Scheduletastic: Heuristic-based Time Management and Collaboration for Undergraduates

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ABSTRACT
Undergraduate students often have poor time management skills; this poster presents a time management approach specifically designed to meet their needs. Scheduletastic is a Web-based application that pre-populates students' schedules by extracting data from their university's Internet portal, including relevant class rosters and meeting times. The study times generated for each user are matched with those of peers in the same classes through the use of a best-case heuristic algorithm. This approach creates a product that encourages synergy and real-time collaboration, while requiring minimal resource investment by the user.

Author Keywords
Undergraduate, time management, project management, collaborative interaction, scraping, DOM traversal, data extraction, synergy, heuristics, social networking.

ACM Classification Keywords
H.5.3. Group and Organization Interfaces: Computer-Supported Cooperative Work, Asynchronous Interaction. H.5.4. Hypertext/Hypermedia: User Issues.

General Terms
Management, Human Factors, Design

INTRODUCTION
Chickering and Gamson [1] emphasize that both collaborative learning and "time [spent] on task" are necessary to the improvement of both teaching and learning across the university. Hence, methods of assisting students in managing time and working together to achieve synergy are in high demand. Problematically, universities are not providing such methods, and are to some extent unaware that a technological solution may be of use.

Some semblance of time management can be achieved through as simple a device as a pad of paper or a specialized notebook like a Day Minder. These are simple to use and cheap, but they are hampered by their generic nature and paucity of already-inserted data. Furthermore, they can easily become lost, outdated or otherwise forsaken.

A more modern solution might be found in a calendar product such as Apple's iCal or Google's Calendar. These are standardized, general-purpose applications and though they may be functional, they require manual addition of events and manual sharing of calendars between peers. They also offer only limited social networking capabilities.

Scheduletastic addresses these weaknesses and improves on them. Its digital nature ensures connectivity and reliability. Its interaction with university-based data portals allows a young undergraduate student to put forth little up-front effort to enter the community, which increases his or her likelihood of doing so. And finally, Scheduletastic's utilization of social networking principles allows its subscribers to work together concurrently. Students enrolled in a lecture together will study at the same times, thanks to an algorithm that determines the best allotment of the students' time relative to others' schedules.

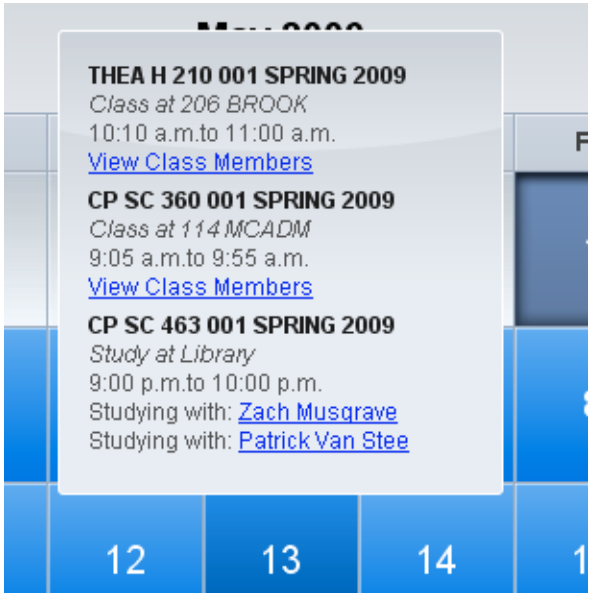

Figure 1. Two students in the same class study together regularly.

Scheduletastic
In order to provide a solution to the vicious cycles of procrastination and inefficient management, we have created a Web application that takes much of the difficulty out of basic time management for the young academic. Our software overcomes more generic offerings by uniting data importing, specialized decision-making, and social networking constructs into one cohesive package. Advantages follow.

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- Data cannot be lost; it is stored securely off-site.
- Little manual input is required; the "barrier to entry" on start is very low.
- Social networking allows synergy to propel student onward into productivity.
- Ease of contact with peers makes hard projects seem doable through collaboration.
- Parameters are customized to the school's conventions and data sources, unlike off-the-shelf solutions.
- Program is accessible worldwide and is independent of platform.

Our philosophy when designing Scheduletastic was to centralize the student's "Game plan for life". By bringing together classes, extracurricular activities, study times, and social activities we hope to make accessible to all a new paradigm of management for the undergraduate student.

Easy Entry

Too often a well-intentioned student will use a paper Day Minder, an electronic organizer, or even an online calendar service at the beginning of a semester, only to quit using it a week later. By pre-populating the calendar with the student's entire academic life, the student is far more likely to continue using Scheduletastic for the entire semester.

This data extraction is customizable to the school in question and may occur through use of a provided application programming interface (API), a Document Object Model (DOM) traversal of a compliant Web interface, or a custom regular expressions parse of a legacy or non-standard format.

Valid student credentials are always necessary to this process, and privacy laws must be kept carefully in mind. If a university sanctions Scheduletastic, its directory photographs may be imported to match the written roster.

Peer-based Collaboration

Students in large lecture halls may not have any close friends with whom they can study. However, having that support network is of great benefit [1]. When a student imports their class schedule into the database, in addition to adding a repeating event to their calendar the application adds references to all their classmates' profiles. This makes getting in contact easy, which is of great use when the student is unsure of a problem's solution or needs clarification on a paper topic. The social aspect of a shared study time may allow a student to make more friends, using that course as a shared bond. Finally, those who study together and help each other often become friends and continue working together in the future.

Heuristic Study Time Generation

Scheduletastic's study time generation wizard first prompts the user to prioritize the list of classes in which he or she is currently enrolled. Since at this point the user's schedule should have only classes and (possibly) extracurricular activities included, prioritizing study times by importance, interest, or some similar factor guarantees that critical classes will have prime study times. By extension, since prime study times will be occupied first in all users' schedules, courses of high priority will have many students studying for them concurrently.

After prioritization, the wizard steps through each class in the list, prompting the user to specify a number of hours per week and a number of sessions per week to devote. At each step, the program's heuristics try to match the student's new study sessions with those of others in the same class. It will succeed in matching study times most frequently with high priority classes, often producing a correlation rate of near 25% of class members who have built their schedules. In informal observations this rate drops in a linear fashion with further iteration.

We consulted various algorithms in developing the wizard [2,3] and determined that an incremental, hybrid approach between event granularity (depth) and equal event prioritization (breadth) allows an optimization of study times per user and a distribution of times per class that allows all users to participate.

Even if the resultant virtual study group is not a daily affair or some of the members' schedules only partially overlap, Scheduletastic still links its users together and enables them to communicate with one another. This concurrency may be reset at the student's whim as the semester goes by and temporal usage patterns change. By allowing this flexibility, we allow the user convenience while not sacrificing efficiency, control, or utility.

CONCLUSIONS AND FUTURE WORK

Selected students have responded very positively to the idea of time management software unique to their needs. Our algorithm has been successful in small-scale trials with a handful of users. Future plans include a pilot program for incoming freshmen across Clemson University. Integration with commonly used social networking platforms, such as Facebook and Twitter, is another future step.

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