Phase 2: Create TUT0103 Team 8 March 24, 2024

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#### 1.0 Executive Summary

Phase 2 utilized the user feedback gathered during the *Understand* phase. Upon further analysis, patterns and recurring issues surfaced, shedding light on significant shortcomings on the platform. The shortcomings include value input controls, toolbar design, and activity continuity, aiming to streamline the users' interactions and enhance overall usability. To address these identified shortcomings, the team transitioned into the *Create* phase to design a solution.

The ideation process utilized free thought boards, individual brainstorming, morphological charts, and a SCAMPER technique. Drawing inspiration from established design principles and existing technological platforms, the team generated design alternatives aimed at tackling specific shortcomings within Kritik [1]. Three distinct design alternatives emerged from this iterative process.

The evaluation of these design alternatives was guided by principles of usability, efficiency, and user experience. Using a weighted decision matrix, the team identified strengths and weaknesses in the features to inform the selection of the final proposed design. Since sections of Kritik required different designs to satisfy the need, features from each alternative were combined into the final design.

The culmination of this selection process resulted in the synthesis of features from the three design alternatives into a single comprehensive design. Grounded in user feedback and design principles, this final design primarily showcases manual value input controls, a clearer toolbar design with hover labels, and a streamlined page without transitions. These enhancements elevate the user experience on Kritik's platform, fostering improved usability and user satisfaction.

In summary, this report highlights the importance of iterative refinement, and user-centric design in platform development, further enhancing the user experience for university instruction teams on Kritik.

### 2.1 Phase One Recap

This report will detail the project's *Create* phase and the process moving from understanding Kritik's system to creating a low-fidelity prototype of the final proposed design. By analyzing the data collected in the *Understand* phase, issues that were frequently commented on were identified as shortcomings on Kritik's platform (see Appendix A). With these, the team moved to creating design alternatives that addressed the shortcomings and improved the efficiency of the platform. Then, of the alternate designs, one solution that best met all criteria was selected to be the proposed design. Finally, a low-fidelity prototype of this design was made to be tested and evaluated in the next phase. The idea generation process is covered in Section 2.0, alternate designs presented in Section 3.0, a low-fidelity prototype of the proposed design is shown in Section 4.0, and insight into the team's plans going into the *Evaluate* phase is in Section 5.0.

### 2.2 Addressing HTA Shortcomings

This section outlines the shortcomings in Kritik's platform and the design principles violated.

### 2.2.1 Value input controls

Controls for inputting values are essential parts of user-interface design. To fulfill Kritik's purpose, they should be intuitive and well-suited for instructors, as the project's target user group. As indicated by the results of the questionnaire during the data collection process (see Appendix A), many users found the arrows that increase/decrease values to be too finicky and tedious. These controls require users to click the up/down arrows up to 60 times (see Figure 1). This is an inefficient and inapplicable design which contradicts the Hick-Hyman and Fitts Laws, and violates the principle to make controls accessible. It fails to be easy to understand, and does not consider taking simpler and swifter steps to complete the task [2]. As such, the controls for inputting values do not properly fulfill their purpose.

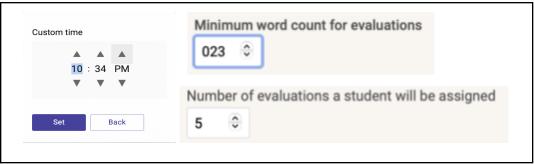


Figure 1. Value input control for time, word count, and number of evaluations [1].

## 2.2.2 Toolbar Design

Icons play a crucial role in user interface design, serving as visual cues that prompt appropriate imagery in the minds of users and convey meaning efficiently [2]. However, this essential function was not evident in task three of the test trial of Kritik's formatting toolbar (see Figure 2). The results showed that many users struggled to understand and utilize the icons in the text boxes found on the 'Create Activity page'. For example, creating a hyperlink took an average time of 3 minutes and 41 seconds, three times longer than any other task (Appendix A). This highlights the need for the toolbar to meet the expectations and associated top-down processing of users [2]. Additionally, Kritik's sole reliance on icons presents an unnecessary risk of misunderstanding. The toolbar fails to utilize redundancy gain [2], which would provide more cues to assist users in linking the icon to its function. Kritik's toolbar design fails to evoke meaningful associations in the mind of the user, so it must be improved in the design alternatives.

