Appendix E: Stage One User Testing Report

Introduction

On April 29 and April 30, user testing was conducted with the team's three primary mockups to assess each design concept's fulfillment of gift wrappers' and gift receivers' wrapping material requirements. Each testing session consisted of hands-on demonstrations and follow-up interview questions meant to evaluate each mockup's usability, reusability, and satisfaction of gift giving's emotional elements. The feedback received from the test subjects was intended to aid the team in deciding which design concepts should be pursued further and the improvements needed for the designs to meet the project's requirements.

Methodology

Five user tests were conducted, each with an individual test subject and lasting approximately 15 minutes. Three of the test subjects (test subjects #1, #2, and #3) were students of college age and two were adults between 40 and 60 years of age (test subjects #4 and #5). Users from both age ranges were included to diversify the perspectives received through testing. The tests made use of the team's three primary design concept mockups, which were constructed by all four team members on April 27.

The team's first design mockup, the "Picture Box," consists of a cardboard box with pockets on its four sides where customizable side panels may be placed (Figure E1). When the top of the design is removed, slots are uncovered that allow for the insertion of the panel (Figures E2 and E3). A top panel is used to close the box, simultaneously covering both the main cavity where the gift is stored and the four slots for the side panels. The top panel is secured by three sets of velcro patches, and detaching the velcro and sliding the top panel out reveals the inside gift (Figures E4 and E5).

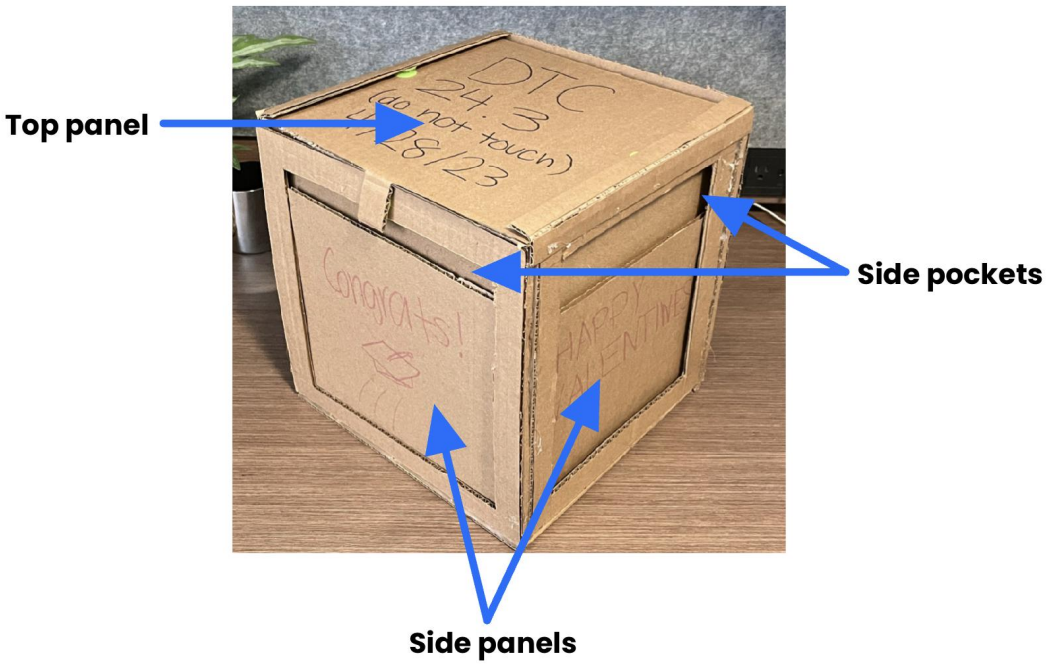

Figure E1: The Picture Box mockup in its wrapped state.

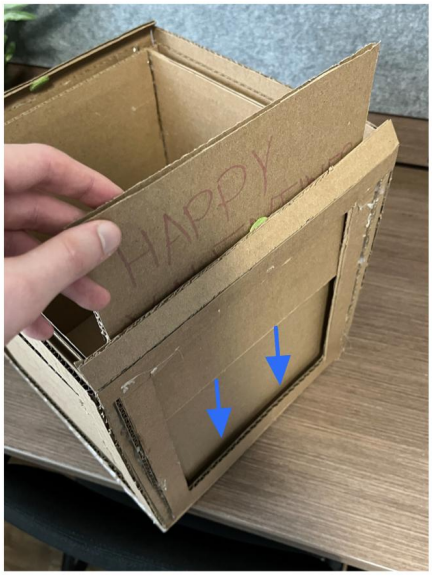

Figure E2: A side panel being placed into the Picture Box.

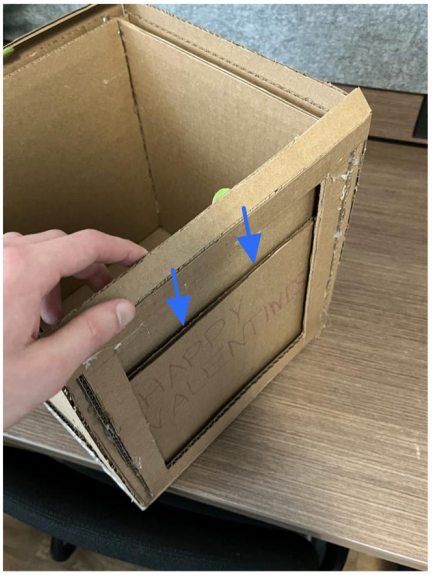

Figure E3: A side panel fully placed into the Picture Box.

Figure E4: The Picture Box's top panel being pulled out.

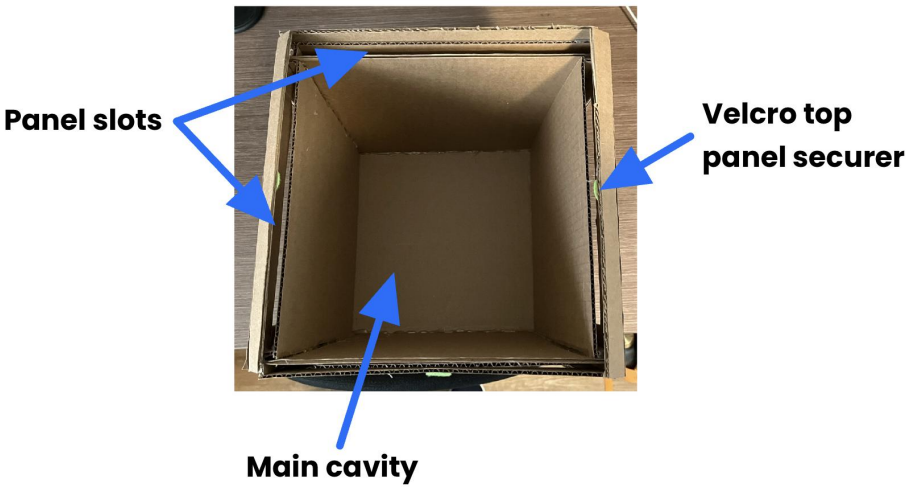

Figure E5: A top-down view of the Picture Box and its cavities.

The second design mockup consists of "Felt Velcro Patches" that are combined to form a custom-shaped wrapping to fit any shape or size of gift (Figure E6). Each patch is square in shape with a side length of 5.5 in. The edges of each patch are lined with velcro strips, all hook-sided velcro on one side and all loop-sided velcro on the other (Figure E7). The patches are secured together by alternating the orientation of the pieces such that loop velcro sides come into contact with hook velcro sides. Combining a sufficient amount of pieces results in a patchwork encasing of the gift that can be unwrapped by pulling apart the velcro (Figures E8 and E9).

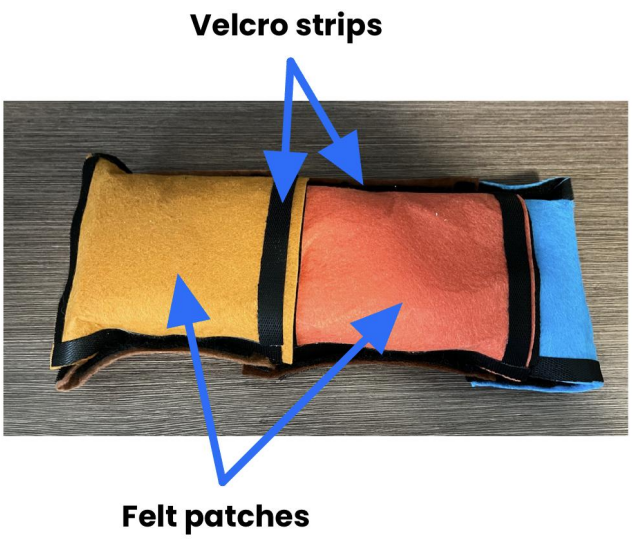

Figure E6: The Felt Velcro Patches mockup wrapped around a gift.

