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A Literature Survey on Student Task Management, Deadline Reminder and Academic Workload Systems: Toward ClassBuddy

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Abstract: *Students receive assignments, practicals, tests and project deadlines through many different channels, which makes it easy to miss submissions and hard to plan daily work. This paper surveys research on digital systems that help students manage academic tasks, schedules and reminders, and on methods for measuring the workload that technology places on students. Three primary studies are analysed in depth: a Java-based task management and email notification system, a web-based course schedule and task reminder application built with the Waterfall method, and a NASA-TLX study of perceived mental workload. Further studies summarised in the literature are discussed briefly. The works are compared by purpose, technology, features, evaluation method and stated limitations. The survey finds that existing tools handle task entry, priority, scheduling and basic reminders well, but offer limited support for showing how heavy a student's workload is on a given day, for delivering reminders outside the application, and for publishing a task once to a whole class. These gaps motivate ClassBuddy, a student-focused academic task tracker with an Academic Load View and an optional class-sharing module, whose design implications and evaluation plan are outlined*

Keywords: academic workload, deadline reminders, literature survey, NASA-TLX, student productivity, task management, web application

I. INTRODUCTION

Managing academic work is a daily challenge for students. Assignments, practicals, tests and projects are announced in class, in messaging groups or verbally, and many students rely on handwritten notes or phone notes that offer no reminders. Deadlines are then missed, submissions are forgotten and the work of a busy week is planned badly. Digital task management systems have been proposed to address this by gathering tasks, priorities, schedules and reminders in one place [1]–[3].

ClassBuddy is a student-focused academic task and deadline tracker proposed as a final-year project. Before designing it, the team needed to know what existing systems already provide, how they were built and tested, and where they fall short. This paper reports that survey. It concentrates on three primary studies [1]–[3] that were read in full, and it adds a short account of other studies as they are summarised in [3].

The contributions of this paper are: (1) a structured review of three primary studies on task management, schedule and reminder applications, and workload measurement; (2) a comparison of the studies by features, technology, evaluation and limitations; (3) the identification of research gaps in existing student task tools; and (4) the design implications of these findings for ClassBuddy.

The rest of the paper is organised as follows. Section II gives background. Section III explains the survey method. Section IV reviews the studies. Section V compares them. Section VI discusses the gaps. Section VII relates the findings to ClassBuddy. Section VIII lists future directions, and Section IX concludes.

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II. BACKGROUND

The Academic Task Management Problem

A student's academic load is made of different kinds of work: assignments, practicals, tests and projects. Each item belongs to a subject, has a deadline, may be more or less urgent, and is either pending or complete. When this information arrives through several channels it is scattered, and the student has no single view of what is due. Studies summarised in [3] report that web-based task tracking with reminders can improve student productivity and effectiveness [4], that digital reminders in e-learning platforms help users remember academic schedules and reduce delays in completing tasks [5], and that students generally view digital task management systems positively because they support discipline, responsibility and learning efficiency [6].

Common Components of Task and Reminder Systems

The systems reviewed in this paper share a small set of building blocks: a task record (title, subject or course, deadline, priority, status), a way to list and sort tasks, a dashboard summarising what is pending, a reminder mechanism, and a login so that each student sees only their own data. Systems differ mainly in how reminders are delivered, whether tasks can repeat or be divided into subtasks, whether tasks are linked to a timetable, and how they were evaluated.

Measuring Workload with NASA-TLX

Where a system claims to help students plan their workload, it is useful to know how workload can be measured. The NASA Task Load Index (NASA-TLX) is a widely used technique that rates mental demand, physical demand, temporal demand, performance, effort and frustration on a scale from 1 to 20 [2], [7]. Because there are six dimensions, respondents also make fifteen pairwise comparisons to decide which dimension contributed more to the workload; the number of times each dimension is chosen becomes its weight, and the weighted ratings are summed into a single score [2]. Such a score can then be grouped into bands such as low, medium and high.

III. SURVEY METHODOLOGY

Search Strategy

Papers were searched on Google Scholar using keywords such as "student task management system", "academic deadline reminder application", "assignment tracker for students" and "academic workload". Titles and abstracts were screened first, and promising papers were then read in full.

Selection Criteria

A study was included if it (i) described a system, application or method for managing student tasks, schedules or reminders, or (ii) described a validated way of measuring workload in student-facing technology; (iii) was published in a journal, conference or preprint server; and (iv) described its method or evaluation clearly enough to be compared. Opinion articles and commercial product pages were excluded.

