**Table 6.2**

*Reliability Analysis of Course Dimension Constructs*

Item	Alpha if item Deleted
<b>Course Clarity (Cronbach's Alpha=.876)</b>	
Being in SMG Classroom 326 helped to illustrate abstract concepts in OB221	.822
SMG Classroom 326 helped explain OB221 assignments clearly	.828
SMG Classroom 326 helped to make the OB221 learning objectives clear	.844
The SMG Classroom 326 experience improved the quality of the OB221 course	.829
The quality of the OB221 course was largely unaffected by the SMG Classroom 326 experience	<b>.927</b>
<b>Perceived Ease of Use (Cronbach's Alpha=.874)</b>	
Taking OB221 via SMG Classroom 326 allowed me to take a class I otherwise had to miss	**
Taking OB221 via SMG Classroom 326 should allow me to finish my degree more quickly	**

Note: Bolded alphas indicate that if the measure is deleted, the reliability will increase the overall alpha of the construct. \*\* Indicates only two measures were calculated for Cronbach's Alpha, so there is no "alpha if item deleted."

### Revisions to the Survey

Problematic measures that were deleted from each section should be revised or deleted from true score calculation. These measures include:

- Student Dimension
  - "The OB221 sections were interactive" (P1Q1)
  - "I learned more from my fellow students in this class than in other courses" (P1Q4)
- Instructor Dimension
  - "SMG Classroom 326 helped my discussion section instructor be a better teacher" (P4Q9)
- Technology Dimension
  - "Taking this course via SMG Classroom 326 made it more difficult than other courses I have taken" (P3Q5)
  - "SMG Classroom 326 allowed me to easily follow class discussions" (P4Q3)
  - "SMG Classroom 326 was useful in the OB221 course" (P5Q10)
  - "I felt the communication quality of SMG Classroom 326" (P5Q11)
- Course Dimension
  - "The quality of the OB221 course was largely unaffected by the SMG Classroom 326 experience" (P6Q6)
  - "Taking this class via SMG Classroom 326 allowed me to arrange my work for the class more effectively" (P6Q7)

- “The advantages of taking OB221 via SMG Classroom 326 outweighed any disadvantages” (P6Q8)

The following measures should be combined or moved into a different construct because there is an overlap in meaning:

- “I learned a great deal in OB221” (P1Q8) move into Course Satisfaction
  - “The comments from my OB221 section instructor in class discussions are constructive” (P2Q8) move into Perceived instructor Encouragement of Interaction
  - Combine Instructor Enjoyment and Instructor Satisfaction measures and delete a few that are the least reliable to have 4 total items.
  - Combine Course Clarity and Course Enhancement measures into one construct
- “Expected Grade in the course” (P1Q11) should be a single-item measure, so it should not be used in calculation of a true score for Perceived Learning Outcomes construct.

Measures that were red-flagged or showed odd groupings at the initial state of inter-item correlations should be revised to increase the common meaning with other measures in the construct. The deleted items mentioned above can be revised as well and reintegrated into the construct. For the constructs that dropped to only two measures after factor analysis and reliability, additional measures should be developed. To shorten the survey taking-time, future studies should remove the measures with the lowest factor loadings within each construct. This pre-test also suffered from a slight order effect, so the items should be randomized more.

## VII. Conclusions

Technology-enabled classrooms, just like SMG Classroom 326, are the wave of the future. However, there has not been enough assessment as to the effect of using such technology on the students. This study's purpose was to propose and develop predictors and subsequent measures for determining students' satisfaction with technology-enabled classrooms. A comprehensive list of predictors that is both reliable and valid was produced through qualitative and quantitative assessment of these measurements along the HELAM Model.

As this was a pre-test, the researcher will revise the survey according to the results of this study and will implement a full-scale study on the undergraduate class that meets in SMG Classroom 326 next semester. It will also be useful to give the course and instructor dimension parts of the survey to students who attend classes in a "regular" classroom and to compare the results with the experimental group in SMG Classroom 326.

In terms of possible future studies, the survey can be revised and expanded to include respondents from MBA programs who use the same technology-enabled classroom, as well as secondary and elementary schools that are starting to integrate technology into the learning process.

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**Appendix 1: Survey Instrument**

**Student Survey on the SMG Classroom 326 Experience**

As part of a BU Graduate Communication course on survey research, I am conducting a study that investigates OB221 students’ experience in SMG Classroom 326. Thank you for taking the time to complete this survey. All responses will remain anonymous and collected data will be confidential.

1. This section will ask you about the OB221 course. Please mark the box corresponding to your answer choice (check only one).

