IPRO 343

Improving Communication Quality of the Drive-thru Experience

Instructors:

Matthew Bauer (HUM) in consultation with Kathryn Riley (HUM) and Thomas Wong (ECE)

Sponsored by McDonald's Corporation

Team Members:

Kevin Arnold

Matthew Campen

Shaun Doran

Karen Hong

Sarah Johnson

Scott Justus

Halcyon Lawrence

Susan Mallgrave

Shavanna Pinder

Russell Ucci

1. Background

In the quick-service restaurant (QSR) industry, a 2007 QSR Consumer Drive-Thru Preference Survey found that "speaker communication" was ranked as "important" by 69% of those surveyed. Moreover, "communications via speaker" received only a 62% satisfaction rate from those surveyed. Thus, in the area of communication, a 7+point spread exists between consumer ratings of importance and satisfaction, indicating a critical need (by industry standards) for improvement.

Research at the McDonald's Innovation Center in Romeoville, Illinois reveals that 57% of errors made during transactions in this area occur during the "capture order phase" (COD). Little systematic research has been conducted into the source of these communication issues.

IPRO 343 was created by Drs. Matthew Bauer and Kathryn Riley, and will build on the exploratory research of the Spring 2008 IPRO 344 team that focused on "Improving Energy-Efficiency and Offering Quality Audio in Mobile Devices," guided by Professor Tom Wong (ECE).

IPRO 343 initially identified four (4) possible sources of communication problems to be investigated:

a. Acoustical issues related to in-bound and out-bound speech signals at the drive-thru;

b. Cognition issues related to multiple modalities (that is, how language perception is affected by the presence or absence of certain cues or by conflicting cues) for the speech signal;

c. Intercultural communication issues related to comprehensibility problems of native and non-native speakers, including speech-in-noise effects and language attitudes; and

d. Human-technology interaction issues related to customer interfaces used for ordering, including findings on customer rejection/approval of technology, and multi-modal/speech recognition systems.

After a consultation with McDonald's executives, IPRO team 343 has been tasked with narrowing the focus to conducting research on in-bound, out-bound speech signals to investigate remedial solutions for the existing 30,000 restaurants, as well as next-generation remedies. **The team has therefore limited the scope of their research to focus on acoustical and culture/cognition issues.**

2. Objectives

The primary objective of IPRO 343 is to identify the communication issues which affect the efficiency and effectiveness of the drive-thru experience at McDonald's restaurants. To this end:

a. The IPRO team will examine two communication factors that influence the drive-thru experience: acoustics and culture/cognition. From these two factors, the team will look for potential areas in which the drive-thru experience at McDonalds' can be improved.

b. The team will develop and conduct experiments related to these factors, to test pre-established hypotheses.

c. The team will make recommendations about possible solutions or further studies which may need to be conducted for the company to meet its end goal.

3. Methodology

Research in the area of acoustics and culture/cognition issues is not new. Its application specific to QSRs however, is a new area and provides IPRO 343 with an opportunity to apply existing methodology to a relatively new problem. In the area of cognition for example, studies conducted by Dodd (1977); Helfer (1997) and Massaro et al. (1983) provide a starting point for the investigation into multiple modalities as an avenue to improved speech recognition. The proposed methodology therefore will involve:

a. Sub-teams using a variety of research methods, drawn primarily from the fields of linguistics and psychology. The methods may include, but are not limited to, experimental, ethnographic, and correlative approaches.

b. Sub-teams working in an interactive fashion, and ultimately integrating their observations and conclusions to make general recommendations about further studies of the drive-thru experience, and to provide feasible options and recommendations for McDonald's to consider implementing in its drive-thru environment.

c. Students conducting original research related to communication difficulties in the drive-thru experience. The research will employ experimental and ethnographic methods in an effort to pinpoint problems, and help create

solutions to problems with acoustics and human-technology interaction and culture and cognition.

