December 2012

Impact of Multitasking on Listening Effectiveness in the Learning Environment

Alla Kushniryk
Mount Saint Vincent University, alla.kushniryk@msvu.ca
Kenneth J. Levine
University of Tennessee, Knoxville, klevine1@utk.edu

Follow this and additional works at: https://ir.lib.uwo.ca/cjsotl_rcacea
http://dx.doi.org/10.5206/cjsotl-rcacea.2012.2.7

Recommended Citation
Impact of Multitasking on Listening Effectiveness in the Learning Environment

Abstract
This experimental study evaluated the impact of multitasking and social presence on students' performances in the learning environment. In the first live-presenter group, the participants listened to a lecture in a face-to-face environment. In the second virtual-presenter group, the participants listened on their computers to a pre-recorded lecture. The participants of these groups listened to a lecture and simultaneously wrote responses to open-ended online survey questions. While the participants of the first two groups were multitasking, those in the third group completed listening and writing tasks sequentially. It was found that multitasking significantly decreased performances on both the listening and writing tasks. The experiment also uncovered that the degree of social presence did not affect students' performances on the listening or writing tasks in the learning environment. The perceived degree of social presence was the same in the virtual- and live-presenter groups.

La présente étude expérimentale évalue les conséquences de la multiplicité des tâches et de la présence sociale sur la performance des étudiants dans l'environnement d'apprentissage. Le premier groupe a assisté à une cours donnée par un conférencier sur place. Le deuxième groupe a écouté le cours préenregistrée à partir d’un ordinateur. Les participants de ces deux groupes ont répondu simultanément en ligne aux questions ouvertes d’un sondage. Alors que les participants des deux premiers groupes ont effectué des tâches multiples simultanément, ceux du troisième groupe ont d’abord écouté puis ont répondu au sondage de façon séquentielle. Les chercheurs ont découvert que le fait de réaliser des tâches multiples entraînent une baisse importante de la performance en ce qui a trait à l’écoute et à la rédaction des réponses. L’expérience a aussi permis de découvrir que la présence en classe n’influe pas sur la performance des étudiants en ce qui a trait aux tâches d’écoute ou de rédaction dans l’environnement d’apprentissage. Le degré perçu de présence sociale était le même dans le groupe du conférencier virtuel que dans celui du conférencier en direct.

Keywords
multitasking, social presence, task prioritization, listening

This research paper/rapport de recherche is available in The Canadian Journal for the Scholarship of Teaching and Learning: https://ir.lib.uwo.ca/cjsotl_racea/vol3/iss2/7
Technological advances have dramatically changed the contemporary learning environment. Our classrooms are now equipped with wireless internet, webcams, and video projectors. Students use computers to take notes and to record lectures. However, the availability of wireless technologies and computers in the classrooms has its own downside: it makes it possible for students to chat, monitor Facebook, read news, edit photo collections, read online magazines, shop online, email, play videogames, do homework for other classes, and so on, while listening to lectures and seminars. In other words, technological advances have brought an increase in multitasking (Caroli & Van Reenen, 2001). Currently, many university and college courses are offered by distance. According to Winter, Cotton, Gavin and Yorke (2010), multitasking is routinely observed amongst e-learners and is often even viewed as a beneficial attribute of an e-learner.

This study analyzes the impact of multitasking on listening effectiveness (i.e. understanding and remembering information) during face-to-face and online lectures. For the purposes of this study, multitasking is defined as accomplishing multiple-task goals in the same general time period, either simultaneously or by engaging in frequent switches between individual tasks (Delbridge, 2000).

**Multitasking and Productivity**

Over the last 100 years, several theories of multitasking have emerged to explain how people can perform multiple tasks simultaneously. One of the first theories in modern cognitive psychology to explain multitasking performance was Welford’s (1952) *single-channel theory*. According to this theory, some mental processes needed for one task must necessarily wait whenever a person engages in another prior task. Broadbent (1958) adopted and expanded the single-channel theory into the *bottleneck theory*, which became a general theory of attention that influenced the first generation of cognitive psychologists and communication scholars (Logan & Gordon, 2001). So-called bottleneck theorists (e.g., Broadbent, 1958) argue that interference occurs because certain mental operations cannot be divided, resulting in a bottleneck that allows only one task to pass through at a time.

