Denture Design Studio

USER MANUAL

A project by:

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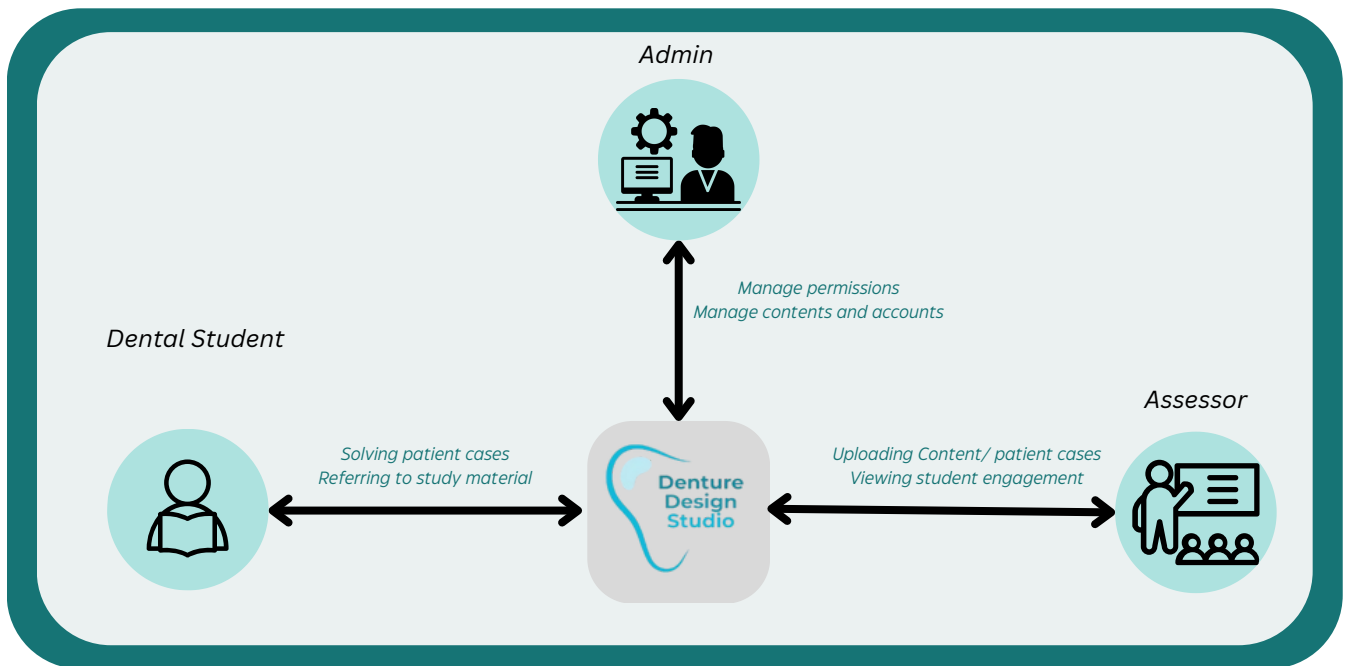
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• INTRODUCTION

Designing dentures is a complex process requiring both theoretical knowledge and practical skills. Traditional learning methods, such as textbooks and lectures, often lack the interactive elements needed for students to fully get a hold of intricate design principles. Clinical practice opportunities are also limited during the undergraduate years, making it essential for students to have alternative methods for gaining practical experience.

Denture Design Studio is an interactive web application developed to assist dental students in mastering the principles and techniques of denture design. This tool provides a hands-on, virtual environment where students can practice essential skills like selecting the relevant components correctly for various dental prostheses. With intuitive features and real-time feedback, Denture Design Studio enhances the learning experience by simulating real-world scenarios in a user-friendly digital platform.

This application provides a Safe Learning Space, enhance practical skills by offering a realistic design experience, helping students become familiar with component selection, proper placement, and overall denture structure. Students can practice anytime, anywhere, ensuring continuity of learning outside clinical hours.

Our platform has three types of users:

- Admin
- Assessor (Teaching staff involved in denture designing)
- Dental Student

Admin role has access to all accounts and their engagement data and has the authority to add and delete accounts if engagement is low. Admin has authority to assign assessor or admin roles to the users upon their request. Assessors are there to provide necessary learning material and guidance to the students. They can create and upload patient cases with answers so that the students can try themselves and refer to the model answers later. Both admin and assessor are capable of uploading lecture material to the content section. Dental student of the main beneficiary of our application. They can create patient cases and solve them for practice or design dentures for both assessor uploaded and auto generated patient cases in the application.

• USER ROLES

ADMIN

Administrators are responsible for the technical and organizational aspects of the platform, to ensure smooth operation and user management.

- ***Features for Administrators:***
  - Manage user accounts and assign roles (student or instructor).
  - Maintain the database of design tasks, models, and tutorials.
  - Monitor the system's performance and troubleshoot any technical issues.
  - Upload content, including any new design criteria.

The administrator role ensures that Denture Design Studio runs efficiently and remains up-to-date with the latest educational requirements.

ASSESSOR

Instructors play a vital role by guiding students, reviewing their designs, and providing feedback to enhance learning outcomes.

- Features for Instructors:
  - Create design tasks and assign them to students.
  - Review submitted designs and provide detailed feedback or corrective suggestions.
  - Monitor student performance through analytics and individual progress tracking.
  - Conduct virtual assessments and score student work.

With these tools, instructors can efficiently mentor students, ensuring they develop strong design skills and gain confidence in their decision-making abilities.

DENTAL STUDENT

Students are the primary users, utilizing the application to practice denture design concepts and hone their skills.