	Strongly Disagree	Disagree	Feel Neutral	Agree	Strongly Agree
The OB221 discussions sections were interactive.					
OB221 discussion sections were more difficult to participate in than other courses.					
Because of OB221, I gained a good understanding of concepts in the field of organizational behavior.					
I learned more from fellow students in my OB221 discussion sections than in other courses.					
I was able to identify the central issues of the OB221 course.					
If I had an opportunity to take OB221 again, I would gladly do so.					
I was disappointed with the way the OB221 course worked out.					
I learned a great deal in OB221.					
Student-to-student interaction in OB221 discussion sections was more difficult than in other courses.					
Overall, I was satisfied with the OB221 course.					

**Expected Letter grade in the OB221 course** \_\_\_\_\_

2. This next section will ask you about your instructor for the OB221 discussion section.

**Who was your OB221 discussion section instructor?** \_\_\_\_\_

Please mark the box corresponding to your answer choice (check only one).

	Strongly Disagree	Disagree	Feel Neutral	Agree	Strongly Agree
Overall, my instructor for my discussion section was an excellent teacher.					

The discussion section instructor stimulated student interaction.					
My discussion section instructor was proficient with all the content used in the OB221 course.					
My discussion section instructor created a learning environment that was fun.					
The discussion section instructor made the course more interesting.					
The discussion section instructor created an environment where I felt comfortable providing input in class discussions.					
The comments from my instructor during discussion sections were constructive.					
The discussion section instructor encouraged us to interact with other students.					
My discussion section instructor was knowledgeable about OB221 course content.					
If I had an opportunity to take another class with my discussion section instructor, I would gladly do so.					
My discussion section instructor helped to make learning an enjoyable process.					
The section instructor created an environment where interaction with other students became more natural as the course progressed.					
I enjoyed attending my instructor's discussion sections.					
I was confident my discussion section instructor was competent with course material.					
I was satisfied with my discussion section instructor.					

3. In this section, I want to know about your experience with the OB221 lecturer, Professor Jack McCarthy. Please mark the box corresponding to your answer choice (check only one).

	Strongly Disagree	Disagree	Feel Neutral	Agree	Strongly Agree
Overall, Professor McCarthy was an excellent lecturer.					
If I had an opportunity to take another class with Professor McCarthy, I would gladly do so.					

Overall, I was satisfied with Professor McCarthy as the OB221 Lecturer.					
The lectures presented by Professor McCarthy were better than most lectures I've attended by other professors.					

4. For the next part, I want to know about your experience using the **SMG Classroom 326**. Please mark the box corresponding to your answer choice.

	Strongly Disagree	Disagree	Feel Neutral	Agree	Strongly Agree
Taking this course via SMG Classroom 326 made it more difficult than other courses I have taken.					
I enjoyed attending SMG Classroom 326 sessions overall.					
If I had an opportunity to take another class in SMG Classroom 326, I would gladly do so.					
SMG Classroom 326 made communication easier with my classmates.					
SMG Classroom 326 created an environment for high-quality discussions.					
SMG Classroom 326 enhanced my ability to identify central concepts in organizational behavior.					
SMG Classroom 326 made the course more interesting.					
SMG Classroom 326 helped me learn a great deal about organizational behavior.					
SMG Classroom 326 made it easier for me to interact with my peers.					
I was disappointed with the way SMG Classroom 326 worked out.					
SMG Classroom 326 helped me to recognize important issues in the field of organizational behavior.					
SMG Classroom 326 allowed me to easily follow class discussions.					
SMG Classroom 326 made the course more fun.					
SMG Classroom 326 helped me understand the concepts of organizational behavior.					

SMG Classroom 326 made the course more enjoyable.					
Overall, I was satisfied with SMG Classroom 326.					

5. In this section, I want to know about your **discussion section instructor’s use of SMG Classroom 326**. Please mark the box corresponding to your answer choice.

	Strongly Disagree	Disagree	Feel Neutral	Agree	Strongly Agree
My instructor emphasized the value in communicating with students via SMG Classroom 326.					
SMG Classroom 326 helped my discussion section instructor be a better teacher.					
The instructor encouraged us to interact with other students by using SMG Classroom 326.					
SMG Classroom 326 helped my discussion instructor demonstrate knowledge for the subject matter.					
SMG Classroom 326 helped my discussion instructor present materials clearly.					
SMG Classroom 326 enhanced my instructor’s teaching in discussion sections.					

6. For this next section, I will ask you about the **technology of SMG Classroom 326**. Please mark the box corresponding to your answer choice.