According to the *limited capacity theory* (Lang, 2000), people have only a limited pool of mental resources for processing information. When a primary task is combined with a secondary task, the person is charged with two tasks that compete for his/her limited information processing resources. Combining two tasks, therefore, may lead to an overload of information that exceeds capacity of available cognitive resources, with the result that only part of the information can be processed, and performance decreases.

Most studies testing multitasking productivity have shown that engaging in simultaneous activities decreases performance level. There is a time cost associated with attempting to multitask by performing two tasks at the same time or switching from one task to another in rapid succession. People’s performances in multitasking situations depend highly on their skills in each of the individual tasks (Alport, Antonis, & Reynolds, 1972). Being skilled in one task allows a person to perform it and other tasks with negligible impact on the overall performance of both tasks. For example, a skilled driver might have little difficulty talking with a friend while driving, whereas a novice driver might find it difficult. However, Shallice, McLeond and Lewis (1985) found that even if a person is highly skillful and trained in a task performance, one should expect a decrement up to 10% in performance as a result of the requirement to monitor two tasks simultaneously.
Wylie and Allport (2000) conducted task-switching experiments in an effort to measure the “cost” or loss of time spent switching between activities. They labeled the time required to switch between and among tasks as reaction time switching costs. They noted that switching from one task to another requires a certain amount of time (i.e., at least within a tenth of a second delay). This switching also involves a change in attention and focus.

Rubinstein, Meyer, and Evans (2001) studied patterns in the amounts of time lost when people switched repeatedly between two tasks of varying complexity and familiarity. In four experiments, the participants switched between different tasks such as solving math problems or classifying geometric objects. The researchers measured participants’ speed of performance as a function of whether the successive tasks were familiar or unfamiliar, and whether the rules for performing them were simple or complex. The measurements revealed that for all types of tasks, participants lost time when they had to switch from one task to another; furthermore, time costs increased with the complexity of the tasks and participants took significantly longer to switch between more complex tasks. Time costs also were greater when participants switched to tasks that were relatively unfamiliar. Switching between tasks takes substantial amounts of time, several tenths of a second, which can add up when people switch back and forth repeatedly between tasks. Thus, Rubinstein and colleagues (2001) concluded that while multitasking may seem more efficient on the surface, it may actually take more time in the end; however, people may choose strategies that maximize their efficiency when multitasking.

Naveh-Benjamin, Craik, Perretta, and Tonev (2000) studied the effect of multitasking on information encoding and retrieval. The information encoding process, their research revealed, required more attention than the information retrieval process, because the encoding processes are more vulnerable to the effects of competing demands of multiple tasks. Naveh-Benjamin et al. also found that divided attention at the point of encoding significantly reduced memory recall. In their research where individuals switched between two specified tasks, one of which was to be learned and stored in memory, Naveh-Benjamin et al. concluded that as attention was switched to a secondary task and away from the first task, memory performance on the first task declined and secondary task performance improved.

Evidently, people performing under multitasking conditions need more time to complete their individual tasks given that multitasking is a type of task-switching. Therefore, people engaged in multitasking are also disadvantaged in terms of performance. Multitasking should cause decreased performance levels when compared to individual task performance on the same tasks.

**Social presence: Does a virtual presenter make a difference?**

Social Presence theory, developed by Short, Williams, and Christie (1976), explains the interpersonal effects between two communicators in organizational settings when using communication technologies such as the telephone, audio channels, closed-circuit video channels, and face-to-face meetings. These communication mediums are characterized in terms of their potential to communicate verbal and nonverbal cues, transmitting socio-emotional information in such a way that the one communicator is perceived as “physically” present. The theory suggests that the more verbal and nonverbal cues that can be transmitted, the higher the perception of the “physical” presence of the communicator will be. Short et al. (1976) ranked telecommunication media according to their degree of social presence. In descending order, they ranked from face-to-face communication, video-conferencing, and finally audio-only (e.g., the telephone).
Other communication studies indicate that email and computer conferencing have lower social presence being less “warm” than face-to-face communication (Fulk, Schmitz, Steinfield, & Power, 1987; Siegel, Dubrovsky, Kiesler & McGuire, 1986). Chimbaram and Jones (1993) found that perceptions of social presence are greater in face-to-face groups than dispersed groups. Short, et al.’s (1976) study suggests that individuals can effectively transmit and receive a broader range of verbal and non-verbal cues in face-to-face meeting than during an audio conference. Accordingly, traditional, unmediated face-to-face verbal communication provides the highest social presence (Miranda & Saunders, 2003), whereas computer-supported media provide lower social presence and virtual groups also experience relatively low social presence (Miranda & Saunders, 2003; Roberts, Lowry, & Sweeney, 2006).

