

THE EFFECTS OF MULTITASKING ON INDIVIDUAL'S TASK PERFORMANCE

Dale H. Shao, Marshall University, Huntington, West Virginia, USA
Lawrence P. Shao, Marshall University, Huntington, West Virginia, USA

ABSTRACT:

Multitasking occurs when an individual works on several tasks or uses several electronics devices, simultaneously. Multitasking has become a common part of life for most individuals. With the advent of smart phones, bluetooth technology, IPADs, LCD televisions, etc., and the communication capabilities they provide, workers are spreading themselves thin in the use of their time. This paper discusses the effects of multitasking on the analytical abilities and problem solving skills of individuals. Some believe that multitasking has no effect on the analytical abilities or performance of individuals as they shift their attention back and forth among various tasks. Others do not believe multitasking is really possible, i.e., working on several tasks simultaneously. (Taylor, 2010). These individuals believe that what is occurring in "multitasking" individuals is they are merely jumping back and forth between tasks, and that the result is low quality output and increased stress levels, and that the final outcome could very well be a "burned out" individual. Studies show that those who text while driving are actually more likely to have an accident than a drunk driver. Those who put make up on, talk on the phone, or perform other tasks while driving, are also more likely to have an accident than those who focus solely on their driving. (Hamilton, 2008). Some studies even show that those who multitask eat more than those who simply have a meal. (Hamilton, 2011). Still others believe we are losing our ability to relax, which can result in long term damage to a person's health. (Richtel, June 2010). So, the true value of multitasking has yet to be determined.

Keywords: Multitasking, single tasking, accuracy in performance, productivity in performance, critical thinking, human-computer interaction, performance tradeoffs

1. INTRODUCTION

Students today are being brought up with wired and wireless distractions. (Richtel, November 2010). More and more students have cell phones, smart phones, and video games. They constantly simultaneously use multiple personal electronic devices to do such things as texting and updating their Facebook pages. The result of the constant fight for their attention has resulted in what former Microsoft executive Linda Stone calls "continuous partial attention." (Conley, 2011; Foehr, 2006). A recent development in higher level education is that many college professors observe their students being distracted by wired and wireless devices, while the professor is trying to lecture and attempting to have the students focus on learning or discussing a concept or solving a problem. This has caused some professors to become very frustrated. Some schools now offer the professors an Internet Kill Switch, that allows to professor to cut Internet access. (Young, 2006). This method, of course, is ineffective for those using a smart phone, which has its own Internet access built in.

Studies suggest that current students have a different attention span focus than those in the past. Students are spending more and more time using multiple forms of electronic media while reading and doing their homework (Foehr, 2006) The effect of these various sorts of stimuli on the student, coupled with the fact that the students are simultaneously "absorbing" knowledge or entertainment, from several of these devices at the same time, or multitasking, has caused a deterioration in student performance on individual tasks. (Ophir, et. al., 2009) The opposite of a synergistic affect occurs when students multitask. Research suggests that the amount of total brain activity decreases when several media devices are used simultaneously, i.e., the student does not use as much of their brain on the task that they would use if the tasks had been accomplished separately (Just, Carpenter, Keller, Emery, Zajac, & Thulborn, 2001).

2. CRITICAL THINKING, PROBLEM SOLVING, AND ANALYSIS

Critical thinking would be an obvious measure to use in evaluating the effect of multitasking on problem solving skills. There are a few studies that look at how multitasking affects accuracy, memory, and performance, which are discussed in the next section. Unfortunately, there are few, if any, conceptual or empirical studies that directly deal with the relationship between multitasking and critical thinking. Because of its importance for discussion purposes and long term research in the area of multitasking and performance, critical thinking will be the focus of this section.

Though it is difficult to find a definitive definition of critical thinking it is possible to find the characteristics found in critical thinkers. Critical thinkers can "Identify central issues and assumptions in an argument, recognize important relationships, make correct inferences from data, deduce conclusions from information or data provided, interpret whether conclusions are warranted on the basis of the data given, and evaluate evidence. (Pascarella & Terenzini, 1991).

An expanded version of characteristics of critical thinkers is presented next.

Characteristics of Strong Critical Thinkers Include (Characteristics, 2012):

- inquisitiveness with regard to a wide range of issues
- concern to become and remain well-informed
- alertness to opportunities to use critical thinking
- self-confidence in one's own abilities to reason
- open-mindedness regarding divergent world views
- flexibility in considering alternatives and opinions
- understanding of the opinions of other people
- fair-mindedness in appraising reasoning
- honesty in facing one's own biases, prejudices, stereotypes, or egocentric tendencies
- prudence in suspending, making or altering judgments
- willingness to reconsider and revise views where honest reflection suggests that change is warranted

Critical thinking is not exhaustive in defining problem solving and analysis, but it is a major element to consider in evaluating the effect of multitasking and its affect on problem solving and analysis.