Analysis Framework

Each primary study was analysed along five dimensions: purpose, technology, features, evaluation method and stated limitations. Findings were then grouped by theme and compared. At this stage three primary studies were read in full; further studies are included only as they are summarised in [3]. The conclusions of this survey are therefore limited to this evidence, and the survey is intended to grow as more papers are reviewed.

IV. REVIEW OF EXISTING WORK

Task Management and Notification System (Vashishtha et al. [1])

Objective and design. Vashishtha et al. propose a task management and notification system to improve student productivity. It follows a client-server architecture with four modules: task management, priority management, recurring task management and notification. The interface is built in JavaFX, application logic in Java, data in MySQL, and email delivery uses the Java Mail API.

Features. Students can create, edit and delete tasks, set a due date and a priority (High, Medium or Low), divide a task into subtasks shown hierarchically under the parent task, and define daily or weekly recurring tasks. Reminders are sent

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by email, only for tasks that are still pending, and users can set the timing and frequency of reminders. The dashboard lists tasks in a table that can be sorted and searched.

Data structures. The main technical contribution is the choice of data structures: a heap-based priority queue to retrieve the most important task (insertion and deletion in logarithmic time), hash maps for fast lookup by name, a red-black tree map to keep recurring tasks ordered by schedule, and array lists for simple non-recurring tasks. A comparison with ordered linked lists and ordered implicit lists shows that the heap-based queue inserts faster than the linear-time alternatives.

Evaluation. The authors report tests with up to 100,000 tasks, an average email latency of 1.2 seconds with up to 1000 concurrent users, and a self-reported usability score averaging 4.6 on a 1 to 5 scale. They also state that the system scales to 10,000 tasks without critical slowness when compared with common commercial tools.

Critical remarks. The usability result does not report how many students answered, the commercial tools used for comparison are not named, and the task counts quoted for scalability differ between sections (100,000 and 10,000). The authors themselves note that the system has no integration with learning platforms and no real mobile support, and propose personalised suggestions and predictive reminders as future work.

Web-Based Course Schedule and Task Reminder Application (Alamin et al. [3])

Objective and design. Alamin et al. build a web application that joins a course timetable with a to-do list, so that students manage class schedules and assignment deadlines on one platform. Development follows the Waterfall method through requirement analysis, system design, implementation, testing and maintenance. Design artefacts include data flow, entity-relationship, conceptual and physical data models, and a use case diagram.

Data model and features. The database has three related entities. A schedule record stores the course name, lecturer, day, start and end time and room. A task record stores the task name, priority, category, deadline date and time, status and the schedule it belongs to. Each user can have many schedules and tasks, and each task can be linked to a course. Functions include registration and login, adding, editing and deleting schedules and tasks, marking tasks complete, filtering tasks by course, a dashboard summary and a responsive interface for laptops and smartphones. Non-functional requirements are data security, ease of use, responsiveness and efficient data access.

Evaluation. The application was checked with fourteen black-box test scenarios covering valid and invalid login, registration including duplicate emails, schedule and task creation, editing and deletion, status change, filtering by course, logout and responsiveness. All scenarios passed.

Critical remarks. Testing was functional only; no user study, performance test or security test is reported. Although the title mentions reminders, the reminder is shown within the dashboard, and automated email or mobile notifications are listed as future work. The authors also propose a hybrid mobile version and collaborative features such as shared tasks and collective reminders.

Perceived Workload in a Student-Facing Application (Criollo-C et al. [2])

Objective and method. Criollo-C et al. do not study a task manager. They evaluate an immersive virtual reality application (FreeDev) for learning basic programming, and examine both learning gain and perceived workload. Of 80 volunteer university students aged 18 to 19, 60 completed the NASA-TLX survey; 55 were male and 5 female. Participants used the application for about 25 minutes.

Results. The average programming test score rose from 6.0 to 7.9 out of 10, a 19% improvement. Scores were grouped into low (up to 500 points), medium (500 to 1,000) and high (over 1,000) workload. Twenty-eight students (46.67%) were in the low band, 32 (53.33%) in the medium band and none in the high band. Among the six dimensions, performance had the highest mean rating (12.52), followed by mental demand (7.55), temporal demand (6.18), effort (5.85), frustration (3.40) and physical demand (1.00), as shown in Fig. 2. The authors recommend intuitive interfaces, avoiding unnecessary information, gradual introduction, and breaks to limit fatigue.