	Strongly Disagree	Disagree	Feel Neutral	Agree	Strongly Agree
I enhanced my efficiency in the OB221 course by using SMG Classroom 326.					
I did not face any system errors while using SMG Classroom 326.					
When I encountered an error in the SMG Classroom 326 system, I got immediate help.					
I improved my performance in the OB221 course by using SMG Classroom 326.					
I felt satisfied with the speed of the technology in SMG Classroom 326					
When I used SMG Classroom 326, I received assistance if I faced a technical problem.					
Learning to operate SMG Classroom 326 was easy for me.					

I found it easy to get SMG Classroom 326 to do what I wanted it to do.					
I felt comfortable using SMG Classroom 326 technology because someone was always around to help me.					
SMG Classroom 326 was useful in the OB221 course.					
I felt the communication quality of SMG Classroom 326 was not good.					
I found SMG Classroom 326 easy to use.					
While using SMG Classroom 326, I encountered many technical difficulties.					
Technical problems with SMG Classroom 326 didn't get addressed.					
I enhanced my productivity by using SMG Classroom 326.					

7. In the following section about using **SMG Classroom 326 for the OB221 course**, please mark the box corresponding to your answer.

	Strongly Disagree	Disagree	Feel Neutral	Agree	Strongly Agree
Being in SMG Classroom 326 helped to illustrate abstract concepts in OB221.					
The SMG Classroom 326 experience improved the quality of the OB221 course.					
SMG Classroom 326 helped explain OB221 assignments clearly.					
SMG Classroom 326 made OB221 better than other courses I've taken.					
SMG Classroom 326 helped to make the OB221 learning objectives clear.					
The quality of the OB221 course was largely unaffected by the SMG Classroom 326 experience.					
Taking OB221 via SMG Classroom 326 allowed me to arrange my work for the class more effectively.					
The advantages of taking OB221 via SMG Classroom 326 outweighed any disadvantages.					

Taking OB221 via SMG Classroom 326 allowed me to take a class I otherwise had to miss.					
Taking OB221 via SMG Classroom 326 should allow me to finish my degree more quickly.					

8. Please answer the following about yourself.

How much experience have you had with distance-learning technology such as podcasts, video casts (vodcasts), online courses, etc.? (Circle one)

No experience          Some experience          A lot of experience

Age \_\_\_\_\_

Class Level (circle one):      Freshman                  Sophomore                  Junior                  Senior

GPA (4.0 scale): \_\_\_\_\_

Gender (circle one):    Female                  Male

Any other comments?

**Appendix II: Revised Survey**

**Student Survey on the SMG Classroom 326 Experience**

As part of a BU Graduate Communication course on survey research, I am conducting a study that investigates OB221 students’ experience in SMG Classroom 326. Thank you for taking the time to complete this survey. All responses will remain anonymous and collected data will be confidential.

1. This section will ask you about the OB221 course. Please mark the box corresponding to your answer choice (check only one).

	Strongly Disagree	Disagree	Feel Neutral	Agree	Strongly Agree
OB221 discussion sections were more difficult to participate in than other courses.					
Because of OB221, I gained a good understanding of concepts in the field of organizational behavior.					
I was able to identify the central issues of the OB221 course.					
If I had an opportunity to take OB221 again, I would gladly do so.					
I was disappointed with the way the OB221 course worked out.					
I learned a great deal in OB221.					
Student-to-student interaction in OB221 discussion sections was more difficult than in other courses.					
Overall, I was satisfied with the OB221 course.					

**Expected Letter grade in the OB221 course** \_\_\_\_\_

2. This next section will ask you about your instructor for the OB221 discussion section.

**Who was your OB221 discussion section instructor?** \_\_\_\_\_

Please mark the box corresponding to your answer choice (check only one).

	Strongly Disagree	Disagree	Feel Neutral	Agree	Strongly Agree
Overall, my instructor for my discussion section was an excellent teacher.					

The discussion section instructor stimulated student interaction.					
My discussion section instructor was proficient with all the content used in the OB221 course.					
My discussion section instructor created a learning environment that was fun.					
The discussion section instructor made the course more interesting.					
The discussion section instructor created an environment where I felt comfortable providing input in class discussions.					
The comments from my instructor during discussion sections were constructive.					
The discussion section instructor encouraged us to interact with other students.					
My discussion section instructor was knowledgeable about OB221 course content.					
If I had an opportunity to take another class with my discussion section instructor, I would gladly do so.					
My discussion section instructor helped to make learning an enjoyable process.					
The section instructor created an environment where interaction with other students became more natural as the course progressed.					
I enjoyed attending my instructor's discussion sections.					
I was confident my discussion section instructor was competent with course material.					
I was satisfied with my discussion section instructor.					