Miranda and Saunders (2003) advocate that the presence of the sender influences the recipients’ understanding of the message. They broaden social presence theory by acknowledging that the presence of others, including (but not limited to) the message sender, influences the nature and success of intersubjective interpretation. Miranda and Saunders (2003) state, “… intersubjective interpretation is ill suited to media low in social presence… low social presence makes it more likely that specific comments will be entirely ignored since individuals are unable to perceive others’ urgency and consequential emotional reactions” (p.89).

Computer mediated communication has lower social presence than other forms of communication (Miranda & Saunders, 2003; Roberts, Lowry, & Sweeney, 2006). Consequently, a low degree of social presence can diminish the receiver’s understanding of the message, suggesting that virtual meetings or distance classes may have lower overall outcomes for quality, satisfaction and productivity. There is no scientific evidence on exactly how the degree of social presence influences the multitask performance. In multitasking situations, the presence of the others may affect the task prioritization. For example, when college students surf the Internet during class lectures, they may consider their class participation as the primary task. Therefore, one might think that they put more effort into listening to the lecture than into Internet browsing. However, during distance education classes, when the teacher is not physically present, these same students may put less effort into listening to lectures given through computer-assisted technology and be distracted, for example, by Internet browsing.

Low social presence makes it more likely that “a sender’s comments could be entirely ignored as individuals are unable to perceive others’ urgency and consequential emotional reactions” (Miranda & Saunders, 2003, p. 89). Thus, in the low social presence situation with a virtual presenter, the participants may consider the writing task their priority and listening an interference. Consistent with previous findings (Naveh-Benjamin, Craik, Perretta, & Tonev, 2000), as attention switches to a secondary task, memory performance on the first task declines and secondary task performance improves.

In light of the research on multitasking presented earlier and the research on social presence, three hypotheses will be tested:

**Hypothesis 1:** Multitasking causes decreased performance levels when compared to individual task performance on the same tasks.

**Hypothesis 2:** The degree of social presence affects participants’ task prioritization in the multitasking environment.
Hypothesis 2a: Participants in a live-presenter group will perform better than participants in a virtual-presenter group on the listening task in the multitasking environment.

Hypothesis 2b: Participants in a virtual-presenter group will perform better than participants in a live-presenter group on the writing task in the multitasking environment.

Method

Participants

Respondents for this study were 114 undergraduate students (51 male, 63 female) enrolled in an introductory communication course in a large North American university. Research participation was a part of this course requirement. Options were available for not participating in this study. Participants reported a variety of ethnic backgrounds (10 - African-Americans, 3 - Asian, 95 - Caucasian, 2 - Hispanic, 2 - Mixed Background, and 2 - Other). The majority of participants (92 per cent) were 18 - 21 years of age.

The experiment included an on-line component. The university IT services created a custom course with 300 anonymous accounts on the university course management system. At the beginning of each experiment, each participant was assigned an anonymous user ID and password to log into the custom course. The custom course was created for the following purposes: (a) to make it possible for each student to participate in an online chat function; (b) to collect and store survey responses from each participant, and (c) to insure the participant’s anonymity. The participants were instructed to log into the custom course using their anonymous accounts.

Task Overview

The participants of the study had two communication tasks to accomplish during the experiment: listening (15 min) and writing (10 min). The students were not instructed which of the tasks was primary and which was secondary. The listening task was in the form of a lecture about an ancient Greek philosopher Aristotle. The lecturer had expertise in the topic and experience in teaching undergraduate and graduate courses in a large public university. The participants were instructed to open the on-line chat window and respond to the text message that would be sent by the chat moderator during the lecture presentation.

Five minutes after the beginning of the lecture, the moderator sent a text message to all of the participants. The message contained instructions on how to proceed to the writing task (i.e., in this case, a survey):

Please click on the “Writing Task” button and proceed to the survey. You have 10 minutes to complete the survey. There is no right or wrong answer to any of these questions. All questions are open-ended. Please answer the questions in the space provided. You can type in as many words as you want. Please, give full answers to the survey questions. Don’t abbreviate words.