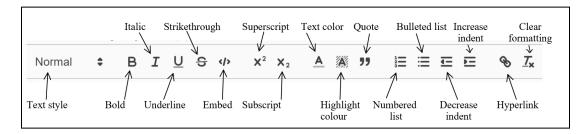


Figure 2. Kritik Toolbar with labels [1].

### 2.2.3 Activity Continuity

Kritik's page transitions and inconsistencies between the Create and Schedule Activity pages were found to negatively impact the users experience on Kritik (see Appendix C). When

transitioning between pages on any website, the user should be able to seamlessly navigate them. As it stands, these processes are complicated, shown by the complex HTA, and pose difficulties for new users (see Appendix C). From comments received during data collection, several participants were overwhelmed by the content on the pages and struggled to find buttons to complete tasks in the walkthrough. These buttons fail to utilize Fitt's Law due to the awkward button size and position and must be made more clear [2]. During the transition between creating and scheduling tasks, participants had difficulty understanding that these tasks must be done on separate pages (see Appendix C). The arrangement of subtasks fails to be clear and is unintuitive to users. As such, the activity page currently violates the Simplify and Structure Task Sequences principle. Some users also noticed inconsistency between the use of icons on the 'Create' and 'Schedule' pages. Since these pages are sequential, this does not adhere to the limit interruptions and distractions attention principle [2]. As this issue was apparent to users, it distracted them from the task at hand and should be resolved in the redesign.



Figure 3. Kritik's current Create and Schedule Activity pages [1].

#### 2.3 Idea Generation Process

The iterative process of generating ideas for UI design is a multifaceted approach adopted to ensure comprehensive exploration and innovation. Beginning with individual brainstorming sessions, team members generated ideas independently. These individual contributions were synthesized through free thought boards (see Appendix A) to integrate diverse perspectives and concepts. Inspiration was drawn from existing technological designs, including Canvas [3] (see Figure 4), and analogies to envision potential UI elements and functionalities (see Appendix A).



Figure 4. Canvas formatting toolbar [3].

Subsequently, a Morph chart was utilized to create five unique solutions to address each shortcoming (see Appendix B). These were selected by consensus, where all team members agreed to the means of resolving each shortcoming.

Using the SCAMPER technique (see Appendix B), the team critically evaluated these combinations against project goals, selecting three alternatives that best aligned with the desired outcomes. The final three (see Section 2.4) include magenta (alternative design 1), blue (alternative design 2), and yellow (alternative design 3). This methodical approach ensured distinct design alternatives that effectively addressed the project's objectives.

### 2.4 Design alternatives

This section outlines three design alternatives developed for Kritik's Create and Schedule Activity pages: value inputs, toolbar design, and activity continuity. Chosen for their comprehensive solutions, each alternative depicts unique alterations aimed to improve the overall teaching team experience.

### 2.4.1 Design Alternative # 1

Table 1 addresses three specific features to address the shortcomings found.

Table 1: Design Alternative 1 Features and Justifications

SC	Feature	How to use	Justification
1	Slider control	Slide thumb shaped white	Make accessible: Used across
	(Figure C1)	button/triangular arrow to select	entire prototype and simple to

		value	use
2	Toolbar with textual labels (Figure C2)	Hover over icons for labels to appear	Redundancy gain principle: Does not solely rely on icons, but has labels as well
3	Toggle/collapse controls alongside activity description (Figure C3)	Click arrow button to expand/minimize content	Resource competition: Minimizes the amount of information on page

# 2.4.2 Design Alternative # 2

Table 2 describes features to remedy the shortcomings outlined in Section 2.2.

Table 2: Design alternative 2 Features and Justifications

SC	Feature	How to use	Justification
1	Clock Input (Figure C4)	Hover over the outer circle to highlight the hours in purple and the inner circle (minutes) in pink. Double tap on the desired number to select it.	Top-down Processing: Resembles an analog clock  Make system state visible: Colour provides the user with information about the state they are in
2	Info button (Figure C5)	Click on the more info button to get labels	Redundancy Gain: Utilizes both labels and symbols
3	Dropdown Scheduling (Figure C6)	Click the arrow on the drop down to get a calendar and time selector via a manual data input. Click "Next" to move to the	Limits Resource Competition: User can focus on the time and

	next Stage and "Reset" to clear.	date selection of one stage at a
		time

# 2.4.3 Design Alternative # 3

Table 3 introduces three new changes to address the shortcomings presented in Section 2.2.