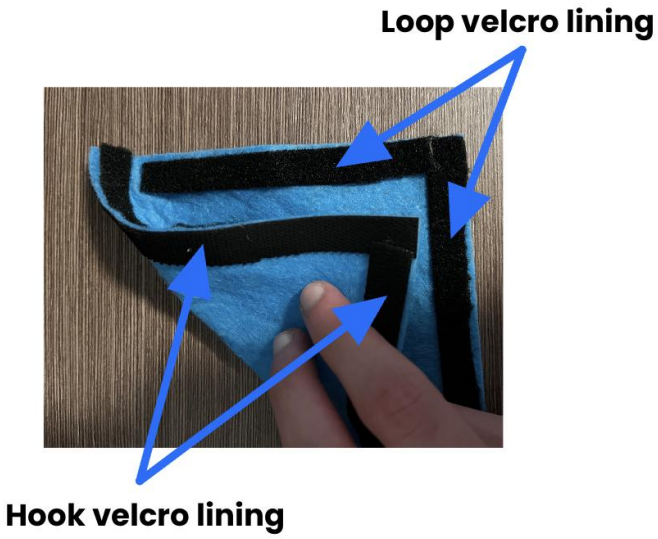

Figure E7: The front and back sides of a patch comprising the Felt Velcro Patches mockup.

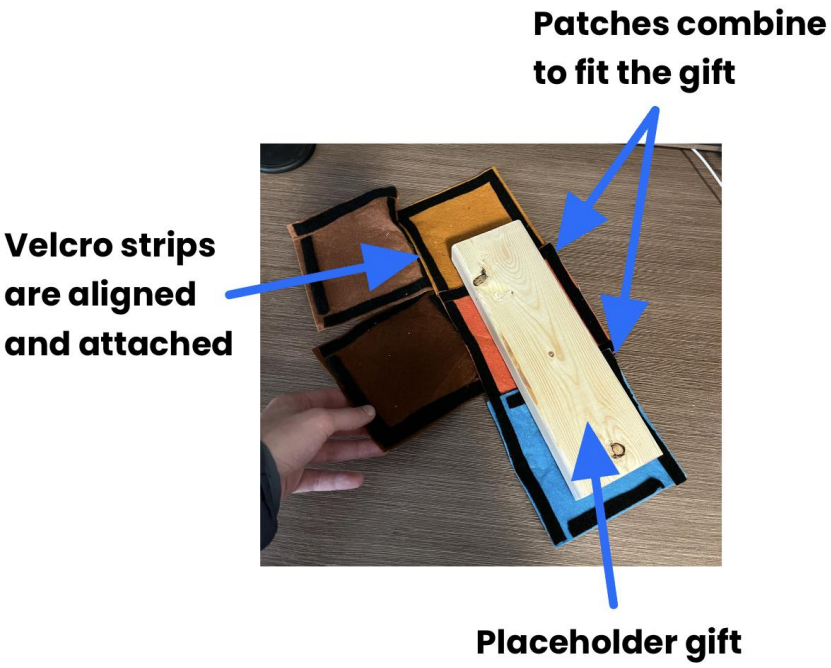

Figure E8: Felt pieces being used to construct a custom wrapping of a gift.

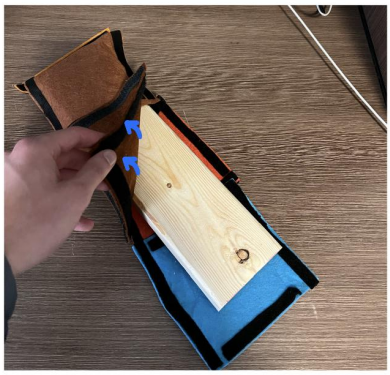

Figure E9: Felt pieces being ripped apart to open a wrapped gift.

The team's final mockup, the "Rip-Stick Box," is a foldable cardboard box that collapses outward when the top-side "rip-stick" is pulled (Figure E10). The four sides of the cardboard box are cut free of one another, allowing the cardboard to lie flat (Figure E11). The tops of the cardboard sides are cut into triangles such that, when the wall tops are folded inward, the four pieces meet at one central location. These triangles thereby form the top side of the box and are held together by tape. A cardboard rip-stick also sits under the tape (Figure E12). When the rip-stick is pulled, the tape is released and the four sides of the box unfold, revealing the gift inside (Figure E13).

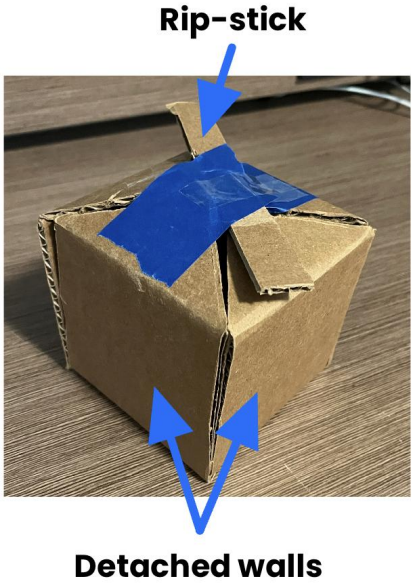

Figure E10: The Rip-Stick Box mockup in its wrapped state.

Figure E11: The Rip-Stick Box mockup in its flattened state.

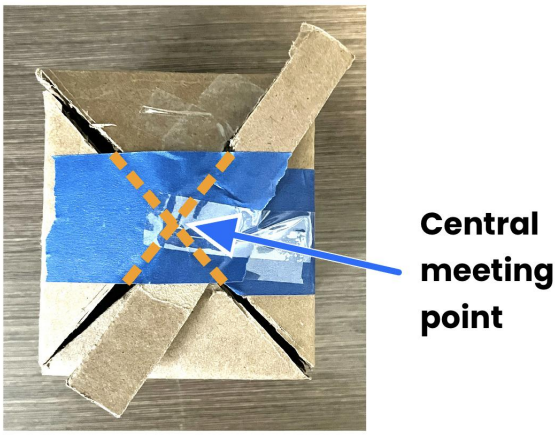

Figure E12: A top-down view of the Rip-Stick Box mockup when closed.

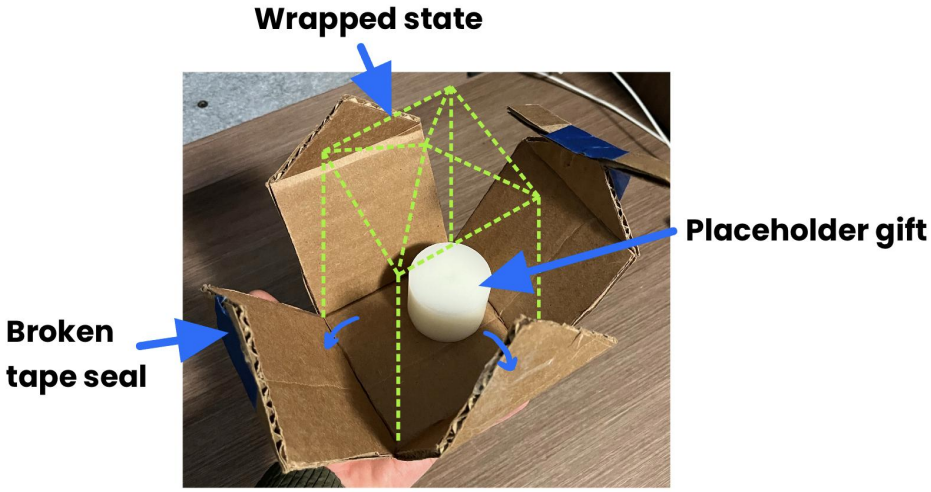

Figure E13: The Rip-Stick Box mockup midway through its unwrapping process.

Each of the five testing sessions followed the same procedure, which included opportunities for users to interact with each mockup hands-on as well as quantitative and qualitative follow-up questions. The sessions were split into three sections of varying lengths:

(1) The first section asked users to answer three demographic questions about their gift wrapping practices. The intention of this section was to aid in contextualizing each test subject's responses.
(2) The second section focused on the users' experience with opening gifts packaged in each of the three mockups. The designs were presented visually to the users, and the users were prompted to state any initial impressions they had. The designs were only explained

afterward, the intention being to best simulate seeing the wrapping design for the first time during a real-world gift opening ceremony. The users were then asked to first imagine a birthday scenario in which they were receiving gifts wrapped in each of the mockups and second to open each gift. The users were subsequently asked to evaluate their experiences based on how fun the process was as well as its suspense, difficulty, and time requirement.