All the survey questions were open-ended and required full answers (e.g.: What did you do during the spring break? What would be your dream job? Why?) The participants were told not to stop listening to the lecture after the moderator sent them the text message. They were instructed to write as much as they could while listening to the lecture and to keep on writing until the end of the
lecture. They had to listen to the lecture and answer the survey questions simultaneously (i.e. they were multitasking). The survey was timed to last only 10 minutes so the students would finish writing the survey responses before the end of the lecture. When the lecture was over, the students stopped writing the open-ended responses. The performance in the writing task was measured by the quantity of the written responses to the survey questions. That is, each individual received a final score that corresponded to the number of written characters. The researchers decided to measure writing task performance by counting the number of characters but not words because many of the participants used symbols or emoticons to express their emotions. At the end of the lecture, the participants of the study completed a multiple-choice quiz on the information presented in the lecture. Each individual received a final score that corresponded to the number of correct answers. The higher scores represented better performances.

The study used an experimental research design to test the hypotheses presented earlier. The two treatments were: task (single vs. multi), and social presence (live vs. virtual presenter). All experiments were run in the same computer lab at the same time of the day. There were three experimental groups each consisting of 37-40 participants.

The students signed up for the experiment in advance based on their availability. Then the groups were randomly assigned to the conditions. Condition 1 (labeled “Virtual-presenter group”) was a multi-task / virtual-presenter group (40 participants); Condition 2 (labeled “Live-presenter group”) was a multi-task / live-presenter group (37 participants); Condition 3 (labeled “Single task group”) was a single-task / virtual-presenter group (37 participants).

The first experiment was designed to measure the subjects’ performance under the multi-task / virtual-presenter condition. The 40 participants of condition 1 listened to the previously recorded video lecture on their computers. They were instructed to complete listening and writing tasks simultaneously. The 37 participants of condition 2 listened to the live presentation and wrote messages simultaneously. The presenter was physically present in the room.

During the third condition, 37 participants were assigned to the single-task condition. They listened to the previously recorded lecture on their computers. The students were instructed to complete listening and writing tasks sequentially. They listened to the lecture for 15 minutes. When the lecture was over they were asked to complete a multiple-choice quiz, followed by a 10-minute writing task.

**Task prioritization.** The participants of the study were not instructed which task (listening or writing) was primary and which one was secondary. Immediately after each session, the participant ranked the tasks based on their perceived importance.

**Social presence.** The degree of social presence was measured using the original measure developed and tested by Short et al. (1976). As previously noted, social presence refers to the “degree of salience of the other person in the communication interaction and the consequent salience of the interpersonal relationship” (Short, et al. 1976, p. 65). The social presence measure has been successfully tested in several empirical studies (e.g. Gunawardena & Zittle, 1997; Yoo & Alavi, 2001). A higher score represents a communication interaction with a higher degree of social presence. Four bi-polar scaled items characterized by dimensions such as personal/impersonal, sensitive/insensitive, warm/cold and social/asocial were assessed immediately after the session, using a seven-point semantic differential technique (Osgood, Suci, & Tannenbaum, 1957).

---

1 While 40 participants had agreed to participate, only 37 were present at the time of the experiment.
2 See note above
Results

Single-task vs. Multi-task Condition

The participants of the study completed both listening and writing tasks during the experiment. The collected data were analyzed in terms of how the performances differed across the three conditions (see Table 1). The one-way analysis of variances between all three groups (ANOVA) revealed significant differences in performances on both tasks between all groups (see Table 2).

To determine if multitasking would cause decreased performance levels when compared to individual task performance (Hypothesis 1), the individual performances in the virtual-presenter versus single-task group were analyzed. The participants in both groups listened to the recorded lecture on their computers. The overall performance in the single-task environment was higher than in the multi-task virtual-presenter situation (see Table 1). Hotteling’s two-sample $t$ test for multivariate analysis revealed the significant mean differences in the individual performances in both listening $t(75)=7.63$, $p < .001$ (two-tailed), and writing tasks $t(75)=10.06$, $p < .001$ (two-tailed). The participants of the single-task group scored higher on both tasks.

