Heuristic Evaluation of MetaGym

1. Problem/Prototype Description

We evaluated the medium-fi prototype of MetaGym, a virtual reality fitness application paired with a mobile app that encourages users to become more active and build community by providing live and on-demand workout classes in VR.

2. Violations Found

1. **H1: Visibility of System Status / Severity 3 / Found by: B, C**
    - In the VR component, a username or any kind of user identification information is missing. This could be confusing for users if they share the product with friends or family members who have different accounts on the platform.
    - Fix: Display a username or, once you have chosen an avatar or profile photo, an image on some corner of the screen.
2. **H1 Visibility of System Status / Severity 2 / Found by: B**
    - In the VR component, there is no indication of where you are in relation to the first screen. After clicking a few options, users may become confused about how many screens they have gone through or how many screens they have left before being taken to an actual workout.
    - Fix: Add some kind of page/screen number indication to each screen in the VR component.
3. **H2 Match Between System and Real World / Severity 3 / Found by: B, C**
    - In the mobile app, under the Statistics page, the axis of the chart and some categories in the legend do not match real-world statistics. Users would be confused about what the numbers in the x-axis represent and what “Protein” and “Car” mean (even “Fat” and “Calories Burn” are slightly confusing).
    - Fix: Have labels for the axis of the chart and reconsider what each line in the chart is measuring.
4. **H2 Match Between System and Real World / Severity 2 / Found by: A**
    - Some of the icons on the wrist interface of the VR application may be unintuitive to the user (ex: icon that allows you to choose your focus). This may be confusing to the user.
    - Fix: Add text that identifies function of icon or help setting.
5. **H2 Match Between System and Real World / Severity 2 / Found by: B**
    - In the VR component, after clicking “Live Classes,” the “Play” icon in the upper-right corner takes users back a page. Users would expect the “Play” icon to help them go into a workout or proceed forwards instead of backwards.
    - Fix: Either change the “play” icon to a back button and change it’s positioning or change the functionality to actually play something/proceed.
6. **H2 Match Between System and Real World / Severity 2 / Found by: C**
    - In task 1 (mobile), when average users select from the “type” of workout on the “Browse” screen, the abbreviated term “Abs” might not be easy to understand. Avoid using abbreviations for professional terminologies since average users may not find intuitive what the abbreviated terms mean.
    - Fix: Rename “Abs” to its non-abbreviated form “Abdominal Muscle”.

7. **H2 Match Between System and Real World / Severity 2 / Found by: C**
    - In task 1 (mobile), the filter button is named “View” when the user filters for the “Duration” and “instructor” of workouts. The user may not intuitively understand the filter functionality if the button is named “View”.
    - Fix: Rename the filter button as “Filter”.
8. **H2 Match Between System and Real World / Severity 2 / Found by: C**
    - In task 1 (mobile), another abbreviated term “Car” is used for the parameters of the “Chart” on the “Your Stats” interface. Average users may be confused or frustrated about what an abbreviated term means when reading the statistics - I had to ask Google and was still confused what “Car” refers to.
    - Fix: Replace “Car” with its non-abbreviated form.
9. **H3 User control and Freedom / Severity 4 / Found by: A, B, C**
    - In the VR component, not every screen had a “back” button or a way to undo a mistake click. There was also no way to go directly to the first screen, giving users very limited choices to go back.
    - Fix: Add more “back” buttons and a “Home” button.
10. **H4 Consistency and Standards / Severity 1 / Found by: B**
    - In the mobile app, under the Calendar page “Browse” view, after clicking on a filter and closing the dialogue, the last-clicked filter stays blue but the other filters remain black. Users may be unsure about not sure what the blue highlights since it seems to have no special meaning besides being the one that was just exited out of.
    - Fix: Have all filters always be black, or have ALL filters that have been changed in some way be blue.
11. **H4 Consistency and Standards / Severity 3 / Found by: A**
    - The workout cards for the VR and mobile application seem to have different information which could be confusing to the user. For example, the upcoming class on the VR app only shows the countdown while the mobile application displays the time and date.
    - Fix: Display the time and date on the workout cards of the VR application.
12. **H4 Consistency and Standards / Severity 3 / Found by: A, B**
    - The VR starts with 2 options (live and on-demand classes) but the app seems to only have scheduled classes – so users can only look at on-demand class options if they were in VR and not the app.
    - Fix: Have all classes available to view in the app, or else make it clear why there are only live classes in the app and why the flows for app and VR are distinct.
13. **H4 Consistency and Standards / Severity 2 / Found by: A, B, C**
    - The VR application refers to the sessions as classes while the mobile app refers to them as workouts. The user may be confused as to the difference between them.
    - Fix: Standardize name of sessions.
14. **H4 Consistency and Standards / Severity 2 / Found by: B**
    - In the mobile app, under the Calendar page, there are filter options under “Browse” view but not under “Planned” view even though their functionality and layout are almost identical.
    - Fix: Either put filter options on both views or on neither.
15. **H4 Consistency and Standards / Severity 2 / Found by: A, C**
    - The VR interface alternates between having return buttons on the left side and the right side of the screen. Users may be confused as to which direction or screen the buttons guide you towards.

