eStudent's Notes: From Classroom To Test

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So, what's in your backpack? The first day of class requires a full backpack of books and a good spiral notebook, if it's 1970, 1990, or 2010. IPad? Laptop? Or Surface? The most efficient way to take notes also requires a good backup. This paper offers a quick look at the recent devices and methods to be an eStudent.

INTRODUCTION

The path for the student can be bumpy and not always clearly marked. A student is constrained or influenced by major, budget, computer skills, and schedule. Working students are tired students. After class tasks that seem routine early in the term become arduous and then incomplete and undone.

"No devices allowed" makes it all seem uphill and the last resort is the minimal pencil and paper. While the process has been described as the best for the student, many students find using a device minimizes the steps in the study process. In particular, once the information is recorded, the job is complete. Some students prefer paper and printed textbooks (Bitters, 2013).

Once the professor says, "Turn it off", the eStudent has basically two choices. Proceed like it's 1980 or use the technology once s/he leaves the classroom. The advantages of a paper world, is the weight of the backpack and no WI-FI hotspot worries.

There is a push toward devices on campus as well as off campus. The Cleveland Browns professional football team has issued tablet computers to the team members. But, also they issued pads of paper. The coaching staff believed that writing things down enhances learning. Good memory is crucial in the game. The head coach said, "To write is to learn," (Clark, 2014). The dialogue and discussion of paper versus device has begun.

HAND NOTES ON A DEVICE

There are several apps which can be used to take handwritten notes on a laptop, iPad, and even a smartphone. Several examples are:

Word

Ink Tools in Word provide a way of marking and writing on a touch screen device like the Surface 3. I could be argued that is the same as the traditional paper and pen technique.

Penultimate

Penultimate is a handwriting app for iPad from Evernote. The pen and paper experience is emulated and the results and be synced with Evernote. Thus, the work is searchable. An example is shown in Fig. 1.

FIGURE 1
RENDERING BY PENULTIMATE

One Note

This is Microsoft's digital app for taking notes by hand. It is free form and results in a digital notebook.

PAPER STRATEGIES

Why take notes? By taking notes our brains connect to the notes, but most importantly the actual content of the notes (Natale, 2012). Moreover, Natale also points out that paper is the ultimate killer app. So, let's look at some observations of using traditional pen and paper.

PowerPoint Slides

Print out before class and take notes. No need to go to class. For the professor, it is a question of teaching style. Is it effective for the student? One study says student achievement increases if s/he carries the PowerPoint slides to class (Chen & Lin, 2014).

Law School

From the Center for Teaching and Learning at Stanford University, hints for a more effective note taking technique is discussed (Chen & Lin, 2014). In this discussion, Glickman lists five reasons to take notes.

1. Notes trigger memories
2. Notes reflect what is important to the professor

3. Inscribe notes kinesthetically
4. Concentrate in class
5. Source for test study material
6. Another source of information not in your textbook

There are several methods briefly discussed:

- The Cornell Method
    - Notes on the right and cue words on the left
- The Outline Method
    - For each sentence or phrase, use a dash on the next line below to list more detailed information below
- The Mapping Method
    - Graphic representation of a lecture. Lines
- The Charting Method
    - Record in column (categories)
- The Sentence Method
    - One thought per numbered line

Visual Thinking

Some methods require paper and pencil, which can be an advantage. "Visual thinking" is natural and lends itself to note taking (Glickman, 2014). One version of visual thinking is sketchnotes, which are visual notes drawn in real time. One must listen, synthesize, and visualize the ideas and concepts and then express them in text and drawing. What's required? Sketchbook and pen. Capture meaningful quotes and key points. Use containers such as quotes, boxes, circles and thought clouds. Connect ideas with lines and arrows to form a "story". Common visual frameworks such as Venn diagrams, 2x2 boxes, and continuums help capture distinct categories. It is suggested that sketches are enhanced by shading and colors. Students need to improvise, capture the important ideas and add what helps make the point. An example of this visual note taking can be found from a research conference (Barman, 2014).
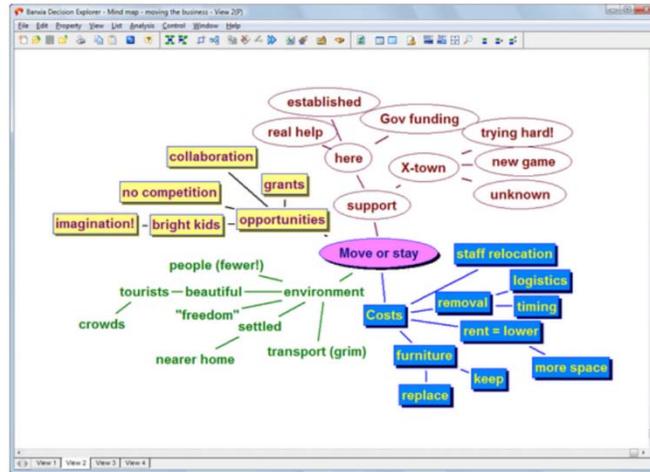
Med-School Note Taking

From actual comments (Bachetti, 2013) it appears that pen and pencil are still favored. Students want flexibility and reliability. Excessive note-taking impedes the ability to concentrate on the class lecture.

The above paper and pen strategies have been shown to be more beneficial than recording, typing on a laptop or tablet. But, where and how does a student manage or store their paper notes? This question leads us to the next section.