- Features for Students:
  - Select and place components like rests, clasps, and retentive parts on virtual models.
  - Receive instant feedback on design choices and placements.
  - Access design scenarios that reflect common clinical challenges.
  - Save and submit designs for instructor review.
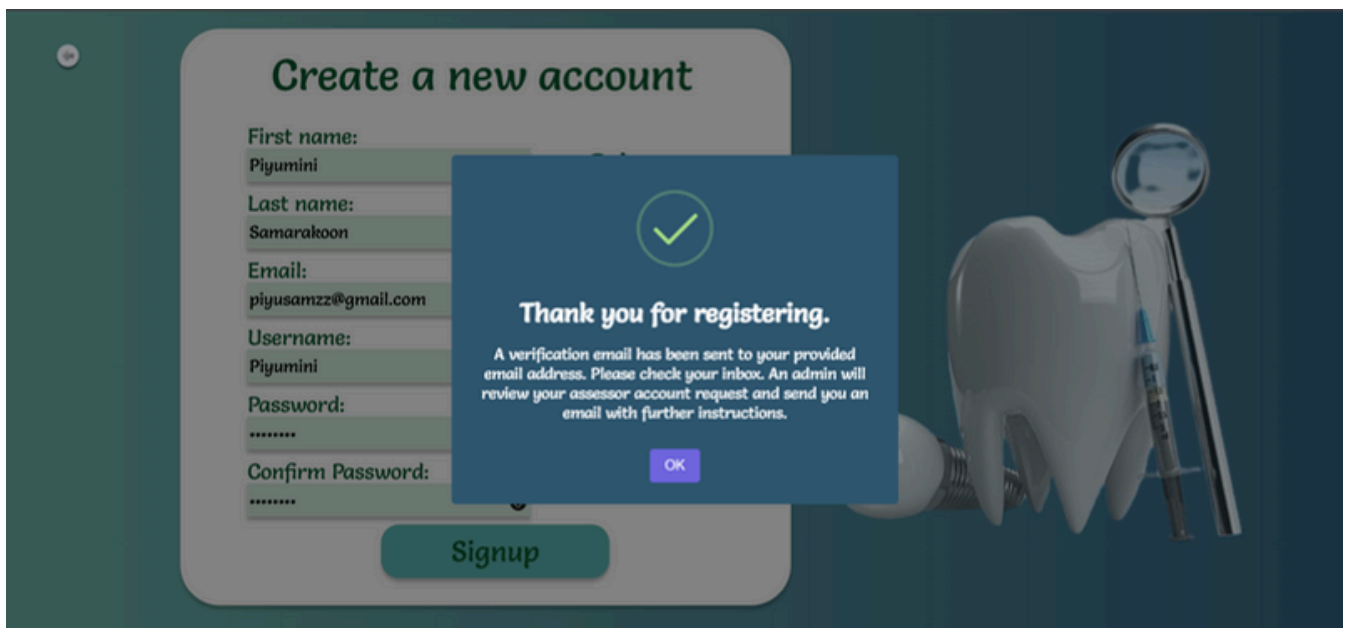 - Track progress through performance metrics and feedback reports.

This role empowers students to experiment freely, learn from mistakes, and gradually build the confidence needed for clinical practice.
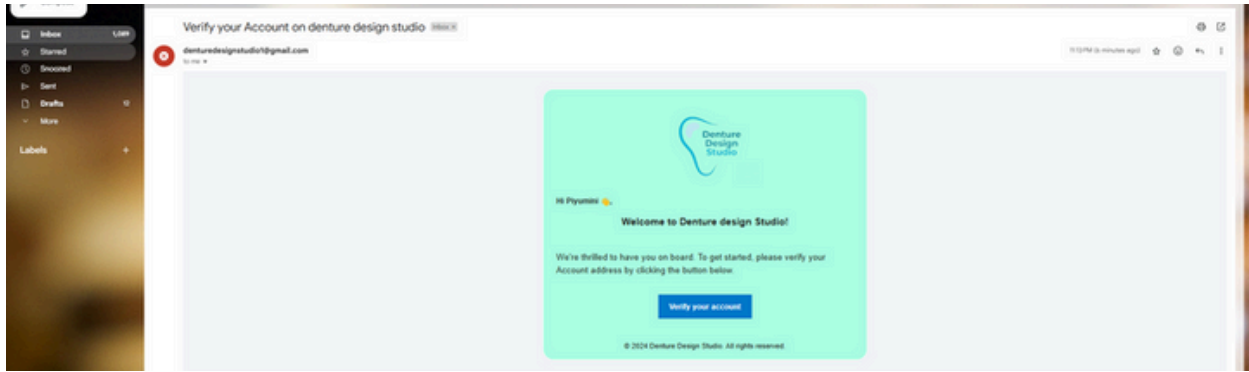
REGISTERING TO THE SYSTEM

1. Go to the link of the hosted web application of Denture Design Studio.
 https://denture-design-studio-front.vercel.app/
1. Click the "SignUp" button.
2. Fill the form duly and provide a valid email address and a strong password.
3. Choose Assessor or Student as roles accordingly.
4. You will get a verification link to the provided email address. Click on the "Verify Your Account" button.
5. Once your email address is verified by the system, you will be registered successfully to the system. if you are creating an assessor account, the assessor features will be accessible once the admin has approved the request.

Note: The verification link will be in spam folder of your email account. Mark it as not spam and then click on the button.
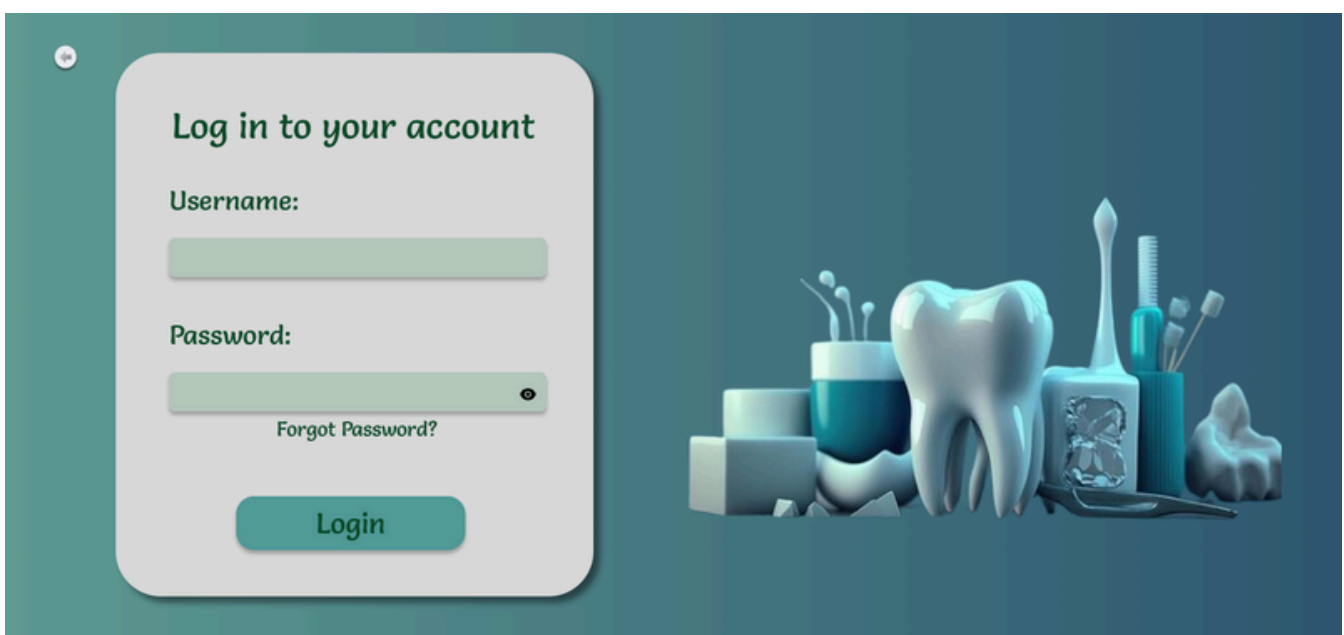
6. Select "Select Verify Your Account".