Table 3: Design Alternative 3 Features and Justifications

SC	Feature	How to use	Justification
1	A scrolling dropdown menu of preset values and the option to manually type inputs for custom values (Figure C7)	Presets for each hour of the day can be chosen in a scrollable dropdown menu  Type in the input boxes or use the arrows provided from the original design to set custom times	Hick Hyman Law, Minimize Resource Competition: Scrolling dropdown only displays fixed number of options at a time to avoid overloading screen [2]
2	A sample of each button and its effect on text is provided (Figure C8)	Click "See Sample" and a pop-up with an example of each buttons effect will be displayed	Knowledge in the World Principle: Information availability helps give instruction for the icons [2]
3	"Schedule Activity" button on Create page (Figure C9)	Click button at the bottom of the Create page to go straight to the scheduled activity page	Limit interruptions/distractions and Simplify and Structure Task Sequences: Reduces the potential for distractions before user can schedule the activity and makes transition more straightforward

## 2.4.4 Selecting the Final Design

To select the final design, a Weighted Decision Matrix was used to compare each design (see Appendix D). Since the designs were similarly scored, features from each were combined into the final design.

## 2.4.5 Final Low-Fidelity Prototype

The final proposed design will improve usability and overall interface experience for all users. Table 4 and Figure 5 depicts the features and corresponding justification of the design. For more detailed views see Appendix D.

Table 4: Features and corresponding shortcomings of the final proposed prototype.

SC	Features	Design Principle Justification & Notes
1	Having manual inputs and big +/- buttons	Hick Hyman Law [2]: Provides a fixed selection with increased degree of customization
2	Hover for icon label descriptions in the toolbar	Redundancy Gain [2]: Features icons and labels
3	Toggle/collapse buttons	Resource Competition [2]: Minimizes the amount of information on the page
	More visible "Create Activity" button	Fitt's Law [2]: Large button close to heading increases ease of use
	Compact schedule timeline selector to see the various stages of activity completion	Be Consistent [2]: Ensures a familiar experience, leverages existing knowledge of calendars  Simplify and Structure Task Sequences [2]:
		Integrates the scheduling page with the creation interface

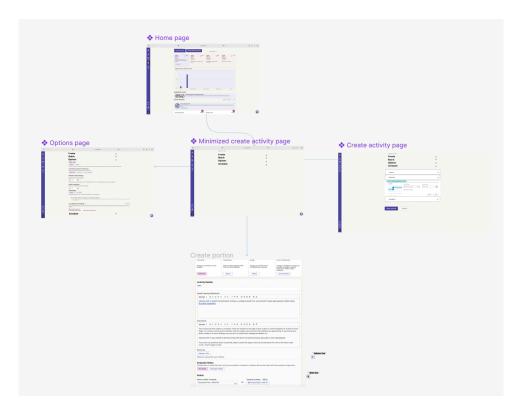


Figure 5. Overview of Proposed Prototype.

#### 3.0 Conclusion

In the *Create* phase, the team addressed Kritik's platform shortcomings through three design alternatives: the value input controls, the toolbar design, and the activity continuity. Throughout the ideation process, the human factors principles related to each shortcoming was carefully considered. This part of the process consisted of creation and evaluation of a free thought brainstorm and Morph chart to create five alternatives. Then, using a SCAMPER technique, the team selected contenders to make wireframe prototypes for alternative designs. Finally, a weighted decision matrix was used to finalize the proposed design, prioritizing user feedback for further enhancements. Our next steps in the *Evaluation* phase include user testing evaluations, analysis of the data, and reporting the findings to justify the changes made to the Kritik creation pages.

## 4.0 References

- [1] "Kritik App," Kritik, Available: <a href="https://ca.kritik.io/">https://ca.kritik.io/</a>. (Accessed Feb. 23, 2024).
- [2] J. D. Lee, C. D. Wickens, Y. Liu, L. N. Boyle, *Designing for People: An Introduction to Human Factors Engineering*, 3rd ed., CreateSpace, 2017. [Online]. Available: <a href="https://www.researchgate.net/publication/319402797">https://www.researchgate.net/publication/319402797</a> Designing for People An introduction to human factors engineering. (Accessed Feb. 23, 2024).
- [3] Quercus rich content editor. Centre for Teaching Support & Innovation, Jan. 20, 2023.

  [Online]. Available: <a href="https://teaching.utoronto.ca/tool-guides/quercus-rich-content-editor/">https://teaching.utoronto.ca/tool-guides/quercus-rich-content-editor/</a>.

  (Accessed Mar. 8).

## 5.0 Appendices

Appendix A: Phase 1 Recap

This section contains visuals for the Create phase.