- Fix: Standardize side of screen the button is placed

16. **H4 Consistency and Standards / Severity 1 / Found by: B, C**
    - In the mobile app, scrolling sometimes gives too much white space or sometimes too little – on the Home page, the horizontal scroll leaves a full widget space empty, while on the Calendar page, scrolling all the way to the bottom cuts off half of a widget.
    - Fix: Make the scrolling consistent so that all white space between edge of screen and widget is the same as white space between widgets.
17. **H4 Consistency and Standards / Severity 1 / Found by: B**
    - Inconsistent font styles within the VR app. After clicking "Live Classes," the font on the sticky note and the main app font are different.
    - Fix: Use the main app font for the "not yet available" sticky note message.
18. **H4 Consistency and Standards / Severity 3 / Found by: A, B, C**
    - Inconsistent aesthetic between VR and mobile app. The app felt very professional and minimalistic, while VR felt more fun/whimsical -- the color palettes, font styles/sizes, spacing, etc. are all different between the two.
    - Fix: Choose the color palette, font style/size, and spacing of one of the two components and use it for the other component consistently.
19. **H5 Error Prevention / Severity 3 / Found by: A**
    - Users do not have the ability to confirm they want to unfollow a user or unplan a workout session on the mobile application. Users may accidentally unplan or unfollow with a misclick
    - Fix: Add confirmation screen/overlay before unfollowing or unplanning.
20. **H5 Error Prevention / Severity 3 / Found by: A, C**
    - Users do not have the ability to confirm whether they want to leave the workout session on the VR application. Users may accidentally misclick and leave the session.
    - Fix: Add confirmation screen/overlay before leaving the session.
21. **H5 Error Prevention / Severity 3 / Found by: C**
    - In task 1 (mobile), users are allowed to plan workouts with time conflicts. The user may end up planning conflicting workout sessions without awareness.
    - Fix: Disallow the user to plan conflicting workouts or alert them about the time conflicts using pop-up windows
22. **H5 Error Prevention / Severity 1 / Found by: B**
    - In the mobile app, within the filters, the round circles allow multi-select, which may be more error-prone for users.
    - Fix: Instead of round circles (usually reserved for single-select), for multi-select it's more common to use square boxes or check boxes.
23. **H5 Error Prevention / Severity 2 / Found by: A, B**
    - The top and bottom navigation bars of the mobile app lack text – the icons used are not universal (for example, what does the 2 people icon could mean sharing, or friends list, or leaderboard, etc.) and users could click them expecting something else.
    - Fix: Make the icons smaller and add text underneath them.
24. **H5 Error Prevention / Severity 3 / Found by: C**
    - In task 2 (VR), the "Join" button is missing for the user to join a public room. Users have to go through multiple tabs of public rooms when selecting a room. They may not know how to join a room.
    - Fix: Add "Join" buttons for all tabs of public rooms.
25. **H6 Recognition Not Recall / Severity 3 / Found by: C**

- In task 1 (mobile), users do not have the ability to cancel workout sessions on the "Planned" screen. The user may forget to go back to the "Browse" screen to unplan the workout.
- Fix: Support the "unplan" functionality on the "Planned" screen.