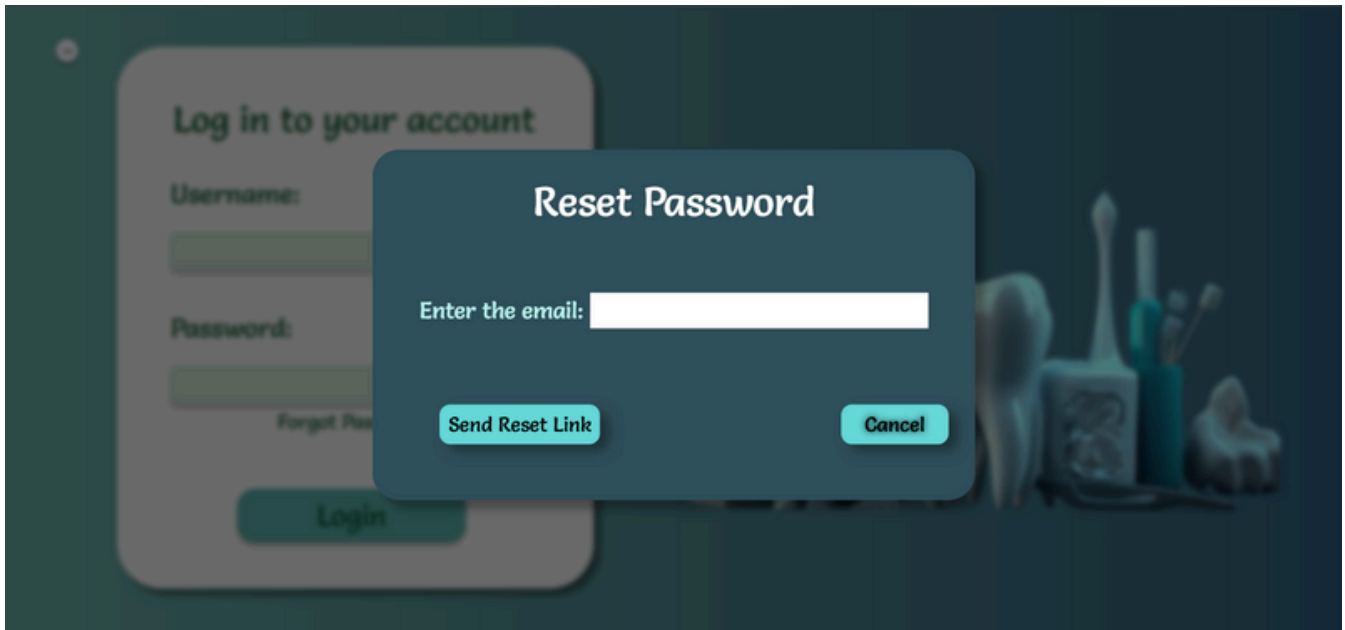7. Now You should be able to log into the system.

LOGGING INTO THE SYSTEM

1. Go to the link of the hosted web application of Denture Design Studio.
 https://denture-design-studio-front.vercel.app/

1. Click the "Login" button.

2. Enter username and password and click "Login".

3. Once your email address is verified by the system, you will be registered successfully to the system. if you are creating an assessor account, the assessor features will be accessible once the admin has approved the request.
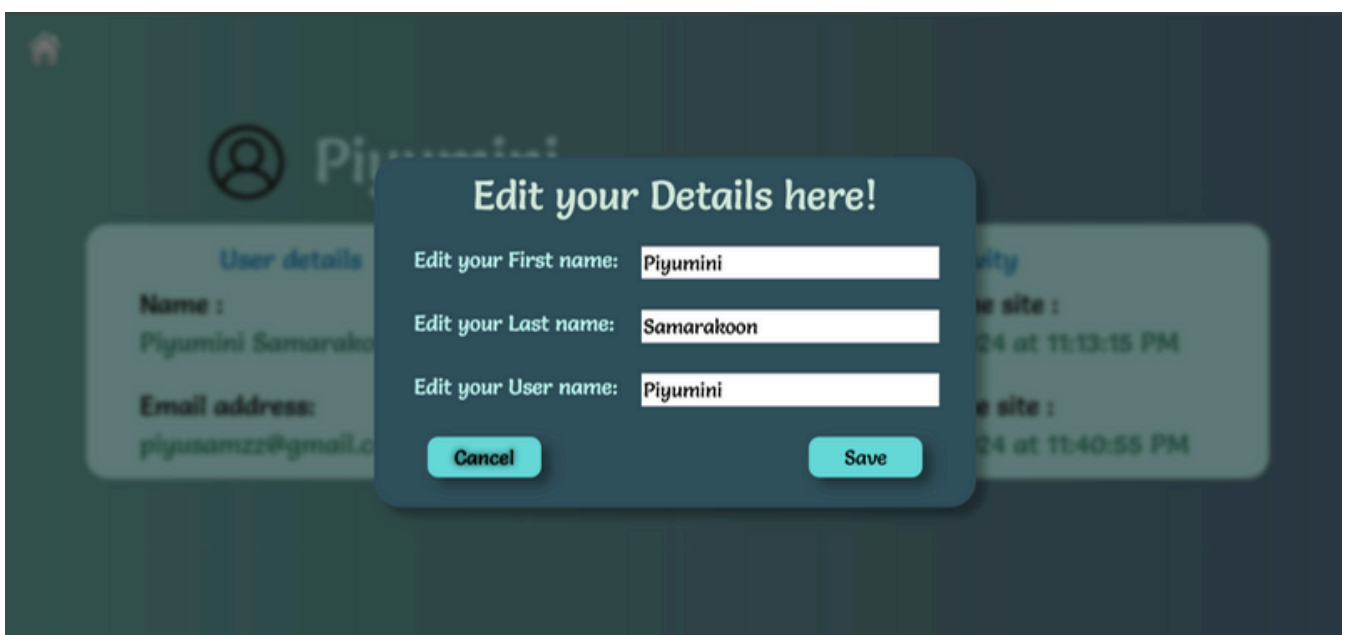
In case you have forgotten your password,