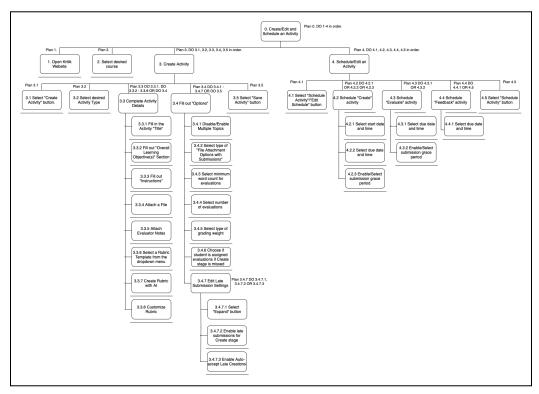


Figure A1. HTA in graphical form. An image with higher resolution can be found here.

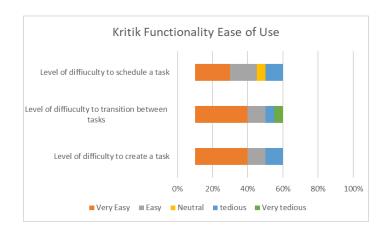


Figure A2. Ease of Use Survey Results



Figure A3: Data Observations example

The platform is very intuitive so minimal instruction is required to create an activity independently.

easy to use and understand

would appreciate a video demo at the begin to go through the process.

Pretty intuitive

confusing, objective is okay but everything after was really confusing

very straight forward

It is not too bad.

Instructions could be a little clearer

I felt that I had to use a lot of brainpower to take in everything on the page.

Creating an assignment was pretty simple.

Figure A3. Questionnaire responses to a question about participants' thoughts on activity creation

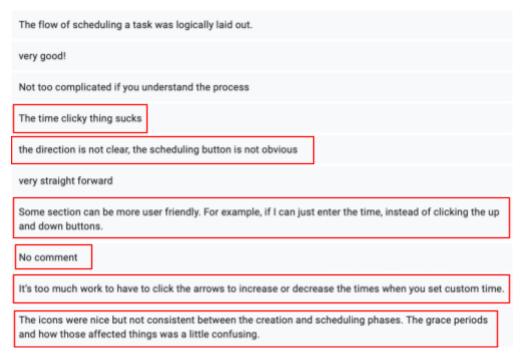


Figure A4. Questionnaire responses to a question about participants' thoughts on activity scheduling.

Very intuitive experience and thoughtful user experience.
Depending on the purpose, this software may still need a lot improving such as approval workflows
It's helpful for the teaching stuff to create and schedule their tasks.
The time clicky thing sucks
not a good tool
Great !
I guess it can be better.
Straightforward and easy to use once explained. The time setting dialogs were unwieldy.
The pages are too busy and there's too much information on the page, it's really distracting and the instructions aren't clear enough
I am not a professor and so do not know any comparable programs and software that might be alternatives to this.
Figure A5. Questionnaire responses to a question about participants' overall experience
The platform is very intuitive so minimal instruction is required to create an activity independently.
easy to use and understand
would appreciate a video demo at the begin to go through the process.
Pretty intuitive
confusing, objective is okay but everything after was really confusing

Figure A6. Questionnaire responses

I felt that I had to use a lot of brainpower to take in everything on the page.

Table A1: Time in minutes to complete each task

Instructions could be a little clearer

Creating an assignment was pretty simple.

very straight forward

It is not too bad.

	Create					transition	schedi	ule		
Task #	1	2	3	4	5	6	7	8	9	Total
001	0:18	0:20	4:20	0:30	0:18	0:10	0:45	0:16	0:06	7:03
002	0:20	0:20	3:09	0:15	0:10	0:13	0:30	0:30	0:18	4:58
003	0:15	0:28	1:30	0:22	0:24	0:04	0:23	0:15	0:01	3:42
004	0:23	0:17	3:09	0:17	0:08	0:15	0:30	0:30	0:15	4:57
005	1:00	1:00	5:40	0:08	3:16	0:56	1:00	0:28	0:23	13:40
006	0:45	0:30	5:57	0:43	0:57	0:06	2:13	2:08	0:11	13:28
007	0:15	0:18	1:40	0:23	0:23	0:03	0:22	0:16	0:09	3:48
008	1:00	1:00	5:40	0:08	3:16	0:50	1:00	0:28	0:26	13:43
009	0:15	0:28	1:30	0:22	0:24	0:04	0:19	0:19	0:14	3:55
010	0:13	0:25	4:22	0:28	0:18	0:09	0:45	0:16	0:03	6:59

Appendix B: Idea Generation

This appendix highlights the different processes used in ideation.