Table 1  
Individual and Group Performances

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Writing task scores</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtual-presenter group</td>
<td>40</td>
<td>925.55</td>
<td>461.31</td>
<td>148</td>
<td>2107</td>
</tr>
<tr>
<td>Live-presenter group</td>
<td>37</td>
<td>958.81</td>
<td>334.88</td>
<td>171</td>
<td>1676</td>
</tr>
<tr>
<td>Single task group</td>
<td>37</td>
<td>1280.13</td>
<td>519.42</td>
<td>436</td>
<td>2733</td>
</tr>
<tr>
<td>Total</td>
<td>114</td>
<td>1051.43</td>
<td>469.76</td>
<td>148</td>
<td>2733</td>
</tr>
<tr>
<td><strong>Listening task scores</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Virtual-presenter group</td>
<td>40</td>
<td>10.05</td>
<td>2.96</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Live-presenter group</td>
<td>37</td>
<td>10.48</td>
<td>2.62</td>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td>Single task group</td>
<td>37</td>
<td>11.86</td>
<td>2.78</td>
<td>7</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>114</td>
<td>10.78</td>
<td>2.88</td>
<td>4</td>
<td>17</td>
</tr>
</tbody>
</table>
Table 2

One-way ANOVA: Differences in Group Performances

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing task scores</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>286552.04</td>
<td>2</td>
<td>1443276.02</td>
<td>7.27</td>
<td>.001</td>
</tr>
<tr>
<td>Within Groups</td>
<td>2.205E7</td>
<td>111</td>
<td>198646.52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2.494E7</td>
<td>113</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Listening task scores</td>
<td>68.050</td>
<td>2</td>
<td>34.02</td>
<td>4.34</td>
<td>.015</td>
</tr>
<tr>
<td>Between Groups</td>
<td>869.468</td>
<td>111</td>
<td>7.83</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>937.518</td>
<td>113</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The next step of the investigation was to determine whether the individual performances were significantly different between the single-task group and live-presenter group (see Table 1). Hotteling’s two-sample t test also uncovered the considerable mean differences in individual performances in both listening \( t(72)=4.81, p=.03 \) (two-tailed), and writing tasks \( t(72)=10.00, p < .001 \) (two-tailed). The individuals in the single-task group scored higher on both.

The results of these comparisons support Hypothesis 1. Participants who were not multitasking performed better on the listening and writing tasks than their multitasking counterparts.

Task Prioritization and Social Presence

To determine whether the degree of social presence influenced participants’ performance while multitasking (Hypothesis 2), students were asked to: (a) indicate their perception of the task priority by indicating if they considered the listening task to be the primary or secondary task, or if they perceived both tasks as equally important; and (b) evaluate the degree of social presence using the social presence scale (Short et al., 1976). The Chi-square test showed that task prioritization did not differ across the groups \( \chi^2(4, n=114)=4.54, ns. \). As such, Hypothesis 2 was not supported; there were no significant differences in task prioritization between the live-presenter group and virtual-presenter group (see Table 3).
Table 3
Participants’ Perceptions of Task Priority

<table>
<thead>
<tr>
<th>Group</th>
<th>Virtual presenter</th>
<th>Live-presenter</th>
<th>Single task</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Listening task was primary</td>
<td>17</td>
<td>16</td>
<td>23</td>
<td>56</td>
</tr>
<tr>
<td>Listening task was secondary</td>
<td>18</td>
<td>16</td>
<td>9</td>
<td>43</td>
</tr>
<tr>
<td>Both tasks were equally</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>important</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>37</td>
<td>37</td>
<td>114</td>
</tr>
</tbody>
</table>

The four-item social presence scale (Short et al., 1976) was used to measure the degree of social presence during the lecture presentations. For this experiment, the degree of social presence had a mean of 9.92 and standard deviation of 3.84, with an alpha reliability of .82. The item means were found to be 2.48 on the 7-point Likert scale, and item variances of 1.45. Overall, the participants of the study reported a very low degree of social presence during the experiments. The one-way analysis of variances between all three groups (ANOVA) revealed no significant differences in the degree of social presence between all groups ($F(2, 114)=.86, ns.$).

Hypotheses 2a and 2b emphasized whether the difference between task prioritization and the degree of social presence would affect participants’ performance. The $t$-tests did not reveal statistically significant differences between students’ performances on both listening ($t(75)=-.682, ns.$) and writing ($t(75)=-.360, ns.$) tasks in a live-presenter group and virtual-presenter group. Consequently, Hypotheses 2a and 2b were not supported.