1. Click "Forgot password?"
2. Enter the email address you used to register in the site to get the reset link.
3. Click the rest link in the email and enter new passwords

EDITING PROFILE INFORMATION

1. Click on profile icon on the upper left corner of the screen. Here you can see your details including first and last access times.
2. Go to edit icon in user details, edit details and click "Save".

• ADMIN ACCOUNT

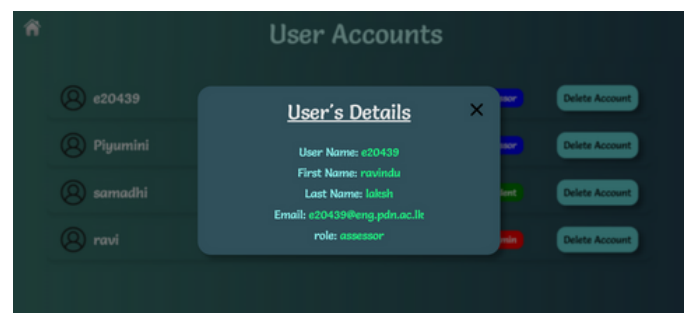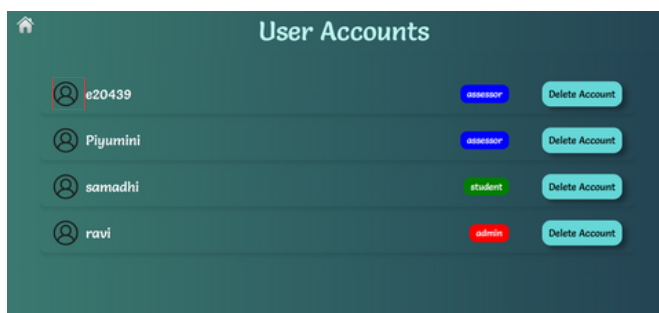Your Admin account homepage will look like this.

You can;

- Manage user accounts
- Upload content
- View engagement metrics of the students in the platform

by selecting the respective button.
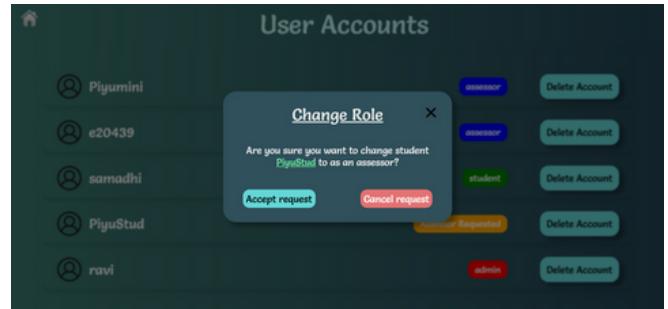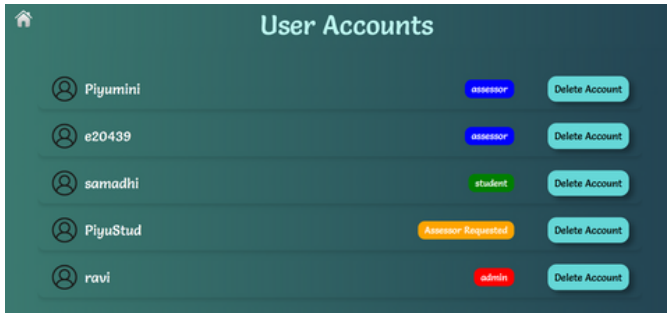
MANAGE USER ACCOUNTS

1. Click "User Accounts". Then you will be able to see all accounts and roles
2. To delete an account click "Delete Account" and then confirm
3. Click on account icons to view account information

When an assessor account is created, a request is sent to the admin to give the relevant permission.
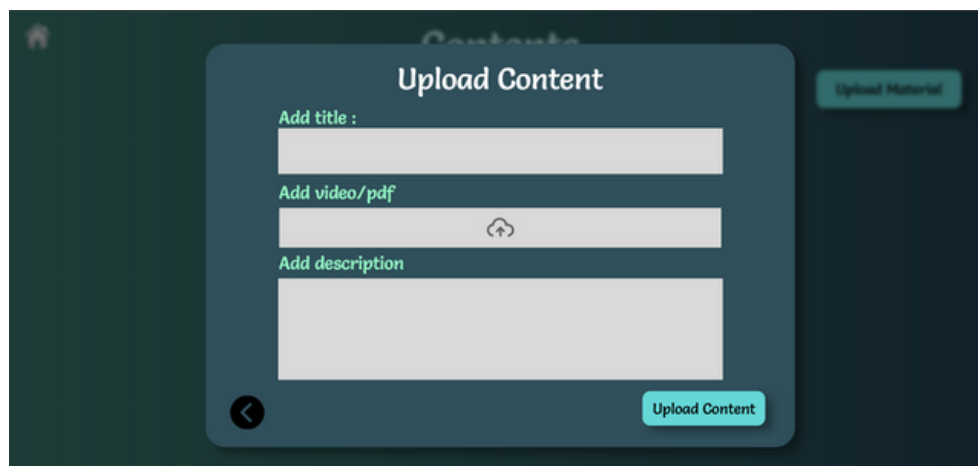
That request also can be seen in this page,

