

# Multitasking in a Managed Learning Environment

**Abstract:** There is considerable evidence that children and adults are, more than ever before, multitasking within learning environments (both academic and corporate). Although, in some situations this can be beneficial, there is also considerable evidence that it has negative effects in other circumstances. In this paper we consider the problems of multitasking in Virtual Learning Environments, and offer a proposal using a Managed Learning Environment that, we believe, will help to produce more positive outcomes.

## 1 Introduction

In this paper we shall focus on the single issue of students and teachers multitasking. By “multitasking” we certainly mean more than just an operating system that enables users to run more than one application at a time – or students using both Microsoft Word and Paintshop to produce a multimedia document. We encompass the so-called “concurrent” use of multiple computer programs, along with: traditional phoning, Web chats and forums, paging, text messaging, pxting, video swapping, etc. With the increasing availability of wireless connections all these activities are taking on “any time any where” capabilities.

In the first half of the paper we shall describe the results of our Web survey on the prevalence of multitasking, and some of its consequences.

In the third section of the paper we shall describe how Managed Learning Environments (MLEs) enhance Virtual Learning Environments (VLEs). Finally we outline how a Knowledge Management System (KMS) can be adapted to support multitasking within a MLE.

## 2 A Brief Survey of Multitasking Outcomes

Our Web survey showed conflict of interest in the numerous articles on multitasking we reviewed. On the one hand there is widespread belief that multitasking is, or at least should be, “more efficient” than single task approaches. Many online job advertisements explicitly have multitasking skills in their lists of requirements, e.g., “Excellent analytical, multitasking, and communication skills,” required<sup>1</sup>. An article, high on a search engine hit list, is entitled: “Multitasking Is a Must for Media Professional.”<sup>2</sup>

On the other hand, there is considerable evidence, chiefly anecdotal, of problems with multitasking – “Multitasking: An Extreme Sport for the Digital Age”<sup>3</sup> and “Don’t believe the hype: multitasking is for PCs not people.”<sup>4</sup>. Many articles blame increased levels of stress amongst workers to multitasking<sup>5</sup>. Employees complain that their employers expect them to multitask to stress levels – that can create health problems<sup>6</sup>. We empathize with the author who writes: “What some see as a necessary evil, others see as an advantage!”<sup>7</sup>

We also note that there is a widespread assumption that gender<sup>8</sup> and age biases exist but more qualitative research on the subject is needed.

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<sup>1</sup> <http://www.transcitive.com/about/viewitem.asp?REQID=50>

<sup>2</sup> <http://www.destinationkm.com/articles/default.asp?ArticleID=195>

<sup>3</sup> <http://www.mondaymemo.net/030714feature.htm>

<sup>4</sup> <http://www.ivillage.co.uk/print/0,9688,167575,00.html>

<sup>5</sup> [http://www.freep.com/features/living/multi3\\_20030303.htm](http://www.freep.com/features/living/multi3_20030303.htm)

<sup>6</sup> <http://www.hr.duke.edu/train/multitasking.htm>

<sup>7</sup> [http://www.cio.com/archive/031502/hs\\_multitask.html](http://www.cio.com/archive/031502/hs_multitask.html)

<sup>8</sup> <http://www.practicalparent.org.uk/boys.htm>

The University of Michigan's Brain, Cognition and Action Laboratory<sup>10 11</sup>, a widely quoted center for analytical multitasking research, where Professor D. Meyer is quoted as saying:

“Unfortunately, however, except under relatively special circumstances where the tasks are routine, we've had a lot of practice at them, and we're not feeling especially stressed, our executive mental control processes won't be this efficient, and extra time costs in either trying to do two tasks simultaneously, or switching back and forth between one task and another, will arise -- and in some cases, as revealed by our studies, these extra time costs are really extremely large. Percentage-wise, the extra switching costs can be a 25 to 50 percent increase or more in the time taken to complete a task compared to what would be involved if you were only concentrating on that task alone...<sup>12</sup>” See also [Rubinstein et al. 2001].

Finally, given the degree of multitasking that occurs nowadays, we can predict that still more will occur in the near future, particularly when we see the ubiquitous use of “wearable” communication devices such as those described in [Stubenrauch et al. 2003].

### 3 From VLE to MLE

In Virtual Learning Environments (VLEs) multitasking problems are compounded. Many students are over-extending themselves multitasking in an effort to fit both study and outside work into overloaded schedules<sup>13</sup>. At the same time, many teachers are frustrated because E-learning has frequently not met their expectations. In our previous paper: “Why it is Difficult to Introduce e-Learning into Schools And Some New Solutions” [Lennon & Maurer 2003] we based the conclusions given in that paper on three major surveys: from the U.S. [PEW 2003], Europe [Vuorikari 2003], and United Kingdom [Becta 2003]. Summarizing our key findings:

- Governments are spending Megabucks implementing so-called VLEs.
- Educator's expectations of a paradigm shift have rarely been met. Many, if not most, VLEs are little more than data depositories coupled with an email system.
- Teachers frequently feel too over-worked, i.e. with too much multitasking, to shift away from ‘tried and true’ methods of teaching.

Recently there has been considerable slander published on the Web over the “collapse” of the £60m joint English and Welsh e-learning system<sup>14</sup>.