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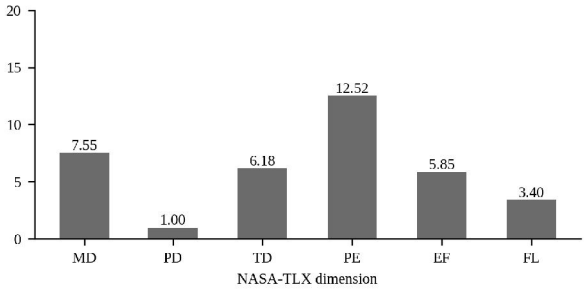


Fig. 2. Mean NASA-TLX ratings (scale 1 to 20) of 60 students, redrawn from the data reported in [2]. MD: mental demand, PD: physical demand, TD: temporal demand, PE: performance, EF: effort, FL: frustration. For PE a higher value means better perceived performance.

Critical remarks. The sample was a convenience sample from a single institution, mostly male, with no control group and with 20 of 80 participants not completing the survey, so the results are indicative rather than general. The paper is relevant here because it shows that workload can be quantified and banded, not because it studies deadlines.

Other Studies Summarised in the Literature

The introduction of [3] summarises further work that is relevant to ClassBuddy; these studies were not read in full for this survey. Indryani and Yahfizham [8] developed a web-based to-do list with the Waterfall method and report better daily task management and more systematic prioritisation. Niesviantika et al. [9] designed an Android activity reminder application with recording of activities, deadline management and automatic notifications. Sepriana et al. [10] studied a web-based learning reminder that lets students manage their learning time independently. Santos et al. [11] report that a Waterfall-developed web system improved administrative efficiency, data transparency and user engagement through automated processes. Fauziyah and Komalasari [12] note the role of centralised data infrastructure in making task applications fast, reliable and secure, and Maulana et al. [13] state that digital schedule reminders improve time management by centralising information. These summaries agree with the primary studies: web delivery, central storage and reminders are the common ingredients, and none of them is described as showing a day-level workload view.

V. COMPARATIVE ANALYSIS

Table I compares the features of the two task-management systems and notes where the workload study applies. Table II compares how each study was evaluated and what limits it.

TABLE I: Feature Comparison of the Reviewed Studies

Feature	[1]	[3]	[2]
Task create / edit	Yes	Yes	N/A
Priority	Yes (3 levels)	Yes	N/A
Subtasks	Yes	Not reported	N/A
Recurring tasks	Yes	Not reported	N/A
Link to subject / course	Not reported	Yes	N/A
Timetable / schedule	No	Yes	N/A
Dashboard	Yes	Yes	N/A
Reminder delivery	Email	In-app; push is future work	N/A
Workload indication	No	No	Yes (NASA-TLX)
Class-level task sharing	No	Future work	N/A
Mobile access	Limited (stated)	Responsive web	VR headset

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TABLE II: Evaluation and Limitations

Study	Evaluation	Key limitation
[1]	Performance tests (up to 100,000 tasks); email latency 1.2 s at 1000 users; usability 4.6/5	Respondents not counted; inconsistent task counts; no learning-platform or real mobile support
[3]	14 black-box test scenarios, all passed	Functional testing only; reminders not automatic; no user study
[2]	60 of 80 students; NASA-TLX; pre-test and post-test (6.0 to 7.9)	Single institution; convenience sample; no control group; not a task tool

Functional Coverage

The two task-management systems cover complementary parts of the problem. The system in [1] is richer in task handling (subtasks, recurrence, three priority levels), whereas [3] is the only one that links tasks to a course timetable. Neither combines all of these with a calendar-style view of deadlines by date.

Reminders

Reminder delivery is the weakest area. In [1] reminders go by email, which reaches the student outside the application but depends on an email account and server. In [3] the reminder is part of the dashboard, so the student must open the application to see it, and automatic notifications are deferred to future work. The studies summarised in [3] mention automatic notifications on Android [9], which suggests that delivery outside the application is a recognised need.

Evaluation Rigour

The evaluations differ widely. Study [3] relies on black-box functional tests, [1] reports performance and a usability rating without full detail, and [2] uses a standard instrument with a clear sample but no control group. None of the task-management studies reports a controlled study showing that students actually missed fewer deadlines.

Workload

Only [2] measures workload, and it does so for a learning application, not for task planning. This shows that a single score and simple bands (low, medium, high) are a workable way to communicate load to users and researchers, an idea that could be carried over to a deadline-based setting.

VI. DISCUSSION AND RESEARCH GAPS

Four gaps emerge from the reviewed work.

G1. Workload visibility. Neither [1] nor [3] tells the student how heavy a particular day or week is. Tasks are listed or sorted, but several deadlines falling on the same day are not summarised as a combined load.

G2. Dependable reminders. Reminders are limited to email [1] or not yet automatic [3]. A student who does not open the application, or the mailbox, can still miss a deadline.