3. A MODEL OF MULTITASKING

Multitasking has become a necessary skill in most jobs. Intelligence is still the most accurate predictor of overall job performance and intelligence affects multitasking capabilities. One value commonly used in measuring performance in multitasking research is Working Memory Capacity (WMC). Working Memory Capacity "is defined by the ability to retain information during short periods of time while performing a concurrent (and interfering) process." (Colom, 2010). Working memory capacity has been shown to be a good predictor of multitasking performance (Hambrick, et. al., 2009, Konig, et.al., 2005, Colom, 2010). Some suggest WMC could be used in the personnel selection process where multitasking is an important requirement in the job. (Colom, 2010). On the other hand, if performance is measured by accuracy, increased levels of multitasking leads to a significant loss in accuracy. (Adler, 2012). This loss in accuracy in performance may be caused by the fact that when performing more than one task simultaneously, we use a smaller total amount of our brain, than if we had focused on one task at a time. This use of our brain causes the worker who multitasks to spend more time completing a job, because the brain wastes time going back and forth between two or more problems and then it must refocus on the current problem. This can result in inefficiencies and decreased productivity. The worker who multitasks usually feels they are more productive, because working on more than one problem at a time gives the illusion the worker is spending less time on each problem. Another byproduct of multitasking is the worker is more easily distracted which results in more errors and more stress, because the worker has increased pressure when they must accomplish complete several tasks simultaneously. (Buser, 2011). In the case where we focus on one task at a time we use more of our brain to address the individual problem than when multitasking.

(Just, 2001). The increased use of our brain on a specific task has benefits, but the one task focus situation is becoming less common in many job situations.

Accuracy and analytical ability are also important in job performance. Multitasking has been shown to reduce productivity and lower the quality of products. Workers who are forced to multitask perform at a lower level when compared to workers who perform tasks sequentially. (Ophir, 2009).

Before multitasking became popular, decision makers used a one task at a time model of problem solving. Figure 1 below illustrates the Single Task Model of Decision Making.

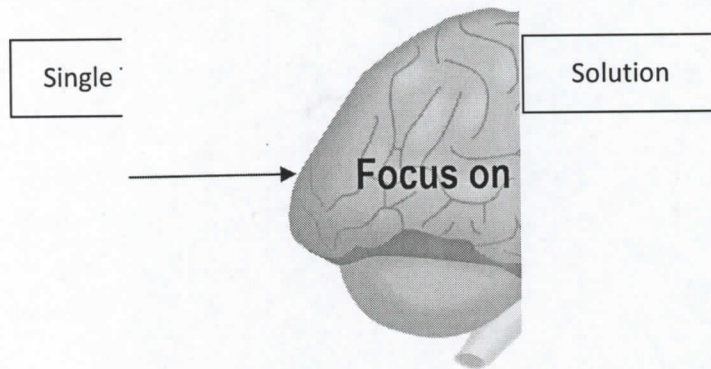


Figure 2 – Single Task Model of Decision Making

The Multitasking Model of Decision Making (see Figure 2 below) occurs when the decision maker is focusing on multiple items simultaneously. The human mind divides the tasks up and assigns different regions of the brain to handle the multiple items. The total capacity taken up by the multiple items that it is working on is much less than the total capacity that would have been utilized if the tasks had been worked on one at a time and with less distractions.