**Discussion and Limitations**

The results of the study reveal that multitasking or accomplishing two tasks either simultaneously or in the rapid succession will decrease the overall individual performance outcomes. Therefore, in the university classroom, the amount of learning will likely decrease as a result of students engaging in activities which overlap with the learning process.

Consistent with research by Naveh-Benjamin, Craik, Perretta, and Tonev (2000), it was found that multitasking significantly decreases memory and performance on the listening task. At the same time, it was found that multitasking not only decreases the performance of the listening task but also affects the performance of a writing task. The participants of the single-task group remembered more information from the lecture and were able to produce more written messages than those who were multitasking. The findings provide quite convincing evidence that focusing on one task leads to better performance compared to alternating between two tasks. On the other hand, it took 25 minutes for the participants of the single-task group to complete the assignments while the participants of the multi-task groups completed the same two tasks in 15 minutes. Even though multitasking decreases performance, it still can be viewed as a time-saving strategy.

The researchers hypothesized that in the multitasking environment, the presence of the lecturer (i.e., the degree of social presence) might affect the task prioritization and performance. In the virtual-presenter condition, the participants of the study might consider the listening task as being secondary and the writing task as being the most important. In the live-presenter situation the task prioritization would be different; the individuals would assume that listening was their priority while...
writing was the interfering task. This task prioritization would affect the performance, as the participant would perform better on the writing task in the virtual-presenter condition, and on the listening task in the live-presenter condition.

An examination of how both social presence and task prioritization would influence the overall performance in the multitasking environment suggested that neither social presence nor task prioritization influenced the performance in the multi-task condition. The results of the study are consistent with Gunawardena (1995) and Gunawardena and Zittle (1997) findings that social presence is not largely the attribute of the communication medium but the user’s perception of the medium. In the multitasking environment, the perceived degree of social presence was the same in the virtual- and live-presenter conditions.

This research also did not find evidence that the physical presence of the sender can influence the recipients’ understanding of the message (Miranda & Saunders, 2003). The findings did not support the hypothesis that, in the virtual-presenter condition, it is more likely that specific comments are entirely ignored as individuals are unable to perceive others’ urgency and consequential emotional reactions. The experiment uncovered that the presence of the sender did not affect the performance on the listening or writing tasks.

Although this work did not find the link between social presence and task prioritization in multi-task groups, the majority of participants (62%) of the single-task group indicated that they considered the listening task as their priority, and the writing task as being secondary. The task prioritization was different but not as hypothesized between virtual- and live-presenter condition, rather between single-task and multi-task conditions. The possible explanation of these findings is that multitasking situations usually include uncertainty and unpredictability (Delbridge, 2000). In single-task situations, the individuals are less confused with the task priority.

This project has several limitations. There are limitations in implementing an experimental design. Using a controlled laboratory environment constrains the generalization of the results of this research. Any results from this experiment should be considered in light of group characteristics, message content, technology environment, and context.

A similar limitation involves the use of a convenience sample for this study. The researcher used student participants of similar demographic backgrounds because of the challenge in the nature and execution of the study. The choice of the participants was based on the following factors: (a) the study objective was to see how individuals’ performances change in the multitasking environment; and (b) none of the demographic variables were taken into consideration.

An experimental study of this nature always raises questions related to the Hawthorne effect or “the tendency for people to behave differently when they know they are being studied” (Davis & Shackleton, 1975, p. 55). In the virtual-presenter group, the participants of the study were supposed to listen to the lecture recorded on their computers. The presence of the presenter was hypothesized to influence task prioritization and consequently the task performance. During the experiment in the virtual-presenter condition, the observer was still present in the lab. The presence of the observer might have affected the task prioritization and the participants put the same amount of effort into the listening task as in the live-presenter group. This possibly explains why the performances in virtual and live-presenter conditions did not differ significantly.

Future research should investigate individual performances in the multitasking environment involving participants of different ages. The undergraduate students differ from the general population not only in age, socioeconomic status, and general education level, but also possibly in skills and attitudes towards multitasking. The 18- to 21-year-olds grew up with more technology...
available than, for example, 30-year-olds. The 18- to 21-year-olds may have significantly different multitasking abilities than older generations.

References