(3) The third section dealt with the users' experience with wrapping presents using each of the mockups. The three mockups were each set to their unwrapped state, and then the users were asked to imagine that they were wrapping a quality gift for someone important in their lives. Afterward, the users were asked to simulate wrapping a gift using each of the designs keeping the imagined scenario in mind. Follow-up questions about the users' experiences focused on the customizability, difficulty, time requirement, and storability of each of the mockups.

The test participants were also asked several quantitative questions throughout the three test sections above to aid in evaluating the average merit of each design concept. Users were asked at various times in the testing process to rate the mockups on a scale of 1 to 10 in a certain category. Three categories were included: how fun the mockup was to open, the level of suspense opening the mockup created, and the perceived customizability of the mockup.

Users were also asked to order the mockups from best to worst in three categories based on their impressions or overall testing experience. First, testers were asked during the present-opening section to state the order in which they would open the mockups based on their initial impressions. Second, testers were asked during the present-wrapping section to provide the order in which they would use the mockups to wrap gifts. Finally, testers were asked at the end of the testing session to rank each mockup based on their inclination to use them during real-life gift-giving events.

Results

The results obtained from the five user testing sessions are provided in the following tables. Each table includes the responses from each test subject, where testers 1-3 refer to the college-aged participants and testers 4-5 refer to the middle-aged participants. Table E1 summarizes test subject responses to the initial demographic questions. Tables E2-E4 present user feedback from the present opening section of the testing, and tables E5-E7 display user feedback from the present wrapping section. Table E8 lists each test subject's best-to-worst rankings of the mockups. Bar graphs useful in visualizing each tester's quantitative ratings and orderings of the mockups are shown in Figures E14-E19. Finally, table E9 provides numerical averages of the ratings and orderings of the mockups in each quantitative category.

Table E1: Participant responses to demographic information questions.

	Tester #1	Tester #2	Tester #3	Tester #4	Tester #5
Currently-used wrapping materials	Wrapping paper, gift bags	Wrapping paper, gift bags	Saran wrap, aluminum foil	Wrapping paper	Wrapping paper, gift bags
Other wrapping materials ever used	Plain or stylish boxes	Cloth wrapping (once)	Newspaper	Newspaper, cardboard boxes	Dish towel when gifting a kitchen item, newspaper
Past sustainable wrapping considerations	Considers reusability for expense purposes	Always reuses gift bags after use	Avoids single-use wrapping paper	Considers wrapping paper waste, but has not taken action	No prior sustainable considerations

Tables E2-4 below list test participant feedback from the present-opening portion of each testing session. Table E2 refers to the Present Box mockup, table E3 refers to the Felt Velcro Patches mockup, and table 4 refers to the Rip-Stick Box mockup. Each table includes numerical ratings of the mockup based on how fun it was to open and the amount of suspense it created. These numerical ratings are on a scale of 1 to 10, with 10 being the best possible score.

Table E2: Feedback for the Present Box mockup during the present-opening section.

	Tester #1	**Tester #2**	**Tester #3**	**Tester #4**	**Tester #5**
Initial impressions	Resembles a milk crate	Looks professional and expensive; would want it back after gifting	None	Appears customizable and easy to understand	A white color scheme would be prettier
Fun-to-open rating	7 – very human and velcro is fun; more velcro should be added	6 – likes the sliding of the top	1 – did not understand how to open it well	8 – packaging itself is fun	10 – thought side decorations made it the most fun
Suspense creation rating	7 – a more pronounced opening motion would be better	8 – top sliding creates suspense	1 – opening mechanism was not intuitive; was not focused on the gift but instead how to open the box	5 – excited to uncover an assumed fun and interesting gift	8 – excited to see what is inside based on decorations
Encountered difficulty	None	None	Unintuitive how to open the box; needs to be clearer	Was not immediately clear how to open	None
Opinion of time needed to open	Slightly too long	Good amount of time	Good amount of time	Took a long amount of time; required a lot of thought	Good amount of time

Table E3: Feedback for the Felt Velcro Patches mockup during the present-opening section.

	Tester #1	**Tester #2**	**Tester #3**	**Tester #4**	**Tester #5**
Initial impressions	Reminds tester of Piet Mondrian's artwork; could have many non-gifting uses	Likes the colorfulness and nice fabric	Intrigued by how the mockup functions	Not aesthetically pleasing; easy to think the fabric is the actual gift	Curious about the design; the prettiest of the three mockups
Fun-to-open rating	9 – closest replication of wrapping paper ripping	9 – resembles opening wrapping paper	5 – standard level of fun	2 – tedious; only one patch needs to be unwrapped	6 – slightly more fun than wrapping paper
Suspense creation rating	9 – wrapping paper replication created suspense	8 – enjoys how it is not intuitive or easy to open	2 – very slow	2 – very slow	6 – malleability or conformation to gift shape was nice
Encountered difficulty	None	Took a bit of strength, thought, and time to open, but that was good as it lengthened the experience	None	None	None
Opinion of time needed to open	Good amount of time	Took a long time but the time added to the experience	Good amount of time	Took a long amount of time; required a lot of thought	Slightly too long

Table E4: Feedback for the Rip-Stick Box mockup during the present-opening section.

	Tester #1	Tester #2	Tester #3	Tester #4	Tester #5
Initial impressions	Looks like a food container or to-go box	Likes the interlocking cardboard "teeth" of the design	Doesn't embody a gift; looks like a rice box	Opening mechanism is intriguing; aesthetically pleasing	A white color scheme would be prettier
Fun-to-open rating	3 – least fun to open	5 – has potential for a fun opening	6 – popping open is fun	6 – obvious how it works; lots of motion	9 – loved the opening mechanism
Suspense creation rating	5 – very quick	4 – very quick	3 – most suspenseful of the three mockups	8 – excited for an assumed interesting gift inside	8 – surprised by the opening mechanism; felt novel
Encountered difficulty	Worried about damaging the mockup when using the opening mechanism; felt breakable	None	None	None	Sort of unintuitive how to open; the rip-stick mechanism was not obvious
Opinion of time needed to open	Good amount of time	Good amount of time	Good amount of time	Slightly too quick but might be slower if adding a bow and ribbon	Good amount of time

Tables E5-E7 below record test subject responses from the present-wrapping portion of each testing session. Table E5 refers to the Present Box mockup, table E6 refers to the Felt Velcro Patches mockup, and table E7 refers to the Rip-Stick Box mockup. Each table includes a numerical rating of the mockup based on its customizability according to the tester. Similar to tables E2-E4 above, these numerical ratings are on a scale of 1 to 10, with 10 being the best possible score.

Table E5: Feedback for the Present Box mockup during the present-wrapping section.

	Tester #1	**Tester #2**	**Tester #3**	**Tester #4**	**Tester #5**
Customizability rating	10 – many designs for the side panels are possible	8 – focus of the design is customization	4 – siding designs can be customized	8 – swappable sides make the design personal	10 – side panels are highly customizable and decorative
Encountered difficulty	None	None	None	None	None
Opinion of time needed to wrap	Good amount of time	Good amount of time	Good amount of time	Good amount of time; easier to decorate than wrapping paper with simple side designs	Might be too long when creating custom siding
Opinion of storability	Fine with storing even with more space; dislikes nesting-style storage idea as would have to open each one to get to the smallest	Not easily stored due to volume, especially with larger box sizes	Easily stored as a box is a common shape; boxes are easier to store than wrapping paper tubes	Not easily stored due to volume; high-quality nature means the giver wouldn't want to give the box away	Not easily stored due to volume

Table E6: Feedback for the Felt Velcro Patches mockup during the present-wrapping section.

	Tester #1	Tester #2	Tester #3	Tester #4	Tester #5
Customizability rating	9 – with a range of pieces available, many combinations are possible	7 – can customize patchwork and colors	7 – can combine patches in different ways	5 – only way to customize is different colors	3 – only way to customize is different colors
Encountered difficulty	Piecing together the patches was hard and like a puzzle	Folding and aligning the patches was difficult; could benefit from instructions	Aligning the side velcro strips was difficult at times	"Heinous" experience; took a lot of time to figure out how to wrap	None
Opinion of time needed to wrap	Took too long to wrap, although that may help the wrapper feel good about the gift	Took too long to wrap	Good amount of time; very similar to wrapping paper in time and feel	Took too long to wrap; was confusing to assemble	Good amount of time
Opinion of storability	Easily stored as the sheets are flat	Easily stored as the sheets are flat	Easily stored as the sheets are flat	Easily stored as the sheets are flat	Easily stored as the sheets are flat

Table E7: Feedback for the Rip-Stick Box mockup during the present-wrapping section.