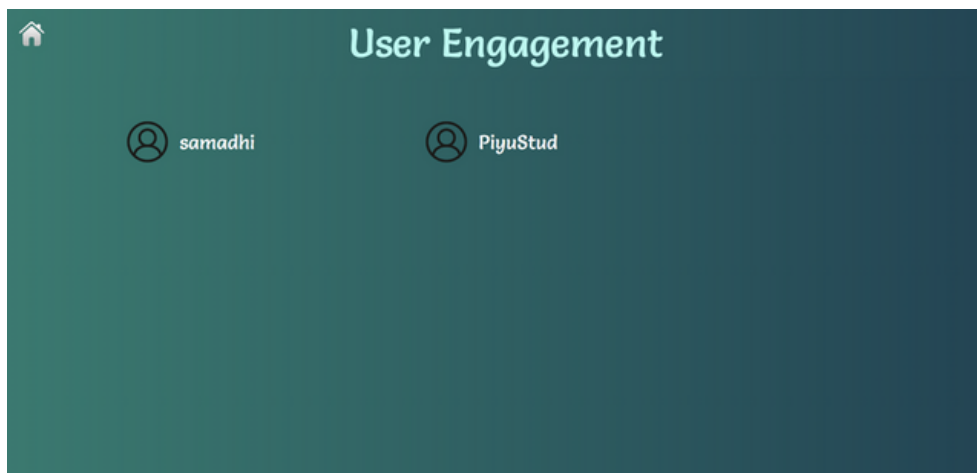You can click on the badge and accept or deny the request.

UPLOADING CONTENT

1. Click "Content".
2. In content page click "Upload Material", and add the material and title then click "Upload Content".

VIEWING ENGAGEMENT METRICS

1. Click "Engagement Metrics"
2. You will be able to see all student accounts in the platform. Click on the account to see the student's engagement.

• ASSESSOR ACCOUNT

Your Assessor account homepage will look like this after admin verification.

You can;

- Create patient case and upload it with answers / material
- Upload content
- View engagement metrics of the students in the platform

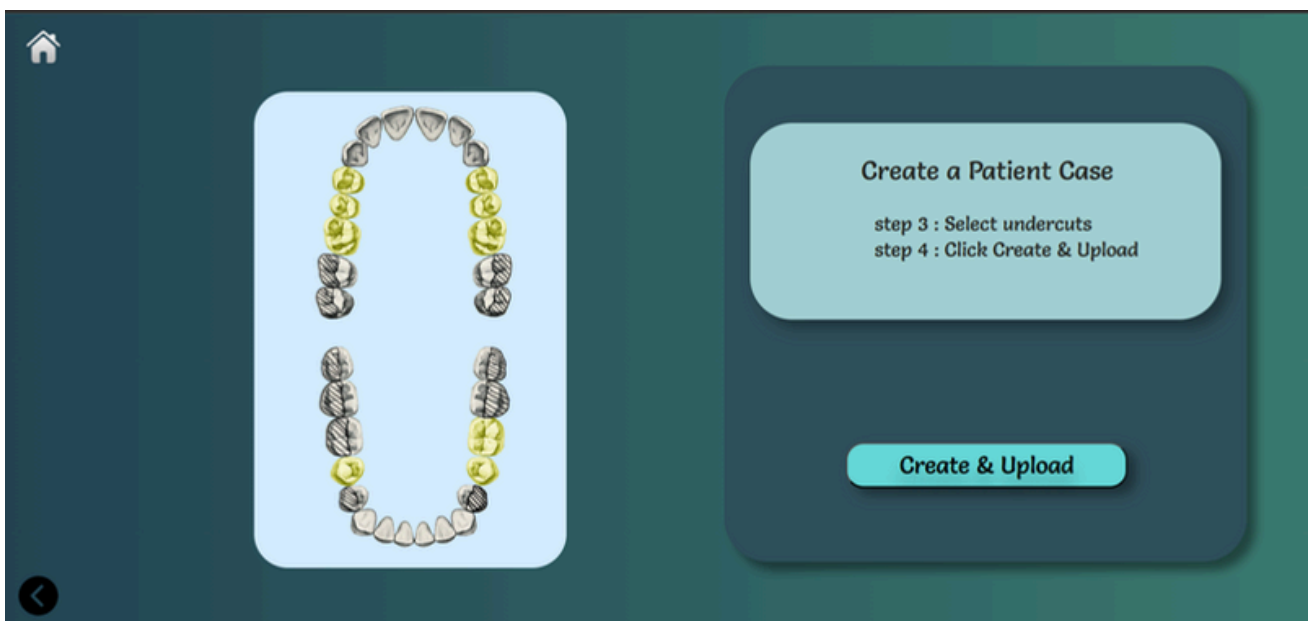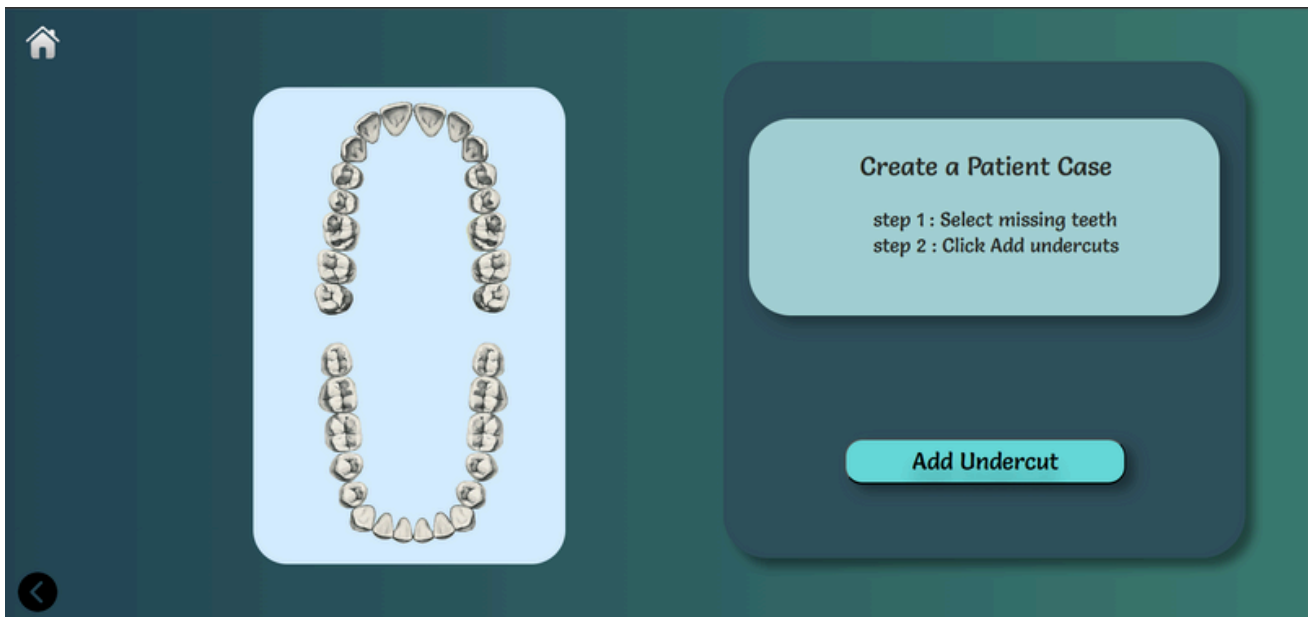by selecting the respective button.