G3. Class-level sharing. Both systems serve an individual. Publishing a task once for a whole class, which is how many academic tasks originate, is only proposed as future work in [3].

G4. Evidence of benefit. Evaluation is mostly functional or performance-based. Evidence from student users, using a standard instrument as in [2], is rare in the task-management studies.

Taken together, the gap is a simple, academic-only tool that links tasks to subjects and deadlines, shows daily academic load, gives timely reminders, supports optional class sharing, and is evaluated with real students, without growing into a full college management system.

VII. IMPLICATIONS FOR CLASSBUDDY

Scope and Objectives

ClassBuddy aims to organise assignments, tests, practicals and projects in one place, provide deadline reminders, and display academic workload and progress in a simple dashboard. It deliberately excludes attendance, fees, notes,

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examination management and library management. These choices follow from G1 to G3 and from the need to keep the project bounded.

System Workflow and Modules

The planned workflow is shown in Fig. 1. A student logs in, adds or receives a task, selects the subject and deadline, and the task is stored in the database. The dashboard and calendar then display it, priority and reminders apply, and marking it complete updates progress. The major modules are user and login management, subject management, task management, deadline and reminder management, dashboard, calendar, progress tracking and an optional class-sharing module.

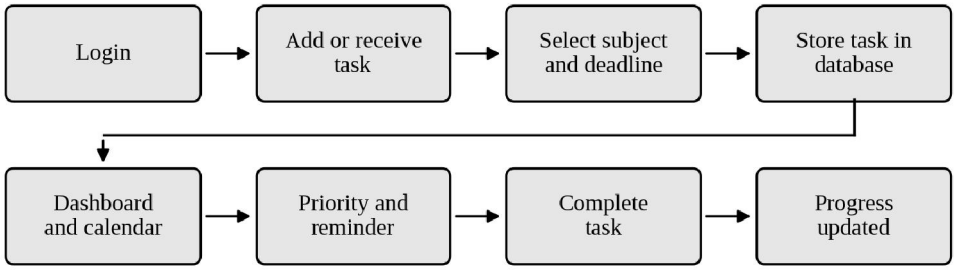


Fig. 1. Proposed ClassBuddy workflow, from login to progress update.

Data and Technology

The database will hold related records for users, subjects and tasks, with each task storing its title, subject, deadline, priority and completion status, similar to the subject-linked design in [3]. The interface will use HTML, CSS and JavaScript, the server side will use Python with a backend framework, and storage will use MySQL or SQLite, with Git and GitHub for version control.

Academic Load View

Inspired by the banding used in [2], the Academic Load View will label each day as light, moderate or heavy. An illustrative rule is to give every task due or in progress on a day a weight of 3, 2 or 1 for High, Medium or Low priority, add the weights, and map the total to a band using thresholds that are calibrated during testing. These weights are a design proposal, not a finding of the reviewed studies, and will be refined with student feedback.

Reminders and Class Sharing

To address G2, reminders will be generated for upcoming and pending tasks, and delivery beyond the dashboard (for example email or mobile notification, as suggested in [1] and [3]) is a design option. To address G3, an optional module will let a teacher or class representative publish an academic task once for the class.

Evaluation Plan

The reviewed studies suggest a three-part evaluation. Functional black-box tests as in [3] will cover login, task creation, deadlines, priority, reminders, completion, calendar and dashboard. A usability rating from student users, with the number of respondents reported, will address the weakness noted in [1]. A short workload questionnaire based on NASA-TLX [2] will check whether the Academic Load View matches how heavy students actually find their days.

VIII. FUTURE RESEARCH DIRECTIONS

The reviewed papers point to several directions. Predictive reminders and personalised suggestions based on task history [1] could help students decide what to do next. Mobile and hybrid versions [1], [3] would make reminders more reachable. Integration with learning platforms [1] and collaborative task features [3] would reduce re-entry of tasks.

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Finally, controlled studies are needed to show that such tools reduce missed deadlines, which none of the reviewed task-management studies demonstrates.

IX. CONCLUSION

This paper surveyed three primary studies, supported by further work summarised in the literature, on student task management, schedule and reminder applications, and workload measurement. Existing systems show that centralising tasks, priorities and deadlines is practical and valued by students, and that workload can be measured and banded. Workload-aware planning, dependable reminders, class-wide task sharing and evidence from student users remain underdeveloped. ClassBuddy aims to address these gaps in a bounded, student-focused system, and its evaluation will combine functional testing, a usability rating and a workload questionnaire. The survey will be extended with additional studies as they are reviewed.

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