Table B.1 Technological Analogy

Technologi	ical Analogy (eg. drawing from nature)
Value input controls	<ul> <li>Getting time value inputs by dragging a pointer throughout a pictogram of a 24 hour day for one specific time</li> <li>Having a physical click button that adds one to the value every time it is clicked, similar to a mouse, but only for this one purpose</li> <li>Type into a text box for values like how user fills out a data entry form</li> <li>User uploads a .txt file of the number of words or minutes or hours (depending on which value input)</li> </ul>
Toolbar design	<ul> <li>Have a toolbox like a graphic similar to an actual toolbox and a search entry next to it. User can search for the function they want, and it will pop out of the toolbox</li> <li>Make the toolbar look like a control panel/command center and have little text boxes of what it does right above it</li> </ul>

- Have a character graphic wear a utility belt and you can chat with it and tell it what kind of function you'd like to do/have and the character will give you the correct function
   Organize like a paint palette, similar functions in similar areas like similar paint colours are placed is the same areas
   Slider for numbers from 1 to infinity (for words), 1-12/24 (for hours), 1-60 (for minutes) for users to select the number they want. The true number is shown next to the slider.
   Filling out the entire page as though they are signing up for something on Google Forms
  - Fill out like a feedback form
  - Like how a book has a table of contents page at the beginning, the create page can have a page of links to the various sections and clicking on it, takes the user directly to the page they'd like and there's a sticky menu at the top of the page so user can go back to it, and click the section of the page they'd like to go to
  - Have auto save