UPLOADING CONTENT

1. Click "Content".
2. In content page click "Upload Material", and add the material and title then click "Upload Content".

VIEWING ENGAGEMENT METRICS

1. Click "Engagement Metrics"
2. You will be able to see all student accounts in the platform. Click on the account to see the student's engagement.

UPLOADING A PATIENT CASE

1. Click on "Upload a Patient Case" on the Assessor home page.
2. Select missing teeth: You can select missing teeth by clicking on each tooth. Deselect the selected tooth by clicking on a tooth again.
3. Click "Add Undercut" button. In the Undercuts page, undercuts appear on the buccal side as default. Click on the undercut to switch sides.
4. Click " Create & Upload".

5. Go to "Add Answer" and continue ***design steps*** to create the answer.

6. After following the steps (including answer review), and clicking "Finish Designing", Your answer will be uploaded and you will be re-directed to above page.

7. You can add additional descriptions related to the question and/or Upload material related to the denture design (i.e: x-rays related) in image/ pdf /video formats

8. You will be redirected to the homepage after clicking "Finish"

- # STUDENT ACCOUNT

Your Student account homepage will look like this. (Note that this would be the view of your assessor account as well until it is verified by the admin)
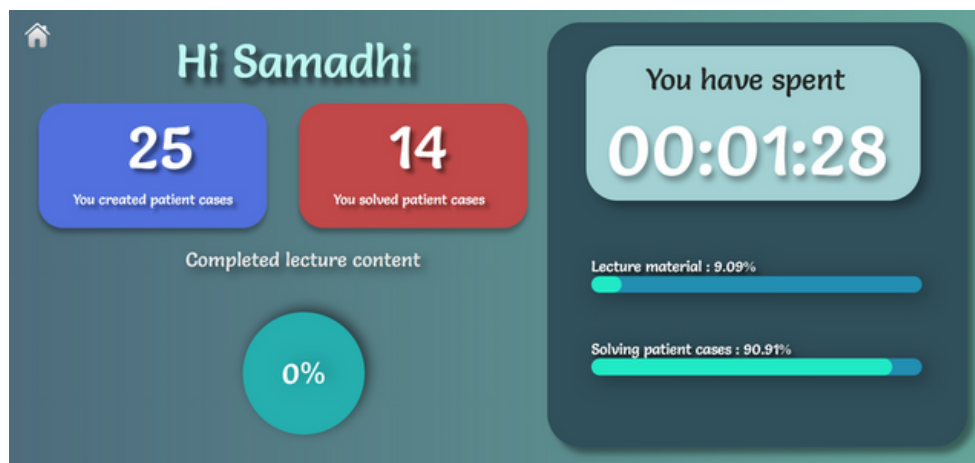

You can;
- Create patient case and solve it
- Solve a patient case from the system
- View content
- View your progress in the platform

by selecting the respective button.

VIEWING YOUR PROGRESS

Click "View your progress" to see your engagement in the platform.
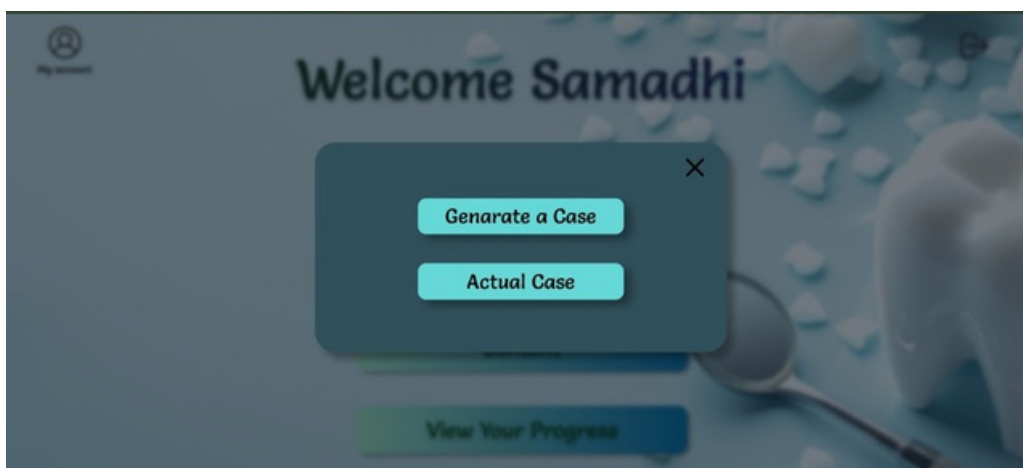
SOLVING / CREATING AND SOLVING A PATIENT CASE