Mind Map

Mind maps can be used to generate, visualize, and classify ideas. It has been suggested as a study tool as it organizes lecture information as well as a tool for decision making and problem solving. A mind map can have the appearance of a spider diagram with the central idea being placed in the middle as in Figure 2 ("Ask Slashdot:Best Software", 2013).

FIGURE 2
MIND MAP EXAMPLE

The Truth Functional form conversion algorithm appears in first order logic. It is essentially a string search problem. Given a string S and starting from the left-hand side, look for substrings of the following three forms in Table 1:

TABLE 1

Form	S_i	S_{i+2}	S_j	Length
F1	A or E	R or S or T		4
F2	A or E	Not R,S,T or "("		2
F3	A or E	(	")"	j-i+1

After one pass through S, if F1, F2, or F3 are found assign the substring form a unique letter. Keep track of the substrings and its corresponding unique letter. At the end of the string, substitute substring with its unique letter. If a string S is:

xxxAxRx123mmEyxxxAy(12345)nnEyn

Then the reformulated string becomes: xxxBx123mmCxxxDnnCn . The mind map for this process is below. The diagram in Figure 3 was created using one of a number of free mind map Web site ("What's in a name", 2013).
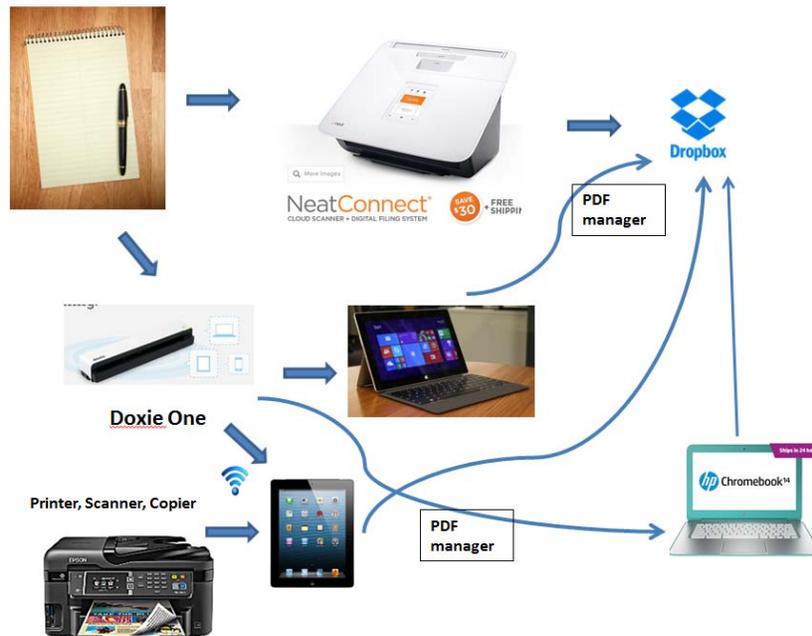
FIGURE 3
MIND MAP

USING DEVICES

On most campuses, one can see students with their laptops, iPads, or smartphones. How can the eStudent incorporate these devices into their note taking routines? If the eStudent above uses paper, how can these loose notes be managed. How secure are our precious notes before the final exam week? The upload process usually requires the conversion to a PDF file and then use of an app residing on the device.

PDF Conversion

One of the PDF conversion devices is the printer/scanner such as ScanSnap Evernote Edition Scanner in Figure 4. It is designed to be used with Evernote. Evernote allows one to scan paper documents, which become searchable, backed-up, and available across a phone, laptop, or iPad.

FIGURE 4

Too much for a student on a budget? Then use a cheaper Doxie One scanner as in Figure 3 in conjunction with the familiar cloud storage facility, DropBox. Note that once the PDF conversion is complete, sometimes an app on an iPad or laptop is required to push the PDF to DropBox.

Lately, cheaper alternatives to be used with a student's smartphone or iPad have arrived. These "stand scanners" offer a way to speed up the picture taking process by almost automating the process. The device

in Figure 5 eliminates the "shaky hand" problem and takes away estimating the correct distance for a clear picture.

FIGURE 5
STANDSCAN

Pictures can be incorporated into PDF's and stored in Evernote. In general, the process in Figure 6 looks like:

FIGURE 6
METHODOLOGY FROM PAPER TO LAPTOP

Dream Scanner

Xcanex (Figure 7) is a camera that can be used to scan papers or books. This device works with hand-written class notes. Scanning is automated. Page detection software detects a new page as one works through a set of pages to be scanned. It also removes any images of fingers as you physically pick up and remove pages from the stack.

Moreover, if scanning a book, the software will "flatten" the book, removing the hump of the binding. It will allow the scanning of odd pages first and then ordering the pages before creation of the PDF. The resulting PDF's are searchable. The software also allows management of pages before creating the PDF. This device could be installed in university open labs.

FIGURE 7

CONCLUSION

Students have the choice of how they take notes in the traditional lecture. iPads are now being distributed in secondary schools as the this is seen as answer to the rising cost of textbooks. On the university campus, professors may or may not allow the use of electronic devices as they may a distraction. Web surfing and email during class are common complaints from current professors.

Some students prefer the traditional paper and pencil method for note taking. Studies can be found that indicate that the old way is the best. Other studies defend the latest technology as part of the eStudent's prerogative for efficiency and accessibility across different devices. Note taking can be taught. The ability to convert paper notes to PDF files and storing them for studying has merit. Student budgets are a significant factor in the decision to adopt a study method.

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