### Appendix B: Idea Generation

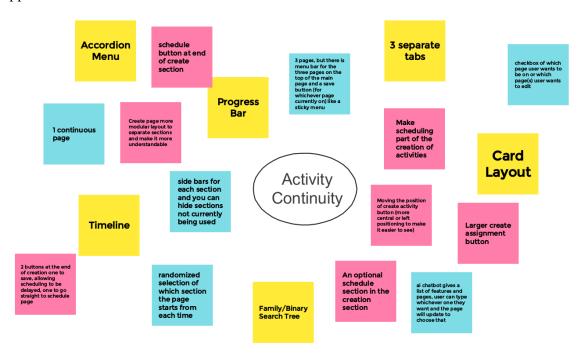


Figure B1. Free Thought Activity Continuity

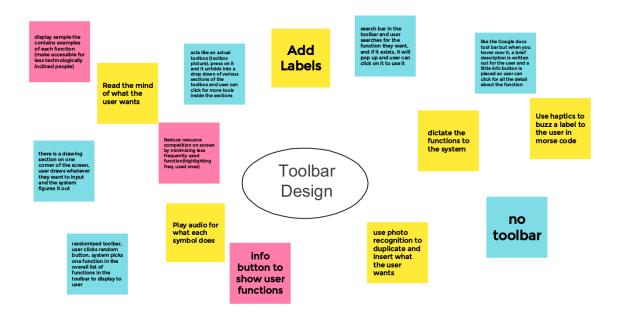


Figure B2. Free Thought Toolbar Design

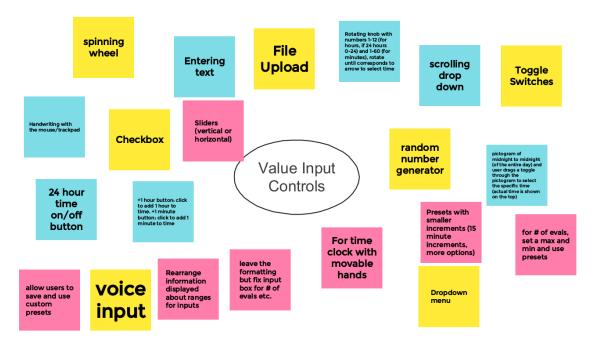


Figure B3. Free Thought Value Input Control

Shortcomings	Value input controls	Toolbar Design	Activity continuity
	Spinning wheel	Read the user's mind	Accordion Menu
	Checkbox	Display a sample	3 separate tabs
	Voice input	Randomize button that chooses for the user	Family/Binary Search Tree
	File upload	Draw what the user wants and use AI to duplicate	2 buttons at the end of creation one to save, allowing scheduling to be delayed, one to go straight to schedule page
	Pictogram of midnight to midnight (of the entire day) and user drags a toggle through the pictogram to select the specific time (actual time is shown on the top)	acts like an actual toolbox (toolbox picture), press on it and it unfolds into a drop down of various sections of the toolbox and user can click for more tools inside the sections	Card Layout
	24 hour time on/off button	Reduce resource competition on screen by minimizing less frequently used function(highlighting freq. used ones)	Create page more modular layout to separate sections and make it more understandable
	Toggle switches	Play audio for what each symbol does	side bars for each section and you can hide sections not currently being used
	Scrolling Dropdown menu in addition to entering text	Hover over to see Labels and shortcuts	randomized selection of which section the page starts from each time
	Rearrange information displayed about ranges for inputs	no toolbar	Progress Bar
Means	Sliders (vertical or horizontal)	search bar in the toolbar and user searches for the function they want, and if it exists, it will pop up and user can click on it to use it	Timeline
	Leave the formatting but fix input box for # of evals. etc	dictate the functions to the system	continuous page
	Rotating knob with numbers 1-12 (for hours, if 24 hours 0-24) and 1-60 (for minutes), rotate until corresponds to arrow to select time	use photo recognition to duplicate and insert what the user wants	Make scheduling part of the creation of activities
	Presets with smaller increments (15 minute increments, more options)	dictate the functions to the system	Moving the position of create activity button (more central or left positioning to make it easier to see)
	Allow users to save and use custom presets	info button to show user functions	An optional schedule section in the creation section
	Handwriting with the mouse/trackpad	Use haptics to buzz a label to the user in morse code	checkbox of which page user wants to be on or which page(s) user wants to edit
	clock with movable hands		Schedule tab
	For # of evals, set a max and min and use presets		Larger create assignment button
	Plus and minus buttons that are large		ai chatbot gives a list of features and pages, user can type whichever one they want and the page will update to choose that
	Random number generator		

Figure B4. Morphological Chart

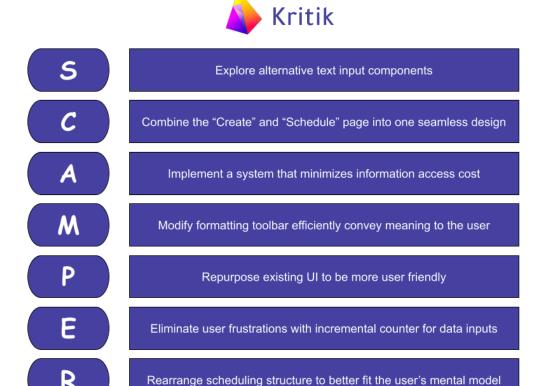


Figure B5. Scamper Technique

## Appendix C: Design Alternatives

This section showcases the alternative designs that were proposed.



Figure C1. Left: Slider control for number of words/evaluations. Right: Slider control for time.

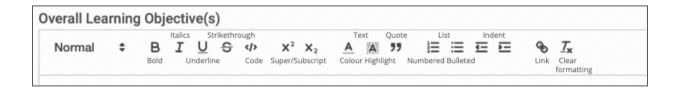


Figure C2. Toolbar design with labels that would appear if the user hovered over each one.



Figure C3. Toggle/collapse buttons for each section of the activity continuation.

