Interaction Report: Canvas Navigational Tool Structure Optimization for Higher Education Students

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This study explores the popular higher education learning management system, Canvas. This system's navigation features were investigated in relation to its current usability structures for students pursuing higher education. Canvas is one of several learning management systems (LMS) that higher education institutions can use for their students and faculty. Students and faculty at The University of Alabama in Huntsville (UAH) are required to manage their course information using this system. This research aims to study higher education student tendencies while using Canvas' navigation features to refine its usability structures and to contribute knowledge to e-learning communities. After conducting the study, it was determined that Canvas users' utilization of the navigational tools is marked by concurring positive sentiments regarding specific features but are faced with pain points due to the variety and redundancy of the navigation features.

Methods

Various data collection methods, including observation and self-report methods, were utilized to ensure accurate results. This study relied on these two types of methods in particular because of the ability to cross-reference observed user behavior with self-reported user sentiments and behaviors.

Site Visit (Observation)

A site visit to UAH's campus was conducted to fulfill the observation methods. Morton Hall, the UAH building designated for the College of Arts, Humanities, and Social Sciences, and the Charger Union (student union) were chosen for this visit due to the high volume of

environmental factors and users. The study was conducted on a weekday afternoon at Morton Hall due to the building's large influxes of students on weekday afternoons. Charger Union was visited the same day later in the evening due to the high volume of post-class students. The site visit consisted of conducting user, task, and environmental analyses of students in the building.

User Analysis

The user analysis involved gathering information about Canvas users that may influence their interaction with the software. The data in this study consisted of collecting user demographics to distinguish any potential data discrepancies caused by these factors. Identity-based demographics, such as age, were collected due to their potential influence on product usage. Situational demographics, such as how much experience a user has with Canvas, were collected in order to explain data trends in relation to external demographics that may coincide with product usage.

The overall identity-based demographics for this study included UAH students aged 21-22. The majority of participants were white (75%) and the study's sample included an evenly split gender demographic. The demographics from the sample population were slightly homogenous regarding age and race due to the setting being a predominantly white higher education institution. The identity-based demographics can be found in Table 1. The situation-based demographics (found in Table 2) concluded that 100% of participants had a high amount of technology access outside the University with varying levels of experience using Canvas. The data from the sample population was also comprised of 100% upperclassmen in their third or fourth year of college. In addition, 75% of participants noted they were transfer students that had not previously used Canvas before attending UAH. Therefore, the average user in this study was

a 21-year-old white upperclassman who transferred to UAH and has access to technology outside of campus.

Table 1

Identity Demographics

Demographic	Results (%)
Age	*21-year-olds = 75%* *22-year-olds = 25%*
Race	*White = 75%* *Hispanic/Latino = 25%*
Gender	*Women = 50%* *Men = 50%*

Table 2

Situational Demographics

Demographic	Results (%)
Experience Level	*High = 50%* *Medium = 25%* *Low = 25%*
Year in College	*4th year of college = 50%* *3rd year of college = 50%*
Transfer Status	*Transfer student = 75%* *Non-transfer student = 25%*
Technology Access	*High = 100%* *Medium = 0%* *Low = 0%*

Task Analysis

The study used a think-aloud protocol to collect data for the task analysis section. This protocol relies on asking the users to narrate their thought process throughout every step while interacting with a product. The think-aloud protocol demonstrated how users think about and

navigate Canvas using their decision-making and short-term memory abilities. Because these skills are used when users interact with certain products, the think-aloud protocol aided in determining the direct process of users interacting with the LMS.

The navigation tools on Canvas are located on the left side of a user's screen on the desktop version (Figure 1). There are eight navigation tools that UAH students have access to: account, dashboard, courses, calendar, inbox, history, help, and campus resources. These tools serve as one of the first hierarchical user-structures students encounter while attempting to achieve common academic tasks. The navigation tools can be categorized based on function into five task categories: settings, grades/feedback, assignments, information, and other. Based on these task categories for the Canvas navigation tools, users were asked to complete ten task scenarios while simultaneously narrating their thoughts and feelings about using the LMS.