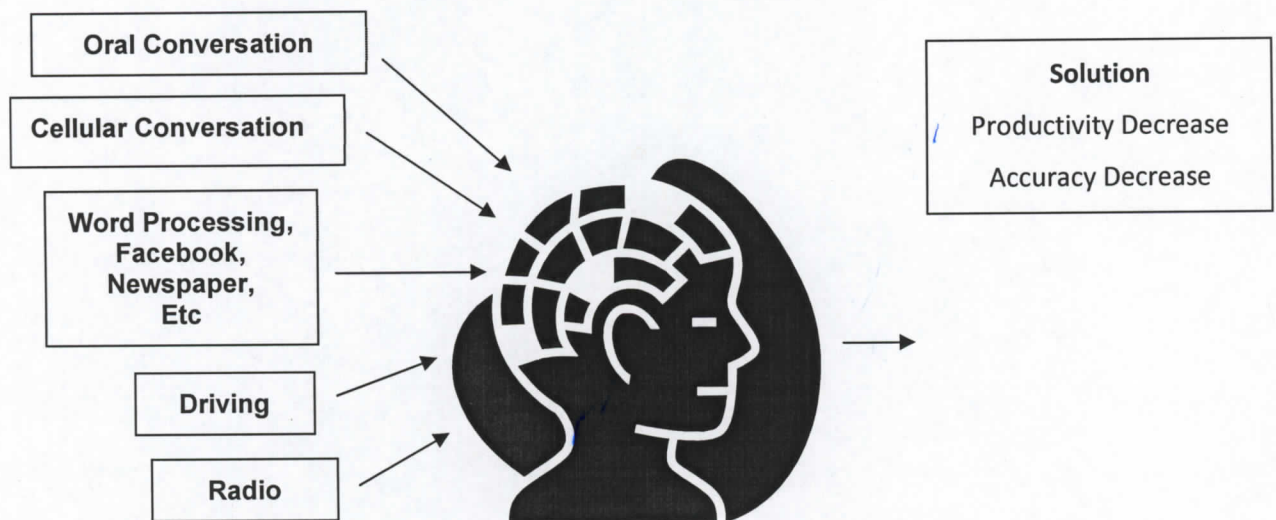


Figure 2 – Multitask Model of Decision Making

4. OVERCOMING MULTITASKING – CURRENT THEORIES

Some studies suggest training can improve performance in situations where multitasking is necessary. (Hambrick, et.al., 2009). One study suggested that an individual working on multiple problems simultaneously (multitasking) can control the allocation of their attention to meet specific performance criteria (Janssen, 2010). As previously mentioned other studies also indicate the accuracy of the individual performing multitasking decreases as multitasking increases (Adler, 2012). It has been suggested that the decrease in focused attention for students, which affects learning and performance, can be counteracted to a certain extent by "testing frequently, reducing unnecessary stimuli, and using multiple, novel instructional methods. (Rekart, 2012).

Methods to Reduce the Negative Effects of Multitasking Include (Rawson, 2010):

- Block off times when you need to multitask – these times should not take up your whole day
- Turn off as many electronic devices as possible to allow you to focus on the task at hand
- Pick blocks of time during the day when you turn off your cell and/or smart phone
- Turn off instant notification alerts
- Don't use a computer to constantly check web sites
- Block off times to relax and/or meditate – isolate yourself during these times
- Exercise – isolate yourself during these times
- Develop a habit of creating times when you are not multitasking

In the past, most individuals were proficient at single tasking. Since the electronic devices necessary to multitask did not exist, most individuals were constantly developing their single tasking skill set. The preceding set of tools should be used as a part of a way of life. Most individuals multitask daily and the increase in multitasking in everyday life will undoubtedly continue to increase. It is still possible that even with the increased presence of multitasking in our lives, some individuals may need extra training in the best way to multitask to maximize their value to an organization. It may be valuable to develop tests to determine the single task and multitask skill sets of each employee. Once an employee's profile for "tasking" has been determined, an individualized training program can be developed for each worker. By strengthening their "tasking" skill sets, the employee will be allowed to reach their full potential, which will maximize their value to the firm.

Achieving a Proper Balance of Single Tasking and Multitasking Skills

If a philosophy of determining the ideal balance between multitasking and single tasking for each worker is followed (see Figure 3) by organizations, the worker should perform well and have a higher level of worker satisfaction. This philosophy also allows the decision maker to maximize the individual's analytical development and performance level, and still develop their skills at multitasking.

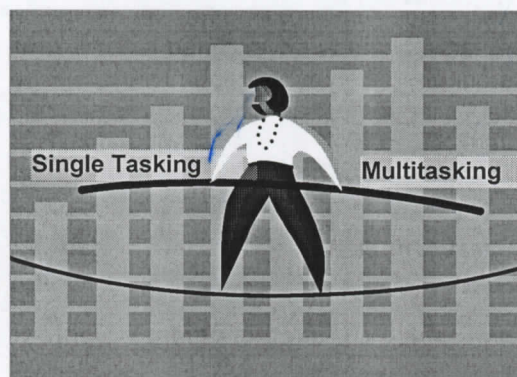


Figure 3 – Balanced Model of Decision Making

Research must be conducted to determine the proper mix of single tasking and multitasking activities. In addition, researchers should try to develop training for those who have weaknesses in single tasking or multitasking. In other words, some individuals need to develop their "other side," if they have weaknesses in either their single tasking or multitasking skill sets.

5. CONCLUSION

If multitasking is necessary, and yet initial studies of multitasking's indicate a negative effect on performance and analytical ability, it would seem prudent to attempt to develop training that might allow multitasking and still develop and improve or maintain a high level of performance and analytical ability for the worker. Individual testing would occur to determine the individual's tasking profile, i.e., is the individual a single tasker or a multitasker. Once this has occurred a unique training regimen would be developed to allow the individual to maximize their potential for the organization. The goals of the training would to balance the individual's ability to handle single and multitasking situations and to maintain and develop the individual to improve their performance and accuracy at their job. Further studies and improved experimental designs should be developed, to attempt to isolate the training that best accomplishes the single task/multitask balance. Multitasking is having a negative affect on decision makers abilities and it is critical a solution to prevent and reverse further deterioration of these abilities be developed before long term damage to these abilities and society can occur.

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AUTHOR PROFILES:

Dr. Dale H. Shao is the H. Paul Kizer Chair of MIS, and is Professor of Management Information Systems at the Lewis College of Business at Marshall University. Dr. Shao has published articles and presented papers relating to management information systems and pedagogical methodology in teaching in the management information systems area.

Dr. Lawrence P. Shao is Professor of Finance at the Lewis College of Business at Marshall University. He has travelled extensively abroad and has lectured in Canada, England, India, Mexico, Taiwan and the Czech Republic. Dr. Shao has authored over thirty five refereed journal articles and books dealing with international business and finance.