26. **H6 Recognition Not Recall / Severity 3 / Found by: B**
    - Users need to remember which classes they scheduled from the app once they go into VR view since it's a whole other flow.
    - Fix: Make the transition from app to VR more intuitive -- add an option in VR first screen to view "Planned" classes from the app.
27. **H7 Flexibility and Efficiency of Use / Severity 2 / Found by: A, C**
    - When searching for different instructors, the user is unable to quickly search for an instructor without applying filters. For power users, this may take too long.
    - Fix: Add search functionality for instructors/classes.
28. **H7 Flexibility and Efficiency of Use / Severity 1 / Found by: A**
    - After adding a course, the user is able to search for it in planned classes to add it to their google calendar. For power users, this may present additional steps that disrupt the flow.
    - Fix: Add overlay/ability to add to google calendar after planning workout.
29. **H7 Flexibility and Efficiency of Use / Severity 2 / Found by: B**
    - In the VR view, it was hard to click things. The user has to pan multiple times until they can click things in the top right and left corners (which often had important icons like back and play), and first aligning with the red dot and then clicking was slow and inaccurate. (Also, this is an extension of Fitt's Law where some options were too small/far away from the center of the screen and so navigation was slow/inaccurate.)
    - Fix: Allow direct clicks (without first having to pan and align) with the red dot.
30. **H7 Flexibility and Efficiency of Use / Severity 3 / Found by: B**
    - In VR view, once you go from one screen to the next, your "pointer" (the little red dot that is your line of vision) does not recenter but instead stays where it last was, making it disorienting if, for example, you had just pressed the back button on the upper left corner
    - Fix: Re-center the red dot after each screen; or see #16.
31. **H7 Flexibility and Efficiency of Use / Severity 2 / Found by: B**
    - In the mobile app, users have to manually check the phone time and then the time of the class to see if they have anything upcoming.
    - Fix: There are reminders for workouts coming up or have the Calendar page order workouts based on how soon they are coming up.
32. **H7 Flexibility and Efficiency of Use / Severity 2 / Found by: B**
    - In the VR view, after clicking On-Demand Classes, the screen "Choose Your Focus" is too close to the user and too big. The user needs to pan around just to see all 4 of the options.
    - Fix: Make the 4 options further away in the VR view.
33. **H7 Flexibility and Efficiency of Use / Severity 3 / Found by: A, B, C**
    - In the mobile app, under the Statistics page, users can click on multiple dates – assuming that once the feature is implemented, the stats change based on the dates clicked, users would need to tap every single date (instead of date range) to show those stats, and then untap each one to change their range selection
    - Fix: Have the option for choosing a date range instead of only tapping individual dates.
34. **H8 Aesthetic & Minimalist Design / Severity 1 / Found by: B**

- In the mobile app, there is very little white space or breathing room and it makes everything feel crowded.
- Fix: Some more white space between “Live Workouts Today” and “Suggested Workouts” on the Home page. Similarly, more white space on other pages.

35. **H8 Aesthetic & Minimalist Design / Severity 3 / Found by: B**
    - In the VR view, the colors are clashing – for example, in the Choose Your Focus screen, the predominant color palette is blues, but there is a red option at the bottom that does not highlight anything different from the other options.
    - Fix: Predominantly use colors closer to each other on the color wheel, and only using complimentary or other highlight colors to highlight important or different information.
36. **H8 Aesthetic & Minimalist Design / Severity 2 / Found by: C**
    - In VR view, instructions on some interfaces such as the “Wrist” screen are too crowded, and the way body texts are centered makes it harder to read.
    - Fix: Replace the paragraph instructions with step-by-step instructions, make the body texts left-justified, and keep the interface minimalistic.
37. **H8 Aesthetic & Minimalist Design / Severity 2 / Found by: B**
    - In VR view, the font looks unprofessional and the all-caps typeface on headers is harder to read (uppercase reads slower than lowercase).
    - Fix: Use the font from the mobile app and/or switch to more lowercase.
38. **H8 Aesthetic & Minimalist Design / Severity 1 / Found by: B**
    - In the mobile app, All text is black and reads with the same level of emphasis. This adds to the crowded feel of the app.
    - Fix: Less important text, for example sub-headers like “Average classes taken/week” could be dark gray instead, and this would also help give the app more breathing room.
39. **H8 Aesthetic & Minimalist Design / Severity 2 / Found by: A, C**
    - When selecting a room, the user is able to go through tabs of possible public rooms. The user may be distracted by the “noise” of more tabs than necessary.
    - Fix: Add ability to scroll through all rooms + search feature.
40. **H8 Aesthetic & Minimalist Design / Severity 1 / Found by: A**
    - On the mobile application the user is able to add/search for friends using the toolbar independent of where they are in the navigation. This is extraneous, and may be distracting for users who believe they have to navigate to the social page to add a user.
    - Fix: Move search for friends feature to the social page.
41. **H9 Help Users with Errors / Severity 3 / Found by: A, C**
    - Both interfaces do not support the functionality of error messages when users encounter an error such as time conflicts in planning workout sessions. No error messages may leave users unaware of their errors.
    - Fix: Display error messages through pop up windows.
42. **H10 Help and Documentation / Severity 2 / Found by: A, B, C**
    - No help or documentation available on either mobile or VR application. This may frustrate users when they need help for complex functions.

- Fix: Lead the user through a tutorial, or add functionality for the user to ask for help, or add instructions for complex functions.