One of the key features here is creating and solving patient cases. For this you have three options.
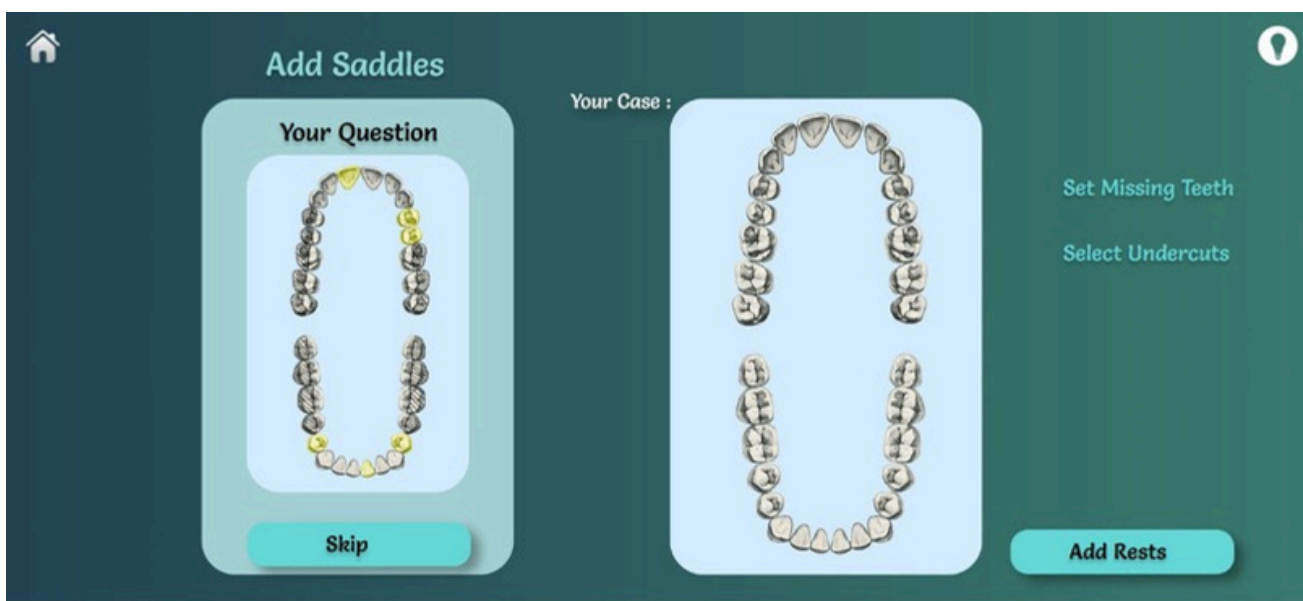
1. **Auto generated Patient Cases**: Include patient cases that are automatically generated by the system. We provide an arbitrary number of missing teeth on both or either arch.
2. **Actual Patient Cases**: These are uploaded by your assessors and administrators to match real world scenarios. Here both missing teeth and undercuts are provided in the case.
3. **Self Created Patient Case:** You can use this to answer any given question. You can select the missing teeth and undecuts to fit a question and then solve it yourself.

- Here is how to solve a **patient case uploaded by the assessors / auto generated patient case.**

1. Click on "Solve a Patient Case" button.
2. Click on "Generate a Case" or "Actual Case" button to continue.
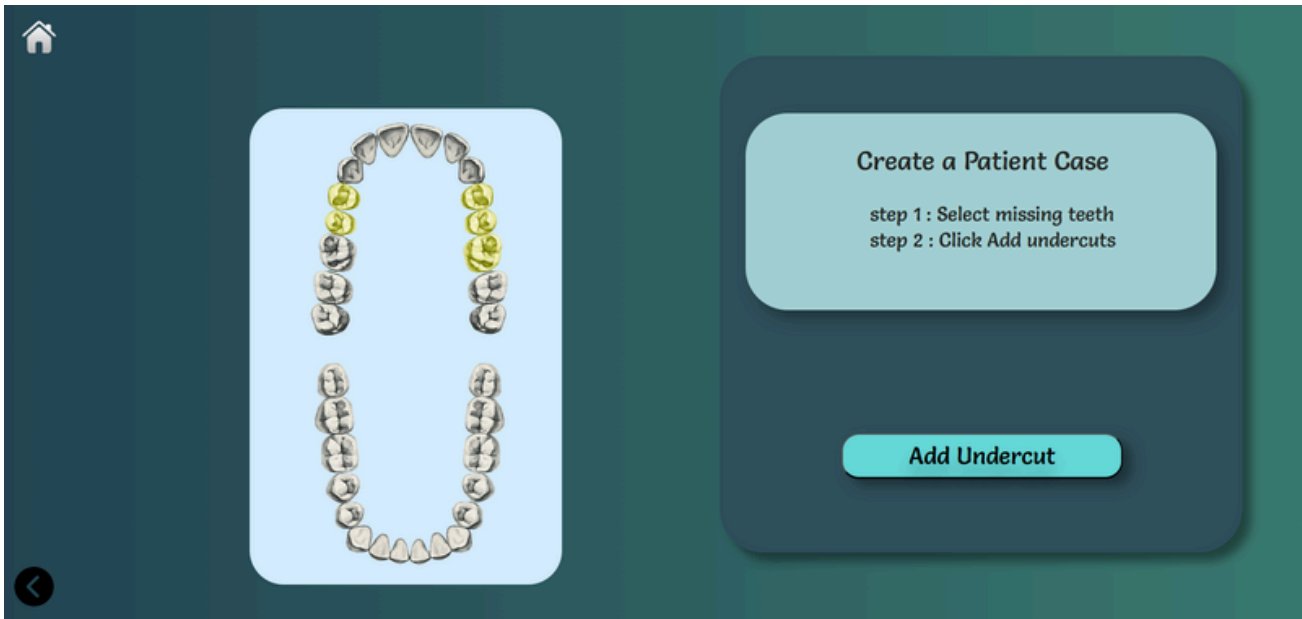
To get a different question, select "Skip".

If you are up to solving the given patient case, you can start solving the question by setting missing teeth and selecting undercuts.

1. Click on "Set Missing Teeth", then select each tooth of the missing array in "Your Case" box. To deselect a tooth, click on the tooth once again.
2. Then click on "Select Undercuts", and click on the undercuts that you want to switch to the palatal side.
3. Continue the step by step *__process of creating the denture__* , starting from selecting "Add Rests".

- To solve a **self created patient case**;

1. Select "Create a Patient Case".
2. Select missing teeth: You can select missing teeth by clicking on each tooth. Deselect the selected tooth by clicking on a tooth again.
3. Click "Add Undercut" button. In the Undercuts page, undercuts appear on the buccal side as default. Click on the undercut to switch sides.
4. Click " Create".