One of the most important points we make in [Lennon & Maurer 2003] is that any VLE should be supported by a first class KM system. In this case the VLE becomes a Managed Learning Environment where not only do common problems have solutions but it is practical for students to also become involved in Managed Discovery Learning.

Although our article focused on elementary schooling a good KM system can provide the following functionality in any higher learning environment: full administrative support, link management, secure read/write access management for groups as well as individuals, avoidance of duplication of work, archived information that can help understand current situations, decreased problems when employees leave, annotation facilities, active documents, which automatically provide answers to students' queries. [Heinrich & Maurer 2000].

Most importantly for our current research, KM systems can generate knowledge automatically: systemic knowledge creation (see Figure 1).

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<sup>9</sup> <http://www.ifpri.org/themes/mp17/gender/news5-2/news52e.htm>

<sup>10</sup> <http://www.umich.edu/~bcalab/multitasking.html>

<sup>11</sup> <http://www.applesforhealth.com/HealthyBusiness/multihealth3.html>

<sup>12</sup> <http://www.umich.edu/~bcalab/documents/meyercnnttranscript.html>

<sup>13</sup> <http://www.uhv.edu/flame/Nov%202002/Multitasking.HTM>

<sup>14</sup> <http://education.guardian.co.uk/elearning/comment/0,10577,1174384,00.html>

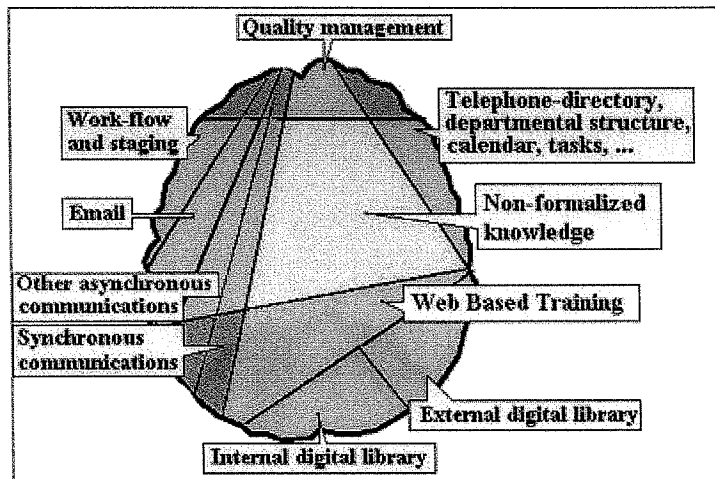


Figure 1: Systemic Knowledge Creation

This automatically generated knowledge, personalized for individual users, can in itself greatly minimize multitask-related stress. However, as we shall demonstrate in the next section, when users want to actively be involved in forums, text messaging, pxtng, video swapping, etc., they may require additional help.

#### 4 Multitasking in MLEs

Consider the following all too familiar scenario. A group of three young college students have to design and implement an interactive multimedia application using Macromedia Director [MacroMind 2000] They can either choose from a given list of topics or decide on something unique (subject to their lecturer's approval.) The implementation period is only a matter of weeks. Being young and keen, they decide to choose their own topic and they are all surprised at how long it takes to agree on a suitable one! They allocate jobs, but agree to all take part in the design process. Unfortunately they are all over-committed: student A has a part-time job, student B is a solo mother, while student C is a soccer player. Trouble soon strikes as first one and then another fail to keep to time schedules. Multitasking, tempers, and stress levels rise and soon the group reaches self-destruction point.

Now consider the options a few years in the future. Here we have a distributed group with more than three members. Problems are compounded – particularly since two group members are professional soccer players and one member works part time at a high-tech job. Unfortunately, the part-time student, who is to write the Lingo code, is forced to multitask almost 24/7 as problems unexpectedly arise with his job. However, the group is now supported by a MLE that, with the students' permission, monitors all, or nearly all, their activities. Before they reach panic point they are free to press the Help! Button.

In this case the core KM system leverages on its management algorithms. It will use the data gained from monitoring each student's activities (work, leisure, chat times etc.) to make intelligent suggestions for better multitasking management. This will take into account factors such as assignment deadlines, task size, and the student's tiredness, as shown by mistakes and slowing down.

Real-time management, integrating data from all members of the group, is a difficult problem, but our proposal is that a good KM system such as Hyperwave [Maurer 1996], could be set up to monitor a limited set of student's activities. If students or teachers feel "overloaded" the system can actively suggest solutions. For example, since complexity, time between interrupts, and familiarity of tasks are key to successful multitasking<sup>15</sup> tasks can be ordered – based on parameters such as these.

<sup>15</sup> <http://www.livingeffectively.com/public/goals.htm>

## 5 Conclusion

In this short paper we have introduced a proposal that leverages the strengths of modern KM systems to help both students and teachers better manage multitasking. We suggest that by monitoring students and teachers activities the system should be able to help by providing active documents and ordering tasks by the degree of complexity, priority, and, who should be doing what when. The system can then offer intelligent suggestions. Best of all, both the students and the system should learn from their mistakes and both should do much better on their next job.

It seems appropriate to conclude with a final quote: "Thus, the three Rs will in time be replaced by the 'three Ms': Multi-Tasking, Materialistics, and Mind Management."<sup>16</sup>

## 6 References

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<sup>16</sup> <http://sll.stanford.edu/projects/tomprof/newtomprof/postings/202.html>