	Tester #1	Tester #2	Tester #3	Tester #4	Tester #5
Customizability rating	3 – not built into the design; would have to rebuild in a personal way	2 – little to be customized with the design	1 – nothing personal about the design; no customization built into the design	6 – bows and ribbons could be added; sides could be folded two ways	3 – other than sizing, could not think of ways to customize
Encountered difficulty	None	None	None	None	None
Opinion of time needed to wrap	Good amount of time	Good amount of time	Good amount of time	Good amount of time; would allow non-decorative people to wrap quickly	Good amount of time
Opinion of storability	Easily stored as it can collapse but would likely throw the box away	Easily stored as it can collapse	Easily stored as it can collapse	Easily stored as it can collapse; easily saved and returned without destroying	Easily stored as it can collapse

Table E8 below lists each test subject's best-to-worst rankings of the mockups in three categories. The first two categories refer to the order in which testers elected to open each mockup and to use each mockup in wrapping a gift. The third category refers to the testers' final rankings of their inclination to use the mockups during real-world occasions. In each case, a rank of "1st" is the best and "3rd" is the worst. In table E8, "PB" refers to the Present Box mockup, "FV" refers to the Felt Velcro Patches mockup, and "RS" refers to the Rip-Stick Box mockup.

Table E8: Each test participant's best-to-worst rankings of the three mockups.

		Tester #1	**Tester #2**	**Tester #3**	**Tester #4**	**Tester #5**
Chosen opening order	PB	1st – developed and has interesting components	1st – intrigued by its large size	2nd – unsure how the mockup works	2nd – gives the impression of a fun gift inside	2nd – looks fun to open
	FV	2nd – looks fun to open	2nd – almost as good as the picture box	1st – likes the shape and the colors	3rd – wrapping looks like an afterthought	3rd – least interesting
	RS	3rd – least exciting	3rd – despite score, the opening mechanism is still enticing	3rd – lowest quality	1st – gives the impression that a cool, high-quality gift is inside	1st – intrigued by the opening mechanism
Chosen wrapping order	PB	1st – looks like the most traditional present box	1st – easy to assemble the final packaging	1st – versatile with size, easy to fit items in a box	2nd – suits a fun, light-hearted vibe well	2nd – most personal for the receiver
	FV	2nd – resembles an art project and is creative	3rd – turned off by the amount of work required	2nd – creates suspense, fits many shapes with patches	3rd – no joy or pride from the giver's end	3rd – too many pieces; prefers one larger piece
	RS	3rd – least exciting	2nd – likes the opening mechanism	3rd – least personal for the receiver	1st – elegant, romantic, and high-end box	1st – more fun and creates a better reaction
Willingness to use	PB	1st – works well even if you don't customize the side panels	3rd – looks expensive	1st – fits many different gift types, reveals contour of gift	2nd – allows quick and easy customization	2nd – likes the customization
	FV	2nd – requires more work to wrap than willing to do	1st – the most fun to open of the mockups	2nd – easy and quick to wrap with	3rd – looks the worst and is difficult to assemble	3rd – should be a single piece with nicer colors
	RS	3rd – lowest perceived quality	2nd – enjoys the opening mechanism	3rd – least exciting	1st – looks highest quality	1st – creates suspense and fun opening

Figures E14-E19 below display each tester's rating or ordering of each mockup in the six quantitative categories included in the testing round. Figures E14-E16 in the left-hand column refer to the 1-to-10 rating categories, where a score of 10 is the best. Figures E17-E19 in the right-hand column refer to the best-to-worst ordering categories, where a rank of 1 is best.

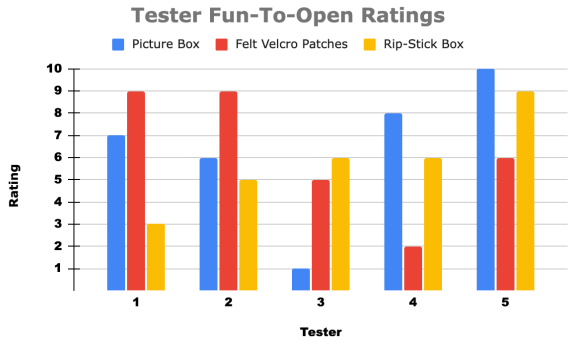

Figure E14: Participant ratings of each mockup based on opening enjoyment.

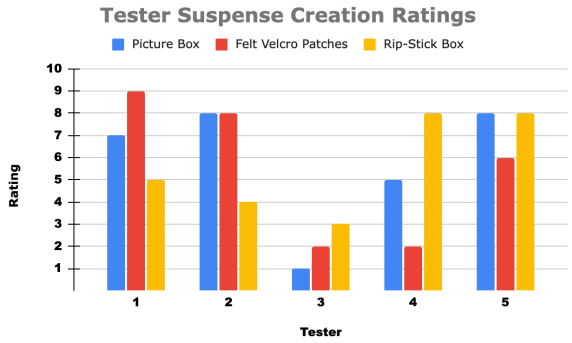

Figure E15: Participant ratings of each mockup based on suspense creation.

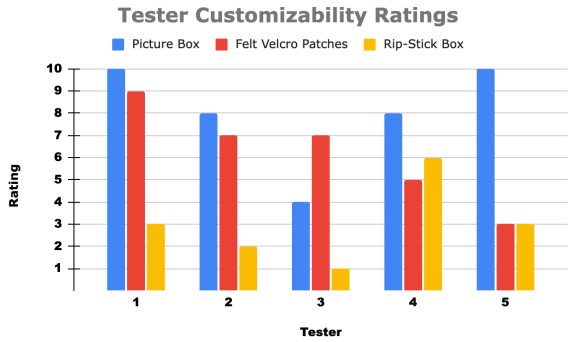

Figure E16: Participant ratings of each mockup based on perceived customizability.

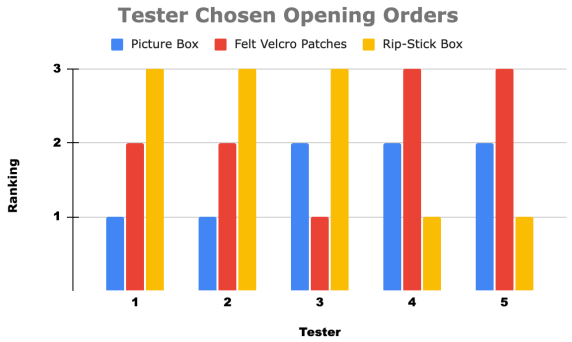

Figure E17: Each participant's chosen order to open gifts inside of the mockups.

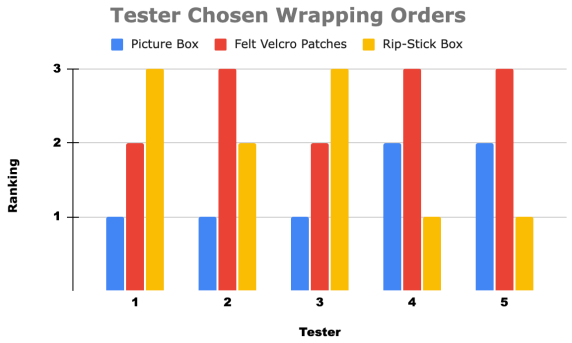

Figure E18: Each participant's chosen order to wrap gifts with the mockups.

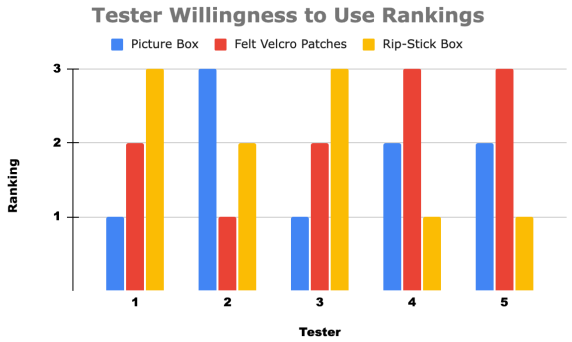

Figure E19: Participant mockup rankings based on the willingness of future use.

Table E9 below provides numerical averages of the ratings and rankings of the three mockups displayed in the figures above. For the "fun-to-use" category, "suspense creation" category, and "customizability" category, the best possible average rating is 10.0. For the "chosen opening order" category, "chosen wrapping order" category, and "willingness to use" category, the best possible average ranking is 1.0. The emboldened value in the center of each cell is the numerical average, and the standard deviation (σ) from each average—higher values of which indicate larger variation from the average—are included in the bottom right corner of each cell. For each category, the mockup with the best score is highlighted in green, the mockup with the middle score is highlighted in yellow, and the mockup with the worst score is highlighted in red.

Table E9: Average ratings and rankings of the three mockups.