This study took note of the first navigation tool each participant selected to complete the task's prompt. While all tasks had a heterogenous mix of navigation tool selections, some tasks had more variety than others. Some scenario tasks garnered a majority consensus of which navigation task to select first. For example, when users were asked to adjust notification settings, the majority of the sample (75%) selected the account navigation tool first. However, completing some tasks were not done the same by users and resulted in a heterogenous percentage mix of which tool is associated with certain tasks. When participants were asked to view their current overall grade for one of their courses, 50% selected the courses tool, 25% selected the dashboard tool, and 25% viewed the "grades" features by switching the viewing mode to "list view". The user that utilized the non-navigational feature to view their course grades said, "The grades button [in list view] at the top is the fastest way. In that view you can click [the grades button] at the top." This user was a 21-year-old white transfer student that described himself as having a

high experience level with Canvas. Therefore, differing navigation tools can be used to achieve the same task. The data confirmed this due to the variety of tool selections for all ten tasks, although some tasks had more common navigation features that were utilized by more participants.

Figure 1
Canvas Navigational Tools (on left blue bar)

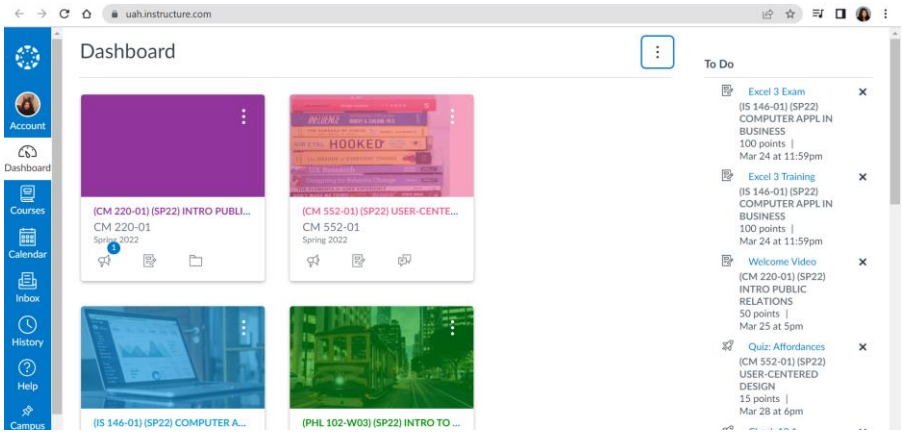

Table 3
Observed Task Categories for Navigation Tools

Task Categories	Prompt for Task	Navigation Tool Used by Participants (%)	Comments
Settings	*Find your account settings and turn off email and push notification settings*	*Account = 75%* *Help = 25%*	*Confusion on sub-structures after selecting account tool from 25% users*
Grades/Feedback	*Find your current overall grade for one of your classes this semester*	*Courses = 50%* *Dashboard = 25%* *Non-Navigation = 25%*	*Non-navigation users selected list view grades*
Grades/feedback	*View feedback from one of your professors on an assignment you turned in this week*	*Courses = 75%* *Dashboard = 25%*	

Assignments	*View one upcoming assignment for one of your classes that is due this week that you have not turned in yet*	*Courses = 50%* *Calendar = 50%*	
Assignments	*View all upcoming assignments for all of your classes this week*	*Calendar = 50%* *Course = 25%* *Dashboard = 25%*	*Dashboard users viewed To-Do List*
Information	*View course material (such as notes, quizzes, lectures, etc…) for one of your courses this semester*	*Courses = 50%* *Dashboard = 50%*	
Information	*Find information and updates about UAH (such as COVID updates, new policies, etc…)*	*Inbox = 50%* *Courses = 50%*	
Other	*Send one of your classmates a message*	*Inbox = 50%* *Courses = 50%*	
Information	*Go to back to the UAH information/updates page you just visited on Canvas*	*Inbox = 50%* *Non-navigation = 50%*	*Inbox users expressed verbal confusion* *Non-navigation users used the browser back button*
Other	*Ask your professor (and other instructors such as a TA) a question for one of your classes this semester*	*Inbox = 75%* *Courses = 25%*	