43. **H11 Accessible / Severity 1 / Found by: A**
    - The workout cards feature white text that contrast well with the pictures. However, if the workout picture were to be a lighter tone, the text could be difficult to read.
    - Fix: Add overlay/background for text; or, alternate text color based on background color.
44. **H11 Accessible / Severity 3 / Found by: A**
    - There seems to be a reasonable amount of text in the VR interface. Users may suffer from motion sickness due to having to read the text.
    - Fix: Add voice overs/limit text.
45. **H11 Accessible / Severity 3 / Found by: A, B, C**
    - The chart for the user's statistics and the text sizes of subtitles ("with Coach Leah," "45 min," etc) are small and could be difficult to read for the user, especially for the visibly impaired. Furthermore, there does not appear to be a scale.
    - Fix: Increase text sizes of subtitles and give the user the ability to increase the scale or zoom in on the chart.
46. **H11 Accessible / Severity 0 / Found by: A, C**
    - The VR interface does not include voice controls or an alternate input method. Users may not be able to interact without controllers.
    - Fix: Add optional voice commands.
47. **H11 Accessible / Severity 1 / Found by: C**
    - The return/continue buttons on the VR interface have low contrast and small size. Users with low vision may need great effort to tell the buttons.
    - Improve the contrast or enlarge the size of the return/continue buttons.
48. **H11 Accessible / Severity 1 / Found by: A**
    - Some text in the VR interface has low contrast (example: text that's different shades of blue). A user with poor visibility may be unable to read the text.
    - Fix: Increase the contrast/change text color.
49. **H12 Fairness and Inclusion / Severity 2 / Found by: B**
    - In mobile app, there may be body image and privacy concerns with showing everyone's calories burned on a leaderboard. People who have struggled with counting calories, losing weight, or other body image issues may be even more discouraged by this feature.
    - Fix: Change the statistic to something healthier like the number of classes attended.
50. **H12 Fairness and Inclusion / Severity 2 / Found by: A**
    - The mobile interface seems to have additional features/functionality that isn't available on the VR interface. This may prevent users who do not have a mobile device from accessing the full capabilities of the VR experience.
    - Fix: Add essential features of mobile app to VR app.
51. **H12 Fairness and Inclusion / Severity 3 / Found by: B, C**

- Frequent use of abbreviations for some fitness terminologies like “Abs” “Car”. This may prevent entry-level users who have no prior fitness knowledge from accessing all functionalities.
- Fix: Avoid using abbreviations for terms or have an info option to explain terms.

52. **H13 Value alignment / Severity 0 / Found by: C**
    - Description: Potential conflicts between the values of inclusion and accessibility. VR headsets may not be affordable for every user, which might conflict with the value of community and inclusion.
    - Fix: Support certain VR features on mobile interface.
53. **H13 Value alignment / Severity 3 / Found by: B**
    - In the mobile app, it seems like this product (through the leaderboard, statistics page, etc.) prioritizes calories burned rather than bringing the accessibility of a home gym and group fitness classes to more people.
    - Fix: Make the signaling clearer that the app is about getting healthier and not about counting calories.

3. Summary of Violations

Category	**# Viol. (sev 0)**	**# Viol. (sev 1)**	**# Viol. (sev 2)**	**# Viol. (sev 3)**	**# Viol. (sev 4)**	**# Viol. (total)**
H1: Visibility of Status	-	-	1	1	-	**2**
H2: Match Sys & World	-	-	1	5	-	**6**
H3: User Control	-	-	-	-	1	**1**
H4: Consistency & Standards	-	3	3	3	-	**9**
H5: Error Prevention	-	1	1	4	-	**6**
H6: Recognition not Recall	-	-	-	2	-	**2**
H7: Efficiency of Use	-	1	4	2	-	**7**
H8: Minimalist Design	-	3	2	1	-	**7**
H9: Help Users with Errors	-	-	-	1	-	**1**
H10: Help & Documentation	-	-	1	-	-	**1**
H11: Accessible	1	3	-	2	-	**6**
H12: Fairness & Inclusion	-	-	2	1	-	**3**
H13: Value Alignment	1	-	-	1	-	**2**
Total Violations by Severity	**2**	**11**	**15**	**23**	**1**	**53**

4. Evaluation Statistics

Severity / Evaluator	**Evaluator A**	**Evaluator B**	**Evaluator C**	**Evaluator D**
Sev. 0	33%	0	67%	
Sev. 1	33%	50%	17%	
Sev. 2	30%	40%	30%	
Sev. 3	30%	37%	33%	
Sev. 4	33%	33%	33%	
Total (sevs. 3 & 4)	30%	36%	33%	
Total (all severity levels)	31%	38%	31%	

***Note that the bottom rows are *not* calculated by adding the numbers above it.**

5. Summary Recommendations

[merge the general recommendations you made here]

Overall, we really enjoyed engaging with MetaGym's medium-fidelity prototype. In terms of choice of platforms, their combined use of both a mobile and virtual reality component is compelling and allows the user to continue interacting with the service outside of a virtual environment. Most functions are intuitive to use and easy to navigate through. The task flow is clear and logical. The mobile application's UI is simple with clean, professional but non-monochrome design aesthetics.