3. In this section, I want to know about your experience with the OB221 lecturer, Professor Jack McCarthy. Please mark the box corresponding to your answer choice (check only one).

	Strongly Disagree	Disagree	Feel Neutral	Agree	Strongly Agree
Overall, Professor McCarthy was an excellent lecturer.					

If I had an opportunity to take another class with Professor McCarthy, I would gladly do so.					
Overall, I was satisfied with Professor McCarthy as the OB221 Lecturer.					
The lectures presented by Professor McCarthy were better than most lectures I've attended by other professors.					

4. For the next part, I want to know about your experience using the **SMG Classroom 326**. Please mark the box corresponding to your answer choice.

	Strongly Disagree	Disagree	Feel Neutral	Agree	Strongly Agree
Taking this course via SMG Classroom 326 made it more difficult than other courses I have taken.					
I enjoyed attending SMG Classroom 326 sessions overall.					
If I had an opportunity to take another class in SMG Classroom 326, I would gladly do so.					
SMG Classroom 326 made communication easier with my classmates.					
SMG Classroom 326 created an environment for high-quality discussions.					
SMG Classroom 326 enhanced my ability to identify central concepts in organizational behavior.					
SMG Classroom 326 made the course more interesting.					
SMG Classroom 326 helped me learn a great deal about organizational behavior.					
SMG Classroom 326 made it easier for me to interact with my peers.					
SMG Classroom 326 helped me to recognize important issues in the field of organizational behavior.					
SMG Classroom 326 helped me understand the concepts of organizational behavior.					
SMG Classroom 326 made the course more enjoyable.					
Overall, I was satisfied with SMG Classroom 326.					

5. In this section, I want to know about your **discussion section instructor’s use of SMG Classroom 326**. Please mark the box corresponding to your answer choice.

	Strongly Disagree	Disagree	Feel Neutral	Agree	Strongly Agree
My instructor emphasized the value in communicating with students via SMG Classroom 326.					
The instructor encouraged us to interact with other students by using SMG Classroom 326.					
SMG Classroom 326 helped my discussion instructor demonstrate knowledge for the subject matter.					
SMG Classroom 326 helped my discussion instructor present materials clearly.					
SMG Classroom 326 enhanced my instructor’s teaching in discussion sections.					

6. For this next section, I will ask you about the **technology of SMG Classroom 326**. Please mark the box corresponding to your answer choice.

	Strongly Disagree	Disagree	Feel Neutral	Agree	Strongly Agree
I enhanced my efficiency in the OB221 course by using SMG Classroom 326.					
I did not face any system errors while using SMG Classroom 326.					
When I encountered an error in the SMG Classroom 326 system, I got immediate help.					
I improved my performance in the OB221 course by using SMG Classroom 326.					
I felt satisfied with the speed of the technology in SMG Classroom 326					
When I used SMG Classroom 326, I received assistance if I faced a technical problem.					
Learning to operate SMG Classroom 326 was easy for me.					
I found it easy to get SMG Classroom 326 to do what I wanted it to do.					

I felt comfortable using SMG Classroom 326 technology because someone was always around to help me.					
I found SMG Classroom 326 easy to use.					
While using SMG Classroom 326, I encountered many technical difficulties.					
I enhanced my productivity by using SMG Classroom 326.					

7. In the following section about using **SMG Classroom 326 for the OB221 course**, please mark the box corresponding to your answer.

	Strongly Disagree	Disagree	Feel Neutral	Agree	Strongly Agree
Being in SMG Classroom 326 helped to illustrate abstract concepts in OB221.					
The SMG Classroom 326 experience improved the quality of the OB221 course.					
SMG Classroom 326 helped explain OB221 assignments clearly.					
SMG Classroom 326 made OB221 better than other courses I've taken.					
SMG Classroom 326 helped to make the OB221 learning objectives clear.					
Taking OB221 via SMG Classroom 326 allowed me to take a class I otherwise had to miss.					
Taking OB221 via SMG Classroom 326 should allow me to finish my degree more quickly.					

8. Please answer the following about yourself.

How much experience have you had with distance-learning technology such as podcasts, video casts (vodcasts), online courses, etc.? (Circle one)

No experience          Some experience          A lot of experience

Age \_\_\_\_\_

Class Level (circle one):      Freshman                  Sophomore                  Junior                  Senior

GPA (4.0 scale): \_\_\_\_\_

Gender (circle one):      Female                  Male

Any other comments?