Environmental Analysis

The environmental analysis for this study involved observing the environment in which the users interacted with a product. This study prioritized visual, auditory, and tactile factors of the users' environment due to their relevance in Morton Hall and the Charger Union. Factors such as noise level, overhead lighting, and usage of flat surfaces have the ability to alter users' navigation of this software. These environmental factors allowed distractions and setting differences to be taken into consideration when analyzing the data. This ensures explanations for any outlier data points that may occur.

The environmental analysis revealed that bright overhead lighting, lower noise volumes, smaller screen sizes, touchpad usage, and Mac laptops were common environmental features at the Morton Hall site visit. In contrast, dimmer overhead lighting, higher noise volumes, bigger screen sizes, and more Windows laptops and touchscreen usage were more common at the Charger Union location. However, both site locations featured bright screens, a mixture of noise types, and devices mounted on flat surfaces. Although there was more potential for distractions at Charger Union due to the auditory factors, the only verbal confirmation of being distracted was in Morton Hall in which another student started talking to the participant during a task. After responding to the other student, the user said, "Sorry, I got distracted" and continued with the task. Despite this interference, she proceeded to complete the task immodesty after. Therefore, the two site visit locations contrast in certain areas, but remain similar in others.

Table 3
Environmental Factors

Sensory Category	Location	Observations
Visual	*Morton Hall*	*Bright lighting* *Bright screens* *Small sized screens, medium sized screens* *Mac laptops*
	Charger Union	*Bright lighting, dim lighting* *Bright screens* *Medium sized screens, large sized screens* *Mac laptops, Windows laptops*
Auditory	*Morton Hall*	*Conversation/object/silent noise* *Low/medium noise volume*
	Charger Union	*Conversational/object/music noise* *Medium/high noise volume*
Tactile	*Morton Hall*	*Devices on flat surface* *Touchpad usage*
	Charger Union	*Devices on flat surface* *Touchpad & touchscreen usage*

Interviews (Self-Report)

This study also utilized self-report methods that involved interviewing users. Informal interviews were conducted to understand how the users perceived their interactions with Canvas. Incorporating this self-report method with the prior observation methods allowed for cross-referencing all the data to gain a more accurate perspective of Canvas users. Informal interviews were chosen as a self-report method to gather a higher volume user insights and sentiments.

The interview data from the participants can be categorized by the users' sentiment tones for each positive and negative question asked. Among all positive-toned questions, one-third of the sample answered that the dashboard tool was their most positive-oriented feature. One user (a Latino transfer student with a medium Canvas experience level) stated, "[The dashboard] is very

well organized in terms of what it's meant to guide you to." The other positive-oriented features in this study included the calendar, course, and inbox tools.

The negative-toned questions had a more heterogenous mixture of navigation sentiments. The inbox feature was associated with negative sentiments by 25% of users, which was the highest proportion of negativity associated with one tool. The other three quarters of negative experiences with navigation tools included a fairly even mix of course, history, account, help, and calendar tools dissatisfaction rates ranging from 8% to 17% of negative user sentiments. This study suggested that the participants have a stronger consensus for which navigation tools are positive rather than negative. This was due to the fewer categories of positive features that had higher percentages of satisfaction compared to the higher amount of negative-toned tool experiences with lower percentage rates.

Users identified pain points regarding the variety of task options on Canvas including the high volume of substructures and specification issues in the navigation bar. One user commented on the difficulty of finding specific items such as assignments on Canvas. When she was asked to describe the most difficult feature to use, she stated, "I wish I could just be able to like type in what I'm searching for [on Canvas]" in reference to finding her assignments easier. Another user explained the overwhelming variety of options to do the same task by saying, "There's just like so many places you can go to find like where [upcoming assignments] were at." This user explained it in context of describing negative experiences with Canvas and mentioned their assignments could be accessed through the calendar, courses, and dashboard.