	Present Box	**Felt Velcro Patches**	**Rip-Stick Box**
Fun-to-open rating	**6.4** σ: 3.0	**6.2** σ: 2.6	**5.8** σ: 1.9
Suspense creation rating	**5.8** σ: 2.6	**5.4** σ: 2.9	**5.6** σ: 2.0
Customizability rating	**8.0** σ: 2.2	**6.2** σ: 2.0	**3.0** σ: 1.7
Chosen opening order	**1.6** σ: 0.5	**2.2** σ: 0.7	**2.2** σ: 1.0
Chosen wrapping order	**1.4** σ: 0.5	**2.6** σ: 0.5	**2.0** σ: 0.9
Willingness to use	**1.8** σ: 0.7	**2.2** σ: 0.7	**2.0** σ: 0.9

Analysis

Picture Box

Although significant variation was observed in the responses between test subjects, users demonstrated an overall preference for the Picture Box mockup. Positive comments from users focused primarily on the customizability of the mockup, which made the mockup suitable for giving personalized gifts, as well as its intriguing and traditional present-like appearance, which increased the appeal to gift openers. The main drawback noted by the test subjects was the mockup's relatively poor storability as it cannot be flattened. A

secondary concern was the expense and quality of the box; two users reported hesitancy with giving the box away to gift recipients. Feedback for the Picture Box mockup was relatively consistent between the two age groups of the test participants.

Felt Velcro Patches

The Felt Velcro Patches and the Rip-Stick Box mockups received much greater variation in user feedback between the two age groups. The Felt Velcro Patches mockup was overall ranked substantially higher by the college-aged participants than by the older participants. The college-aged test subjects felt that the mockup closely replicated traditional wrapping paper and viewed the patchwork as being customizable. The two older participants, however, thought that the mockup looked uninteresting or of poor build quality and viewed the mockup's many pieces as a burden. Both groups felt that the Felt Velcro Patches mockup was very storable as the pieces are plat but also agreed that wrapping a gift with the mockup was cumbersome.

Rip-Stick Box

The Rip-Stick Box mockup's feedback held the largest variation between the two age groups and was ranked significantly better by the older two participants than by the three college-aged testers. The former group concentrated on the mockup's quick opening mechanism, believing that the mockup generated a large amount of suspense, and also saw potential for the box to serve as a high-end, romantic gift wrapping. The younger participants overall felt that the mockup was poorer in build quality, lacked a personal element, and did not embody the appearance of a gift. All users agreed that the mockup was easily storable given its ability to lie flat and most users favorably viewed the mockup's opening mechanism.

Quantitative Results

The overall positive views toward the Picture Box mockup versus the variance in feedback for the other two is reflected in the quantitative rankings of the three mockups. Across all six quantitative rating and ordering categories, the Picture Box scored the best on average, with the worst scores varying between the Felt Velcro Patches and the Rip-Stick Box mockups (see Table E9). The standard deviations of the average scores for all three mockups were sizable, however, indicating significant variation and a lack of consensus between the test participants' responses. The variation in the tester scores can be visualized in Figures E14-E19. Excluding the consistent outlier in the Picture Box mockup's ratings in Figures E14-E16 (test subject #3), the mockup consistently scored well across both user age groups in all six numerical categories. Whereas, a clear visual

disparity (most prominent in Figures E17-E19) can be seen between the rankings of the Felt Velcro Patches and Rip-Stick Box mockups between the two user age groups. Thus, the distribution of the quantitative ratings and orderings of the three mockups corresponds closely with the qualitative feedback received during the testing sessions.

Conclusions

User testing was not definitive in revealing a single best mockup to pursue further. Although the Picture Box received all-around more positive feedback, the existence of considerable variation in the data decreased the conclusiveness of the results. Deviations in each mockup's build quality likely confounded the testing results, resulting in the variation observed. A substantial number of comments were made in regard to the Felt Velcro Patches and Rip-Stick Box mockups' quality of construction and materials, especially in reference to the tendency for the Rip-Stick Box's opening mechanism to break. These comments revealed that the varying quality of the three mockups had considerably impacted the testing results, and this impact was further demonstrated by the lack of consensus among the test participants in scoring the mockups. The degree to which testers fixated on each mockup's build quality appeared to influence their view of the mockups, likely accentuating the split opinions seen in the testing results. For example, the middle-aged participants ranked the Rip-Stick Box particularly high, and these participants made explicit their imagination of the mockup in a higher quality state; the college-aged testers ranked the mockup much worse and appeared to focus more on the mockup in its current condition. Thus, the build quality of the mockups potentially played a significant role in the results' lack of consensus and in the worse average scores for the Felt Velcro Patches and Rip-Stick Box mockups.

The influence of build quality on the results and the existence of several positive comments and high scores for both the Felt Velcro Patches and Rip-Stick Box mockups convinced the team to conduct an additional round of user testing. The second round of testing will involve updated versions of the Felt Velcro Patches and Rip-Stick Box mockups, and these newer iterations will aim to address users' main design concerns to remove confounding variables and clarify each designs' viability as a solution. The Felt Velcro Patches mockup's second iteration will attempt to reduce the wrapping process' frustration through improved velcro strip profiles. The second Rip-Stick Box mockup will have a better build quality with a properly constructed opening mechanism. The team decided to not construct a second Picture Box mockup in the belief that users' main concern with the design—its lack of storability—was already fully understood through the first round of user testing. See the Stage Two User Testing Report (Appendix F) for the results of the additional round of user testing.

Limitations

The feedback received during the five user testing sessions was potentially skewed by the presence of several confounding variables and limitations in the testing methodology. The constructed mockups varied in size, color, and build quality, but variance in these features was generally not intended as part of each design. Several users provided explanations for their opinions that cited these characteristics, indicating that these variables had unintentionally influenced the testing results.

Mockup-specific limitations also existed during user testing. For the Picture Box mockup, users were not asked to design their own side panels, a choice made to prevent the sessions from becoming too long. As a result, the side panel creation time was not factored into the time requirement for wrapping a gift with the Picture Box mockup, possibly altering users' opinions.

For the Felt Velcro Patches mockup, only a single size and shape of patch was used during testing, and only a limited number of squares were provided. User frustrations with packaging gifts with the patches may have been less severe if they had been given more patches and size options.

Finally, for the Rip-Stick Box mockup, variance existed between each user test due to the tendency for the mockup's tape to fail. For certain users, the mockup worked as intended, and for others, the mockup opened sporadically when the tape gave out to the outward forces exerted by the four box sides. Several comments were made regarding the build quality of the Rip-Stick Box mockup based on this tendency to fail, demonstrating a clear impact on user feedback.

Appendix F: Stage Two User Testing Report

Introduction

On May 8, a second round of user testing was completed with the team's most recent iterations of the Picture Box, Felt Velcro Patches, and Rip-Stick Box mockups. The goal of the second stage of user testing was to better understand the viability of each of the team's design concepts using improved mockups that addressed users' primary concerns with the original designs (see Appendix E for details about the first round of user testing). The second user testing round followed a procedure similar to the first, although the process was condensed in order to focus on the effect of the changes made between the two sets of mockups. Each testing session included qualitative interview questions, quantitative rating and ordering questions, and hands-on mockup interactions like the first testing round. Through a clarified understanding of each design's merit with the second stage feedback, the team aimed to narrow its focus to one design concept to pursue further.

Methodology

User testing involved three test participants, each of whom tested all three of the mockups in an individual testing session lasting approximately 10 minutes. All three of the test subjects were students of college age and none of the participants had been a part of the first stage of user testing. New test subjects were used to eliminate the possibility of biases resulting from users' impressions of the first mockup iterations. Unlike the first round of testing, no middle-aged participants were involved in the second testing round (see Limitations section). The testing involved only the most recent versions of each design mockup, all of which were finalized on May 5.

The second iteration of the Felt Velcro Patches mockup used in the testing deviated from the original design in several ways. First, the mockup eliminated the use of felt patches, opting instead to use patches made entirely out of velcro. By extension, the mockup also dropped the use of velcro strips lining the sides of each patch, with the second iteration's patches having velcro spread across the full surface area (Figure F1). Hook-side velcro covered the entirety of one side of each patch and loop-side velcro covered the other side (Figure F2). While the team originally intended for the new patches to be larger than the original patches, material availability constraints resulted in smaller patches. Each new patch was square in shape with a side length of 4.0 in (Figure F3). Similar to the original mockup, the new velcro patches are torn away from each other to open the wrapping (Figure F4).

Figure F1: A set of second-iteration patches secured together with their all-velcro surfaces.