Based on the Nielsen heuristic categories, we would like to give our recommendations on two biggest areas of improvement: design consistency and efficiency of use.

As to design consistency, since the app is divided into the closely-related mobile interface and VR components, it's important that the two are functionally and aesthetically consistent with each other to give the whole product a unified user experience. In this regard, the two most important suggestions are to 1) make the visual interfaces match in terms of color scheme, fonts, alignment and use of photos and 2) make sure that either the flows for the mobile and VR apps match, so the user is not learning two separate flows to complete a task, or to make it very clear and intuitive how the two flows connect with each other.

Another large area of improvement is designing for efficiency, especially in the VR component. The key to this product is to get users working out, so the time spent with the app should be on the actual workouts, and minimally on navigating to said workout. There are many opportunities to speed up the navigation process by tweaking how users click, go back, and move around within the VR space.

On a higher level, we would further recommend rethinking what an entry-level/average user with little previous exposure to fitness or AR would find intuitive in the functionality you plan to develop to improve the overall user experience. There is also room to streamline the interactions for power users by tailoring the app to their frequent actions. Moreover, we recommend you consider what statistics to show users and contextualize it in patterns on the mobile app. For example, instead of focusing on calories burned or the average number of classes they attended this week, focus on how they

improved from last week to this week in terms of minutes spent exercising and the time of day at which they were most likely to show up to their planned classes.

Overall, it's clear that the product and prototype is developed and has a clear direction. For feasibility of development, it could be worth it to explore using the existing Oculus companion app for workout notifications rather than developing a standalone mobile app. It would also be promising for you to combine voice control commands together with controllers to make your app accessible to a larger audience.

Smaller Concerns:

1. We think your "wrist" full body integration with a menu feature is very innovative but might not be intuitive enough for the user to frequently look up and down with their headsets. It's worth thinking about supporting voice control commands to call the menu.
2. For the virtual reality application, we were confused as to whether there would be additional functionality and information as provided in the mobile application.

Severity Ratings

0 - not a usability problem
1 - cosmetic problem
2 - minor usability problem
3 - major usability problem; important to fix
4 - usability catastrophe; imperative to fix

Heuristics

H1: Visibility of System Status

- Keep users informed about what is going on

H2: Match Between System & Real World

- Speak the users' language
- Follow real world conventions

H3: User Control & Freedom

- "Exits" for mistaken choices, undo, redo
- Don't force down fixed paths

H4: Consistency & Standards

- Words, actions, and UI elements should be consistent across the entire platform
- Follow platform and industry conventions

H5: Error Prevention

- Minimize error-prone conditions
- Remove memory burdens, support undoing, and warn your users when necessary

H6: Recognition Rather Than Recall

- Make objects, actions, options, & directions visible or easily retrievable

H7: Flexibility & Efficiency of Use

- Accelerators for experts (e.g., gestures, keyboard shortcuts)
- Allow users to tailor frequent actions (e.g., macros)

H8: Aesthetic & Minimalist Design

- No irrelevant information. Focus on the essentials.

H9: Help Users Recognize, Diagnose, & Recover from Errors

- Error messages in plain language
- Precisely indicate the problem
- Constructively suggest a solution

H10: Help & Documentation

- Easy to search
- Focused on the user's task
- List concrete steps to carry out
- Not too large

H11: Accessible

- Users can interact with the system using alternative input methods.
- Content is legible with distinguishable contrast and text size.
- Key information is upfront and not nested for screen readers.

- Purely visual or auditory content has text-based alternatives for users with low vision and low hearing.

H12: Fairness and Inclusion

- Users shouldn't feel that the design is not made for them.
- The design should meet all users' needs equally and prevent the reproduction of pre-existing inequities.
- It should not create additional burdens for members of disadvantaged populations.

H13: Value Alignment

- The design should encode values that users can understand and relate to.
- Conflicting collateral values should not emerge when the user interacts with the product.
- Encoded values should match users' values in a broad set of use-contexts.