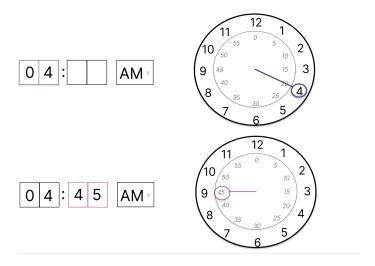


Figure C4. Clock Input

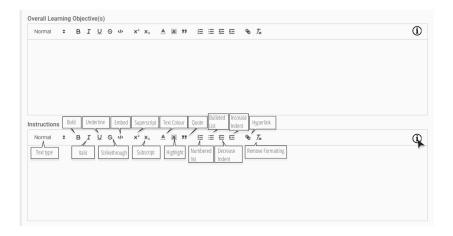


Figure C5. Info Button

## Schedule

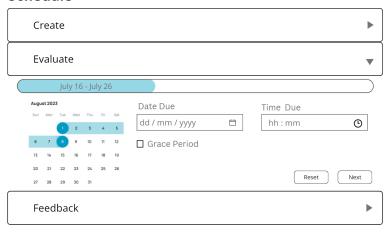


Figure C6. Dropdown Scheduling



Figure C7. Date and time scheduling for each phase

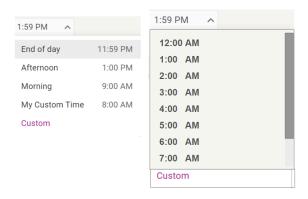


Figure C8. Old vs new dropdown designs

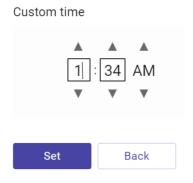


Figure C9. Alternate #3 value inputting control



Figure C10. Access to sample texts



Figure C11. Example of samples for function

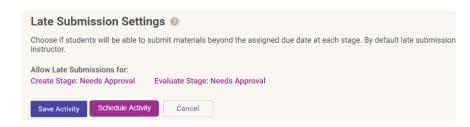


Figure C12. Bottom of create activity page with schedule activity button

## **Appendix D: Proposed Design**

This section shows the final design selection and more detailed photos of the final low-fidelity prototype.

Table D1: Weighted Decision Matrix

*Inputs from [-3,3]	Weighting	Current Platform	Alternative #1	Alternative #2	Alternative #3
Shortcoming #1	0.4	0	1	1	2
Shortcoming #2	0.2	2	3	2	2