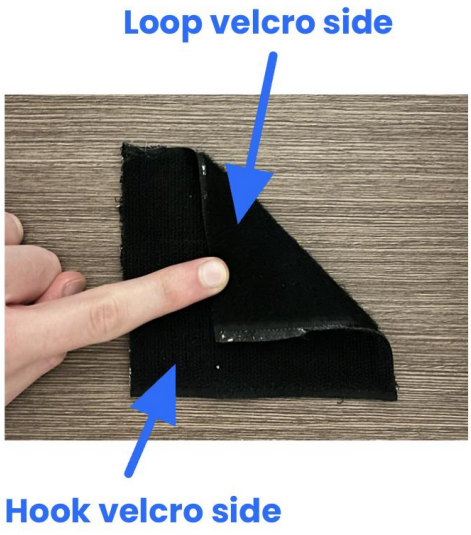

Figure F2: A second-iteration patch with all hook velcro on one side and loop velcro on the other.

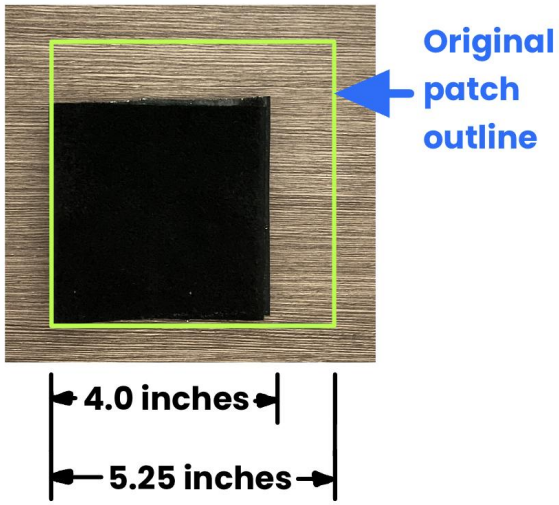

Figure F3: The second-iteration patches are smaller than the first-iteration patches.

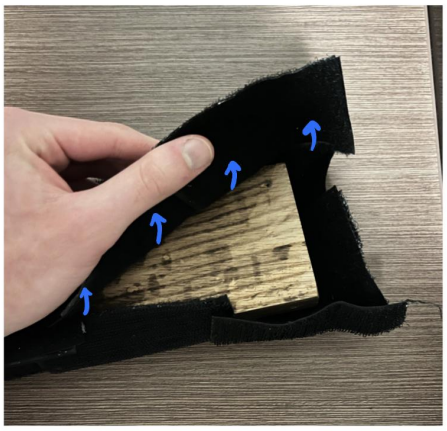

Figure F4: The Felt Velcro Patches mockup being opened by ripping apart two patches.

The second iteration of the Rip-Stick Box mockup used in the testing featured an improved opening mechanism designed to withstand multiple uses. The tape mechanism used by the original design was superseded by velcro. Hook-side velcro patches were placed at the apex of each triangular fold of the box's four sides (Figure F5) and loop-sided velcro was glued to the bottom of a square piece of cardboard intended to function as the new "rip-stick" (Figure F6). Paired together, the cardboard piece can be placed on top of the four triangular folds, thereby securing the triangular folds at their central meeting point (Figure F7). To open the mockup, the user need only rip the square piece off of the top of the box, which causes the four box sides to collapse (Figure F8).

Figure F5: The apex of each triangular fold features a hook velcro patch.

Figure F6: The square cardboard topper with loop velcro glued to its base.

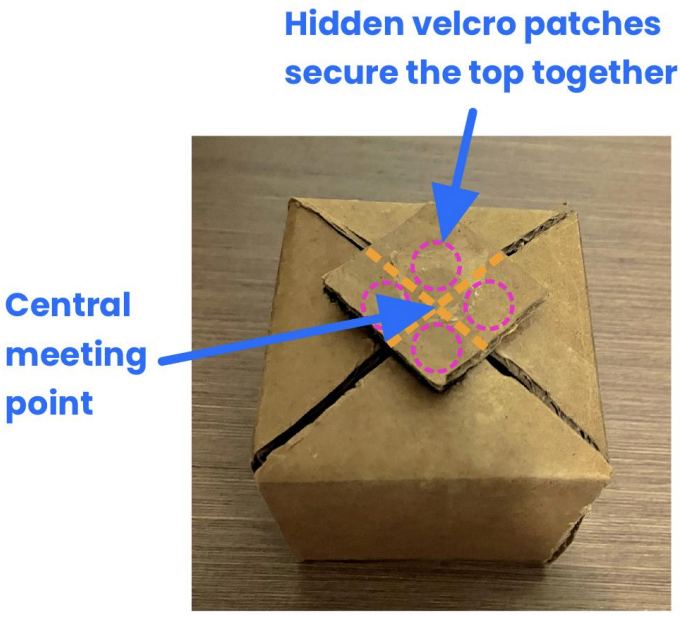

Figure F7: The Rip-Stick Box mockup secured in its wrapped state by velcro.

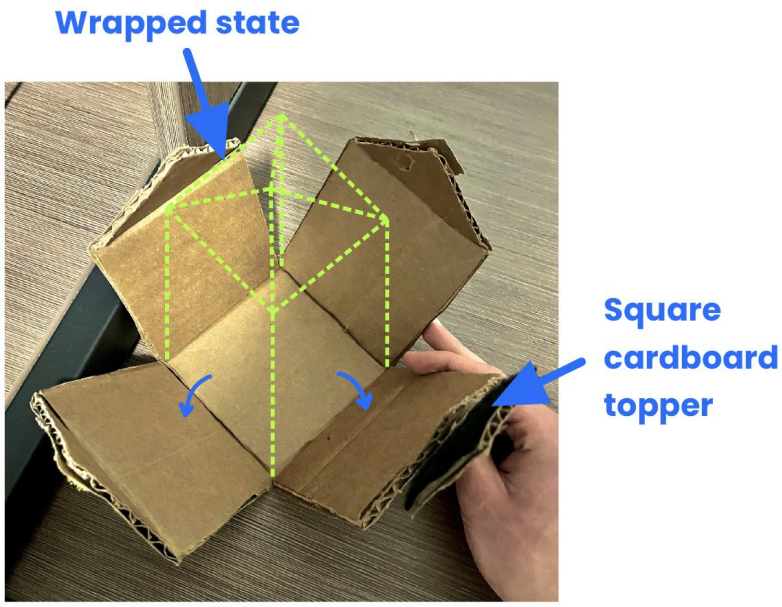

Figure F8: The box's walls partially collapsed after the cardboard topper has been torn off.

Unlike the other two mockups, the Picture Box mockup was not updated for the second round of testing. The team believed that the feedback received from the first round of testing was adequate in evaluating the Picture Box mockup. The design's primary issue—its lack of storability due to its inability to collapse—was fully understood, meaning that constructing a second mockup for clarification was unnecessary. Nonetheless, the second round of user testing included the original Picture Box for comparison purposes.

The three testing sessions followed a condensed adaptation of the procedure from the original user testing round. Questions with a tendency to elicit feedback repeated from elsewhere in the testing, a lack of relation to the changes made between the first and second set of mockups, or a focus on traits such as storability that were fully understood from the original testing round were removed. All quantitative rating and ordering questions were retained between the two testing stages. The same three sections—demographic information, gift opening, and gift wrapping—composed each testing session, and information regarding the specifics of each section can be found in the Stage One User Testing Report (Appendix E).

Results

The following tables record participant feedback from the three user testing sessions. Table F1 includes tester responses to the initial demographic questions. Tables F2-4 list tester feedback from the present opening portion of the testing, and tablesF 5-7 present tester feedback from the

present wrapping portion. Table F8 includes each test subject's best-to-worst rankings of the mockups. Figures F9-F14 display each participant's ratings and rankings of the three mockups in the quantitative categories included in the testing round, and averages of these quantitative results are shown in table F9. Table F10 compares the standard deviations of each average rating and ranking between testing rounds one and two.

Table F1: Participant responses to demographic information questions.

	Tester #1	**Tester #2**	**Tester #3**
Currently-used wrapping materials	Gift bags	Wrapping paper	Wrapping paper, gift bags
Other wrapping materials ever used	Wrapping paper, tissue paper	Paper bags	Cardboard boxes
Past sustainable wrapping considerations	Sometimes opts not to wrap gifts, saves and reuses all wrapping paper and gift bags	No prior sustainable considerations	No prior sustainable considerations

Tables F2-F4 below include user feedback from the present-opening portion of the testing sessions. Table F2 refers to the Present Box mockup, table F3 refers to the Felt Velcro Patches mockup, and table F4 refers to the Rip-Stick Box mockup. As with the first testing round (Appendix E), each table includes numerical ratings of the mockup based on how fun it was to open and the amount of suspense it created. These numerical ratings are on a scale of 1 to 10, with 10 being the best possible score.