Although the participants shared negative experiences using Canvas navigation tools, they offered insight into their desires for a better LMS. A user mentioned similar issues to the quotes above and provided a solution he thought would be helpful. In reference to the navigation

tool redundancy and specifications, he said, “[Canvas] could specify a little more in some tabs of what exactly you’re about to click.” He mentioned that some navigation tools were not clear in their function such as the history tool, which was also commented on by other users.

Table 4
Canvas User Sentiments

Tone	Question	Results (%)	Comments
Positive	*Easiest feature*	*Calendar = 50%* *Inbox = 25%* *Dashboard = 25%*	
	Most used feature	*Dashboard = 50%* *Courses= 25%* *Dashboard = 25%*	
	Most enjoyed feature	*Courses = 50%* *Inbox = 25%* *Calendar = 25%*	*All users that enjoyed courses the most specified that they enjoyed the “what-if” grade calculator feature*
Negative	*Hardest feature*	*Courses = 50%* *History = 25%* *Account = 25%*	*Users that indicated courses was the hardest feature to use specified they do not like the upcoming assignments and discussion post features*
	Least used feature	*Help = 25%* *Calendar = 25%* *Inbox = 25%* *History = 25%*	
	Least enjoyed feature	*Inbox = 25%* *Inbox = 25%* *Account = 25%* *N/A = 25%*	*User that least enjoyed the account feature specified the*

			notification options

Walk-Through Interaction

Although there were two different locations where the study took place, protocol structures remained the same for each user. Morton Hall was the first location visited on a weekday afternoon and Charger Union was visited the same day later that evening. Participates were approach based on their engagement levels with their current activity. The users chosen did not appear occupied with a crucial task at the time of being approached and were informed of the study objective prior to participating. Once a user was selected and agreed to participate, they were asked to open their personal device to use Canvas. While the user was opening Canvas, the environmental observation data was collected by selecting previously written features in a paper notebook. Then, the users were asked demographic questions and the results were recorded in the notebook under the demographics section.

Next, the recording of the users' screen was recorded while engaging in the think-aloud protocol for references (the task prompts are listed in Table 3 for reference). A digital document was open with written instructions for each task on a separate page so users could only view one task description at a time to prevent overthinking and planning. After each task, users were instructed the user to go back to the Canvas homepage and were then shown the written prompt for the second task. Clarity was provided if needed. Once all tasks were complete, the video recording of the screen was stopped.

Finally, each user was interviewed informally. They were verbally asked six sentiment-based questions about Canvas' features to cross-reference with the observational data. A voice

recording app was used to have their answers for personal reference. The positive-toned questions consisted of which features were easiest to use, most often used, and enjoyed most. The contrasting questions included which features are were most difficult, least often used, and enjoyed least. Once the user answered all the interview questions, the recording was ended, and analysis began shortly after.

Insights

The general insights gained through this research include important information about the strengths and weaknesses of Canvas' navigation features. The first conclusion that can be made is that there are many routes a user can take to complete the same task, which is a pain point for some users. This argument was determined due to the variety of navigation tools users selected to complete one task and was confirmed by the users' negative-toned interview comments about navigation variety. The second claim this study suggests is that users have diverse opinions about the positive and negative features of Canvas, with more varying opinions about the negative navigation tools. This was concluded due to the heterogenous mixture of satisfaction percentages, with more variety regarding negative attributed questions (Table 4). Finally, the most commonly used navigation tools selected to complete the task prompts were not indicated as being a positive experience for users. This can be seen by comparing the high percentage of navigation tool used by participants (Table 3) with the high percentages of negative attributes associated with the same feature (Table 4), such as the inbox tool. Overall, these three claims about Canvas navigation usability suggest that users have similar positive sentiments with a select number of tools, yet still face pain points regarding the high variety and redundancy of the navigation features.