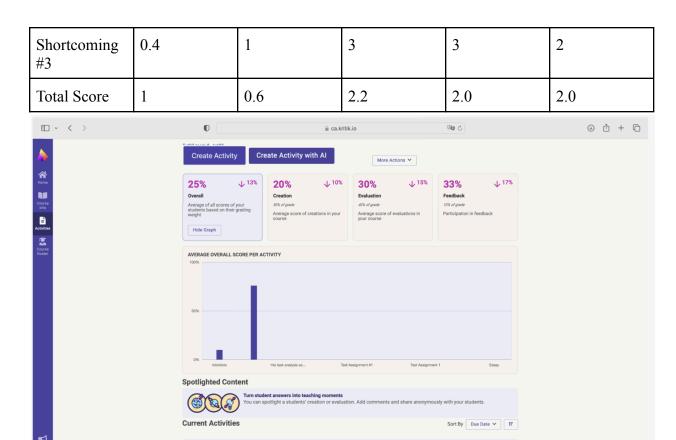


Fig D1. Proposed Activity Homepage

Pending Working Chair

∠ Learn more

Test Assignment #1

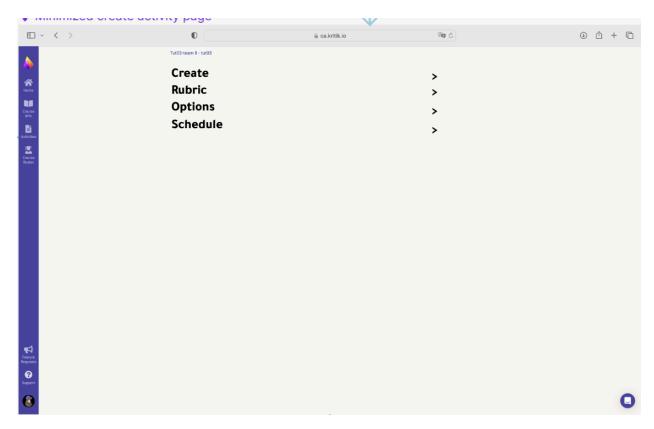


Fig D2. Proposed Create page

iluiviuuai	Galibration	Group	Live Fresentation
ssign an activity to each tudent	Align student grading with how you would grade	Assign an activity to be completed as a group	Assign a student or a group to present a creation during class time while others evaluate
Selected	Select	Select	Join the beta!
Activity Details			
overall Learning Objective(s)			
Normal + B I U +	⟨→ X² X₂ <u>A</u> <u>M</u> 33       □   □   □   □   □   □   □   □   □	≣ Œ Œ % <i>Τ</i> ×	
actructions			
		= E	
Normal * B I U S  This activity has three stage stage. You will also receive phone number in Account S  INSTRUCTOR TO ADD SPEC	email reminders when the stag ettings, you can opt in to receiv EIFIC INSTRUCTIONS FOR WHA bout using Kritik, please contact	dule to the right of your screen to n es open and when the deadlines ar	THE ASSIGNMENT.
Normal * B I U S  This activity has three stage stage. You will also receive phone number in Account S  INSTRUCTOR TO ADD SPEC	es to complete. Check the scher email reminders when the stag ettings, you can opt in to receiv EIFIC INSTRUCTIONS FOR WHA bout using Kritik, please contact	dule to the right of your screen to ness open and when the deadlines are etext message reminders, too.	e approaching. If you provide your THE ASSIGNMENT.
Normal * B I U S  This activity has three stage stage. You will also receive phone number in Account S  INSTRUCTOR TO ADD SPECT If you have any questions as corner. They're happy to held the sesources  Attach a File	es to complete. Check the scheremail reminders when the stagettings, you can opt in to receive IFIC INSTRUCTIONS FOR WHA about using Kritik, please contact.	dule to the right of your screen to ness open and when the deadlines are etext message reminders, too.	e approaching. If you provide your THE ASSIGNMENT.
Normal * B I U S  This activity has three stage stage. You will also receive phone number in Account S  INSTRUCTOR TO ADD SPECT If you have any questions as comer. They're happy to held the sesources  Attach a File  Maximum upload file size is 2	es to complete. Check the sche email reminders when the stag ettings, you can opt in to receiv EIFIC INSTRUCTIONS FOR WHA bout using Kritik, please contact pl	dule to the right of your screen to ness open and when the deadlines are etext message reminders, too.	e approaching. If you provide your THE ASSIGNMENT. The live chat in the bottom right
Normal * B I U S  This activity has three stage stage. You will also receive phone number in Account S  INSTRUCTOR TO ADD SPECT of you have any questions as corner. They're happy to held the sesources  Attach a File Maximum upload file size is 2  Evaluator Notes include notes or attach files the No Notes Evaluator Notes	es to complete. Check the sche email reminders when the stag ettings, you can opt in to receiv EIFIC INSTRUCTIONS FOR WHA bout using Kritik, please contact pl	dule to the right of your screen to nees open and when the deadlines are text message reminders, too.  T STUDENTS SHOULD INCLUDE IN the Support team by accessing the	e approaching. If you provide your THE ASSIGNMENT. The live chat in the bottom right
This activity has three stage stage. You will also receive phone number in Account S  INSTRUCTOR TO ADD SPECT of you have any questions as corner. They're happy to hele the stage of the s	es to complete. Check the sche email reminders when the stag ettings, you can opt in to receiv EIFIC INSTRUCTIONS FOR WHA bout using Kritik, please contact pl	dule to the right of your screen to nees open and when the deadlines are text message reminders, too.  T STUDENTS SHOULD INCLUDE IN the Support team by accessing the	e approaching. If you provide your THE ASSIGNMENT. The live chat in the bottom right

Fig D3. Activity Details Section

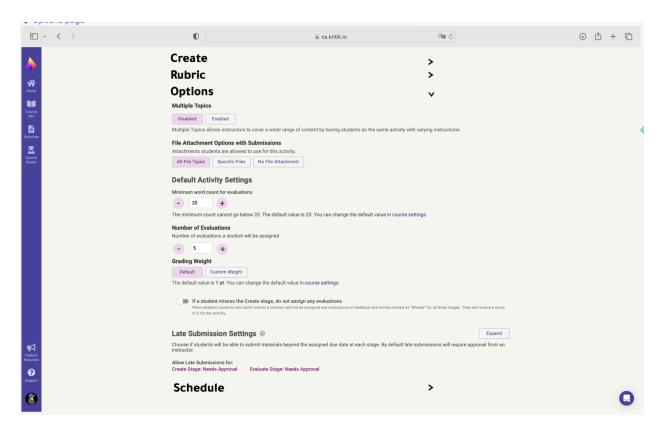


Fig D4. Proposed Options section

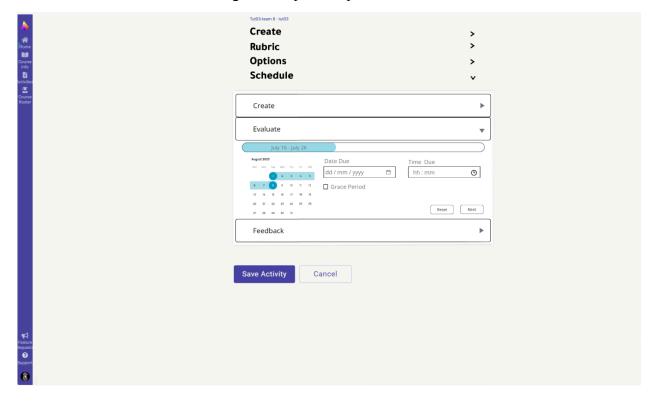


Fig D5. Schedule section