Table F2: Feedback for the Present Box mockup during the present-opening section.

	Tester #1	**Tester #2**	**Tester #3**
Initial impressions	Looks like high-quality laundry boxes	Side messages are unique; wouldn't want to throw away	Personalization is intriguing
Fun-to-open rating	2 – sliding the cardboard top is uninteresting	7 – number of steps lessened the enjoyment	7 – functional and simple but uninteresting
Suspense creation rating	2 – standard box is not exciting	8 – similar to RS but less interesting	8 – simplicity of the design makes it unintriguing
Encountered difficulty	None	Would like there to be fewer steps to opening	None

Table F3: Feedback for the Felt Velcro Patches mockup during the present-opening section.

	Tester #1	Tester #2	Tester #3
Initial impressions	Does not scream “gift,” confusing in appearance	Confused; poor quality and ugly; no effort given	Low quality appearance but seems versatile
Fun-to-open rating	2 – similar to opening a bag	2 – looks low quality and boring	5 – folding velcro and using many pieces is annoying
Suspense creation rating	5 – somewhat mysterious	1 – untidy and not enticing	6 – the wrapping reveals the gift shape
Encountered difficulty	Hard to pull the gift out of the velcro “bag”	None	Wrapping falls apart as the pieces are being torn apart

Table F4: Feedback for the Rip-Stick Box mockup during the present-opening section.

	Tester #1	Tester #2	Tester #3
Initial impressions	Looks like high-quality laundry boxes	Looks like it might store a diamond or rolex	Appealing and easy to open; resembles a cupcake
Fun-to-open rating	8 – fast and exciting opening mechanism	9 – fun opening mechanism but too fast	9 – opening mechanism is fun and exciting
Suspense creation rating	6 – quick opening mechanism and expensive vibe	10 – design attracted attention, raised excitement	10 – surprising and quick opening mechanism
Encountered difficulty	Too much force needed to undo the velcro top	Velcro stuck to the triangular folds too tightly	None

Tables F5-F7 below detail user responses from the present-wrapping portion of the testing sessions. Table F5 refers to the Present Box mockup, table F6 refers to the Felt Velcro Patches mockup, and table F7 refers to the Rip-Stick Box mockup. Similar to the first testing round (Appendix E), each table includes a numerical rating of each mockup’s customizability according to the tester. Similar to tables F2-F4 above, these numerical ratings are on a scale of 1 to 10, with 10 being the best possible score.

Table F5: Feedback for the Present Box mockup during the present-wrapping section.

	Tester #1	**Tester #2**	**Tester #3**
Customizability ranking	10 – side panels make the design customizable	7 – side panels make the design customizable	8 – side panels make the design customizable
Encountered difficulty	None	None	None

Table F6: Feedback for the Felt Velcro Patches mockup during the present-wrapping section.

	Tester #1	**Tester #2**	**Tester #3**
Customizability ranking	2 – can only change the wrapping pattern	1 – cannot think of any ways to personalize	9 – different colors and patterns can be used
Encountered difficulty	Puzzle-like and tedious to use; velcro pieces to stick to each other when not desired	Velcro gets dirty when sticking to objects; velcro sticks to itself when not meant to	Took too much effort to wrap; had to play around with it for awhile to understand

Table F7: Feedback for the Rip-Stick Box mockup during the present-opening section.

	Tester #1	**Tester #2**	**Tester #3**
Customizability ranking	8 – can be drawn on with custom art	6 – can write on the box itself	4 – not designed to be customizable
Encountered difficulty	Holding triangular pieces together before securing can be hard	Tough to hold the triangular folds in place; needed to secure rip-stick onto one first	None

Table F8 below lists each tester's best-to-worst rankings of the mockups in three categories. As in the first testing round (Appendix E), the first two categories refer to the order in which testers decided to open the mockups and use them in wrapping a gift. The third category still refers to the testers' rankings of the mockups based on their willingness to use them during real-world events. For each category, a rank of "1st" is the best and "3rd" is the worst. In table F8, "PB" refers to the Present Box mockup, "FV" refers to the Felt Velcro Patches mockup, and "RS" refers to the Rip-Stick Box mockup.

Table F8: Each test participant's best-to-worst rankings of the three mockups.

		Tester #1	Tester #2	Tester #3
Chosen opening order	PB	2nd – modularity is exciting, makes gift seem expensive	2nd – interested because of the side panels	2nd – curious about the function of the side panels
	FV	3rd – texture is off putting	3rd – would never want to open	3rd – looks low in quality and effort
	RS	1st – looks the most finished or refined	1st – intrigued by opening mechanism	1st – looks high quality and fun to open
Chosen wrapping order	PB	1st – can safely hold a gift, easily opened without breaking	2nd – slightly less good looking than RS	2nd – easy to wrap but less fun for the receiver
	FV	2nd – can wrap up a gift tightly and securely	3rd – would never use; design is unattractive	3rd – looks the worst for the receiver
	RS	3rd – feels weak; fragile gifts could break	1st – looks the most appealing but is weak	1st – presentable and fun to open
Willing-ness to use	PB	2nd – customizable but design is boring	1st – better than RS for safety reasons	2nd – less interesting than RS but customizable
	FV	3rd – off putting texture and wrapping process	3rd – "hates" the design, especially the appearance	3rd – too much effort, thinking, and organization required
	RS	1st – easily used and understandable	2nd – good mechanism but fragile	1st – opening mechanism has the best surprise factor

Figures F9-F14 below display each tester's rating or ordering of each mockup in the testing round's six quantitative categories. The plots were generated for the same numerical categories used in the first testing round, and the figures may be compared with the corresponding plots from the first stage of user testing (see Appendix E, Figures E14-E19). Figures F9-F11 in the left-hand column refer to the 1-to-10 rating categories, where a score of 10 is the best. Figures F12-F14 in the right-hand column refer to the best-to-worst ordering categories, where a rank of 1 is best.

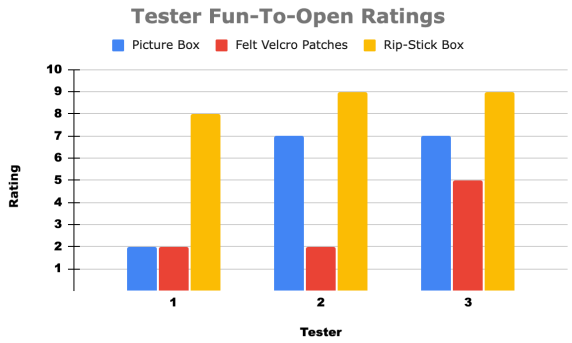

Figure F9: Participant ratings of each mockup based on opening enjoyment.

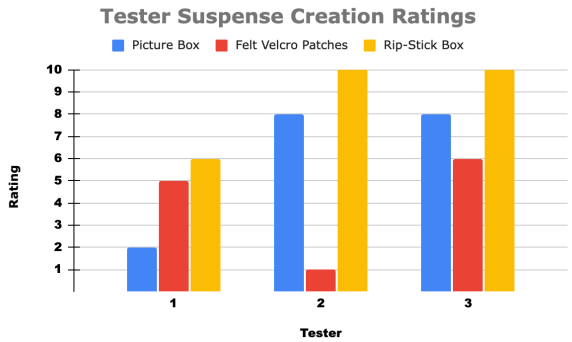

Figure F10: Participant ratings of each mockup based on suspense creation.

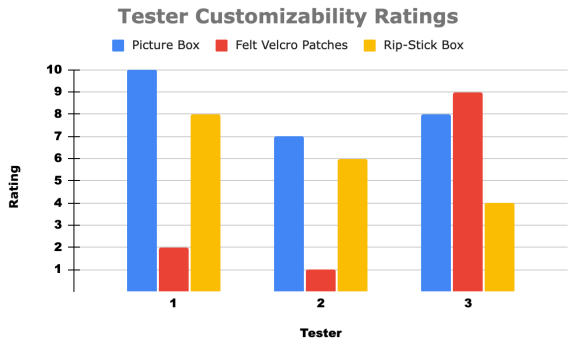

Figure F11: Participant ratings of each mockup based on perceived customizability.

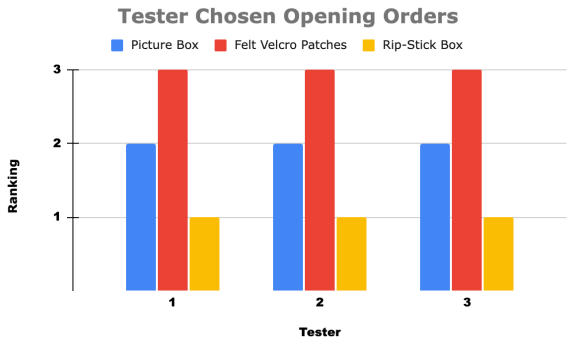

Figure F12: Each participant's chosen order to open gifts inside of the mockups.