Acoustics Sub-team: This team will conduct an experiment to test the effects of white noise on the ability of employees to accurately capture an order. The experiment will focus primarily on the order-taker's ability to acquire an order under various circumstances, including the use of one or two headphones, the use of white noise, and the influence of multiple lines of speech.

Culture/Cognition Sub-team: This team will focus on the benefits of multiple modalities, using the presence of video of the speaker, in an effort to promote communication. The team will explore the benefits of having video of a speaker available, and whether it may or may not improve the accuracy of order capturing.

4. Expected Results

We expect our results to yield at least two major recommendations related to acoustics and culture/cognition respectively, which McDonald's Corporation can apply to increase the quality of drive-thru communication. These recommendations will be based on data collected from communications experiments, and if possible, field research.

Based on the data and the experiments, a final report and presentation will be created for McDonald's Corporation to review.

5. Project Budget

The proposed budget for IPRO 343 is listed below:

Item	Budgeted Cost
Equipment (headphones etc.)	$100.00
Participant incentives	$200.00
Travel (fieldwork)	$100.00
IPRO Day	$100.00
Total	**$500.00**

6. Schedule of Major Project Milestones

Milestones/Activities	Duration	Start Date	Completion Date
Project Plan Due	0 days*	19-Sep-08	19-Sep-08
Ethics Module Completed	13 days	19-Sep-08	7-Oct-08
Research Design Completed	**19 days**	**22-Sep-08**	**16-Oct-08**
Midterm Presentation to Group	0 days	2-Oct-08	2-Oct-08
Midterm Presentation	0 days	6-Oct-08	6-Oct-08
Ethics Review	0 days	20-Oct-08	20-Oct-08
Participant Recruitment	**8 days**	**23-Oct-08**	**3-Nov-08**
Exhibit/Poster/Abstract Due	0 days	26-Nov-08	26-Nov-08
Experiments Conducted	**7 days**	13-Nov-08	**21-Nov-08**
IPRO Day Preparation Seminar	0 days	20-Nov-08	20-Nov-08
Analysis Completed	**7 days**	24-Nov-	**2-Dec-08**

Milestones/Activities	Duration	Start Date	Completion Date
		08	
Presentation Uploaded	0 days	3-Dec-08	3-Dec-08
Final Report Due	0 days	4-Dec-08	4-Dec-08
IPRO Day/CD Due	0 days	5-Dec-08	5-Dec-08

*durations listed as 0 days reflect deadlines and not actual durations for tasks

7. Team Members

IPRO 343 is led by instructors Matthew Bauer in consultation with Kathryn Riley and assisted by Yu Zhang. There are ten (10) student members:

7.1. Kevin Arnold

- **Background**: 4th-year student majoring in political science with minors in professional and technical communication and art history; taking first IPRO
- **Skills**: Experience with Microsoft Office, especially Excel, courses in linguistics, research methods and design experience
- **Interests**: History, language, urban politics, and cooking
- **Team role:** Co-team leader and member of acoustics sub-team

7.2. Matthew Campen

- **Background**: 3rd-year student majoring in computer engineering; taking first IPRO
- **Skills**: Circuit design, Java, C, Unix, Microsoft Office
- **Interests**: Computers, programming, history, videogames, guitar
- **Team role:** Ethics team leader, acoustics team member

7.3. Shaun Doran

- **Background**: 3rd-year student majoring in electrical engineering; taking first IPRO
- **Skills**: problem solving, computer skills, experiment design
- **Interests**: Electronics, cars, music, guitar
- **Team Role**: Budget/facility management, acoustics sub-team member

7.4. Karen Hong

- **Background:** 5th year student majoring in architecture, digital design specialization; taking first IPRO
- **Skills:** AutoCAD, 3d Studio Max, Adobe Photoshop/Illustrator, and fluent in Korean
- **Interests:** Reading, traveling, photography, meeting new people, and trying new things
- **Team Role:** Document management/meeting team leader and acoustics team member