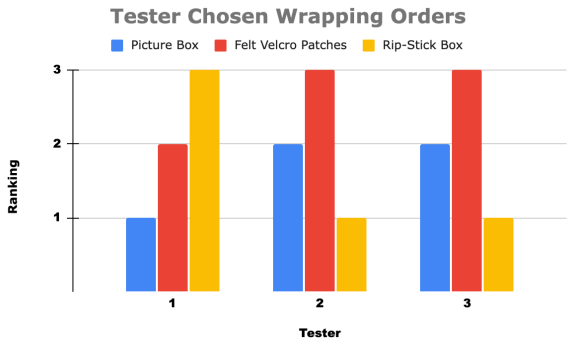

Figure F13: Each participant's chosen order to wrap gifts with the mockups.

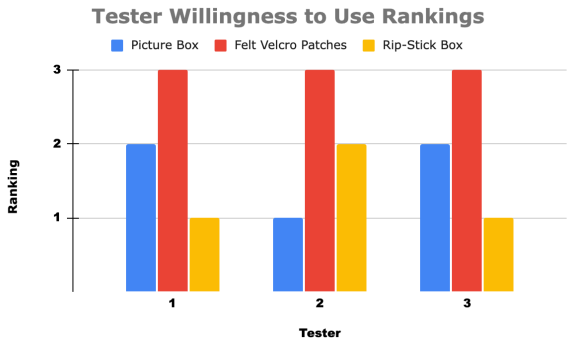

Figure F14: Participant mockup rankings based on the willingness of future use.

Table F9 below lists the average ratings and rankings of the three mockups in each numerical category. As with the first testing round (Appendix E), the "fun-to-use" category, "suspense creation" category, and "customizability" category have a best possible average rating of 10.0. For the "chosen opening order" category, "chosen wrapping order" category, and "willingness to use" category, the best possible average ranking is 1.0. The emboldened value in the center of

each cell is the numerical average, and the standard deviation (σ) from each average is included in the bottom right corner of each cell. For each category, the mockup with the best score is highlighted in green, the mockup with the middle score is highlighted in yellow, and the mockup with the worst score is highlighted in red.

Table F9: Average ratings and rankings of the three mockups.

	Present Box	**Felt Velcro Patches**	**Rip-Stick Box**
Fun-to-open rating	**5.3** σ: 2.4	**3.0** σ: 1.4	**8.7** σ: 0.5
Suspense creation rating	**6.0** σ: 2.3	**4.0** σ: 2.2	**8.7** σ: 1.9
Customizability rating	**8.3** σ: 1.2	**4.0** σ: 3.6	**6.0** σ: 1.6
Chosen opening order	**2.0** σ: 0.0	**3.0** σ: 0.0	**1.0** σ: 0.0
Chosen wrapping order	**1.7** σ: 0.5	**2.7** σ: 0.5	**1.7** σ: 0.9
Willingness to use	**1.7** σ: 0.5	**3.0** σ: 0.0	**1.3** σ: 0.5

Table F10 records the standard deviations from the average of each quantitative rating or ordering category in the first and second testing rounds. The first testing round's standard deviations are originally listed in Appendix E, Table E9. In the table, "R1" refers to the first round's standard deviations and "R2" refers to the second round's standard deviations. cells where the standard deviation was lower in the second round are highlighted in green, cells where the standard deviation was the same between the rounds are highlighted in yellow, and cells where the standard deviation was higher in the second round are highlighted in red.

Table F10: Differences between the first and second testing round standard deviations.

	Present Box	Felt Velcro Patches	Rip-Stick Box
Fun-to-open rating	R1: 3.0 R2: 2.4	R1: 2.6 R2: 1.4	R1: 1.9 R2: 0.5
Suspense creation rating	R1: 2.6 R2: 2.3	R1: 2.9 R2: 2.2	R1: 2.0 R2: 1.9
Customizability rating	R1: 2.2 R2: 1.2	R1: 2.0 R2: 3.6	R1: 1.7 R2: 1.6
Chosen opening order	R1: 0.5 R2: 0.0	R1: 0.7 R2: 0.0	R1: 1.0 R2: 0.0
Chosen wrapping order	R1: 0.5 R2: 0.5	R1: 0.5 R2: 0.5	R1: 0.9 R2: 0.9
Willingness to use	R1: 0.7 R2: 0.5	R1: 0.7 R2: 0.0	R1: 0.9 R2: 0.5

Analysis

Overall

The second round of user testing yielded overall more positive views toward the Rip-Stick Box mockup and more negative views toward the Felt Velcro Patches mockup. As noted in the Stage One User Testing Report (Appendix E), users were generally split between liking the Rip-Stick Box mockup and disliking the Felt Velcro Patches mockup or vice versa. However, such a division was not observed in the second testing round, in which all three test participants conveyed negative perceptions of the Felt Velcro Patches mockup and a preference for the Rip-Stick Box. Feedback regarding the Picture Box mockup was consistent with the first testing round, with all three participants expressing neutral to positive opinions of the design.

Rip-Stick Box

The revised Rip-Stick Box mockup was received well by the test subjects, especially its improved opening mechanism. Users reacted positively to the surprise factor created by the collapsing of the box's sides and felt that the mockup's appearance was appealing. The positive qualitative feedback from the participants matched their quantitative rankings, in which the Rip-Stick Box mockup was rated the best in two of the three 1-to-10 scale questions and in all three ordering questions on average (see Table F9). The revised Rip-Stick Box altogether outperformed the unedited Picture Box mockup. The main drawback of the design noted by participants was the use of a velcro opening

mechanism; users disliked the high amount of force needed to tear off the cardboard topper.

Felt Velcro Patches

The altered Felt Velcro Patches mockup did not receive the same positive reactions. The intention to reduce user frustration by making each patch's surface area entirely velcro on both sides was poorly received. Participants noted the new patches' tendency to stick to themselves, each other, and other objects when not intended. Moreover, the new patches did not address the puzzle-like aspect of the design, which continued to frustrate users in the second testing round. Users also disliked the appearance of the design and some stated that the design gave off the impression that a poor quality gift was inside.

Quantitative Results

Less variation existed in the results from the second user testing round. As shown in Table 10, the far majority of the standard deviations of the numerical averages in the second testing round were lower than in the first round, indicating an overall decrease in results variation between the two rounds. The lower variation can be visualized in Figures F9-F14, which illustrate how the Rip-Stick Box and Picture Box mockups overall scored well across the testers in all six of the quantitative categories. The Felt Velcro Patches mockup's results were relatively consistent as well, with the mockup receiving mostly poor scores across the testers and categories.

Conclusions

Using updated mockups of more equal build quality, the results of the second testing round were more consistent and conclusive than the first. The Felt Velcro Patches design concept was discarded following the results of the testing. While the mockup received mixed reviews in the first testing round, the overall negativity toward the second design iteration definitively indicated that the design created a poor user experience and should not be pursued further.

Considering the two testing sessions together, both the revised Rip-Stick Box and the Picture Box displayed merit as a design solution. Nonetheless, the team decided to further pursue the Rip-Stick Box design after review of the project's primary goals. While testing revealed that the Picture Box was more customizable than the Rip-Stick Box, the Rip-Stick Box excelled in areas such as storability, simplicity, and present-like appearance. Believing that the Rip-Stick Box's primary strengths were more important in creating a solution that would genuinely be reused (and therefore be sustainable), the team decided to continue developing the Rip-Stick Box.

Limitations

Attempts were made to mitigate the limitations of the first round of user testing. Since the second iteration of the Felt Velcro Patches mockup was entirely black, all three mockups were neutral in color, thereby removing the color distraction seen in the first testing round. The issue of varying build qualities was remedied as well, with all three mockups relatively similar in construction quality for the second testing stage.

Even with these changes, several limitations persisted between the two sessions. The Picture Box was still much larger than the other two mockups, requiring the test administrator to explicitly ask users not to factor the mockups' sizes into their feedback. Moreover, total testing time constraints meant that designing custom side panels was not tested for the Picture Box mockup, so users were asked to imagine their own custom designs instead.

Two new limitations were introduced in the second round of testing. First, the lack of velcro available in a timely manner meant that the new Felt Velcro Patches were smaller in size than the original patches. The team had intended to increase the size of the patches to reduce the frustration in using the mockup, and the inability to do so may have negatively affected the mockup's feedback. Second, no middle-aged participants were included in the second round of testing. The small window between second mockup construction and the team's intended testing completion date made testing with college students the most feasible option.