7.5. Sarah Johnson

- **Background:** 5th-year student majoring in architecture; taking second IPRO.
- **Skills:** Design, project organization, thinking outside of the box
- **Interests:** Photography, reading, rock climbing
- **Team Role:** Acoustics team leader and ethics team member

7.6. Scott Justus

- **Background:** 4th-year student majoring in biochemistry; taking first IPRO
- **Skills:** Good knowledge of human anatomy/physiology, basic understanding of various linguistic concepts, very computer savvy, good team player
- **Interests:** Biology, volleyball, movies, and the occasional good book.
- **Team Role:** Culture/cognition sub-group leader

7.7. Halcyon Lawrence

- **Background:** Ph.D. Technical Communication candidate; taking first IPRO
- **Skills:** Certified MS Office Master Instructor, strong organizational and communication skills
- **Interests:** travel, cooking, educational technology
- **Team Role:** Co-team leader and member, culture/cognition sub-team

7.8. Susan Mallgrave

- **Background:** 4th year student majoring in technical communication; taking second IPRO
- **Skills:** writing, editing, web design, document design**,** communication skills
- **Interests:** reading, writing poetry and fiction, and traveling
- **Team Role:** Editor and culture/cognition team member

7.9. Shavanna Pinder

- **Background**: 5th-year student majoring in architecture; taking first IPRO
- **Skills**: Architecture: 3D Studio Max, AutoCAD, model making, hand drafting, freehand, Adobe Photoshop/Illustrator, typing 50 wpm, basic Spanish
- **Interests**: Reading, bike-riding, traveling, and music
- **Team Role**: Recruitment team leader and culture/cognition team member

7.10. Russell Ucci

- **Background**: 4th-year student majoring in chemical engineering
- **Skills**: MS Word, Excel, Matlab, HYSIS, LABVIEW
- **Interests**: Laplace transforms, track, and movies
- **Team Role**: Experiments team leader, culture/cognition sub team, ethics module team

8. Designation of Specific Roles

Role	Person Responsible	Duties
Team Leaders	Kevin Arnold Halcyon Lawrence	Oversee all team activities; liaise with group leaders and academic staff members
Culture Team Leader	Scott Justus	Manage culture/cognition group; design culture/cognitions experiment; liaise with experiment and recruitment teams
Acoustics Team Leader	Sarah Johnson	Manage acoustics group; design acoustics experiment; liaise with experiment and recruitment teams
Budget/Facility Manager	Shaun Doran	Liaise with IPRO team to develop budget; manage expenditures; book facilities; procurements
Document Manager	Karen Hong	Manage all documents (hardcopy & softcopy) for IPRO 343 through iGROUPS; work with team leaders to design meeting agendas; take and distribute minutes for meetings
Editor	Susan Mallgrave	Edit all official IPRO 343 documents (project plans, brochures, abstracts, presentations etc.)
Ethics Team Leader	Matthew Campen	Work with team members to complete the ethics requirements for the Ethics Review Board (ERB); brief team members on the outcome of ERB requirements
Recruitment Team Leader	Shavanna Pinder	Manage recruitment of all participants; liaise with acoustics, culture/cognition, and recruitment team leaders
Experiment Team Leader	Russell Ucci	Manage all experiments; liaise with acoustics, culture/cognition, and recruitment team leaders

Works Cited

Dodd, Barbara. (1977). The Role of Vision in the Perception of Speech. *Perception*, 6, 31-40

Helfer, Karen S. (1997). Auditory and Auditory-Visual Perception of Clear and Conversational Speech. *Journal of Speech, Language & Hearing Research*, 40 (2), 432-450

Massaro, Dominic W., & Cohen, Michael M. (1983). Evaluation and Integration of Visual and Auditory Information in Speech Perception. *Journal of Experimental Psychology*, 9 (5) 753-771