Solving follows the same sequence of steps as before.

AFTER SOLVING

Click "Finish Designing" after you reviewing the answer.

For a self created case, you can download your answer for self evaluation later or finish designing. (Note that upon "Finish" this answer or the patient case will not be saved anywhere.)

For an assessor uploaded case, you can view and download *model answer* as well as your answer for self evaluation.
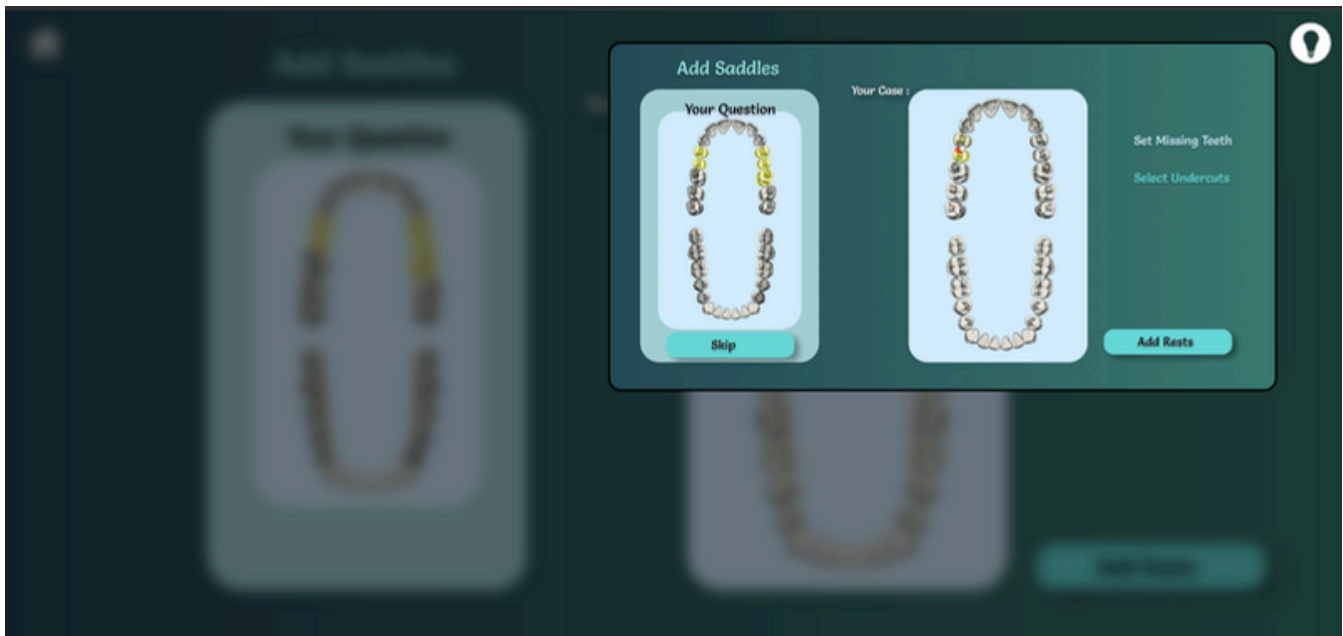
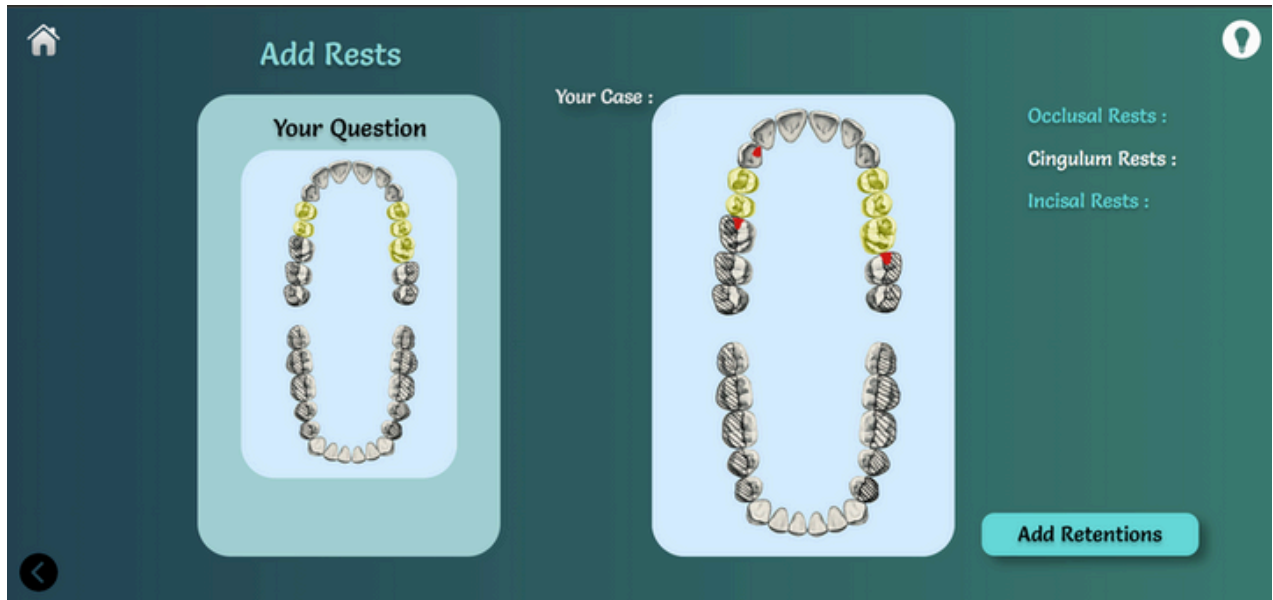This is the complete guide to the design steps of the denture design process.

1. If you are an assessor, you will have to follow these steps in designing the answer.
2. If you are a student, these steps will be useful in designing the denture.

Note: In the top right corner of each design step page, there is a demo button which will provide a video guide for you through. Use it as an additional guideline to clarify anything unclear to you.

STEP 1: ADDING RESTS

1. Select the rest type on the list on the right
2. Click on the places you want to add the rests of the selected type one by one. (To remove, click on it again)
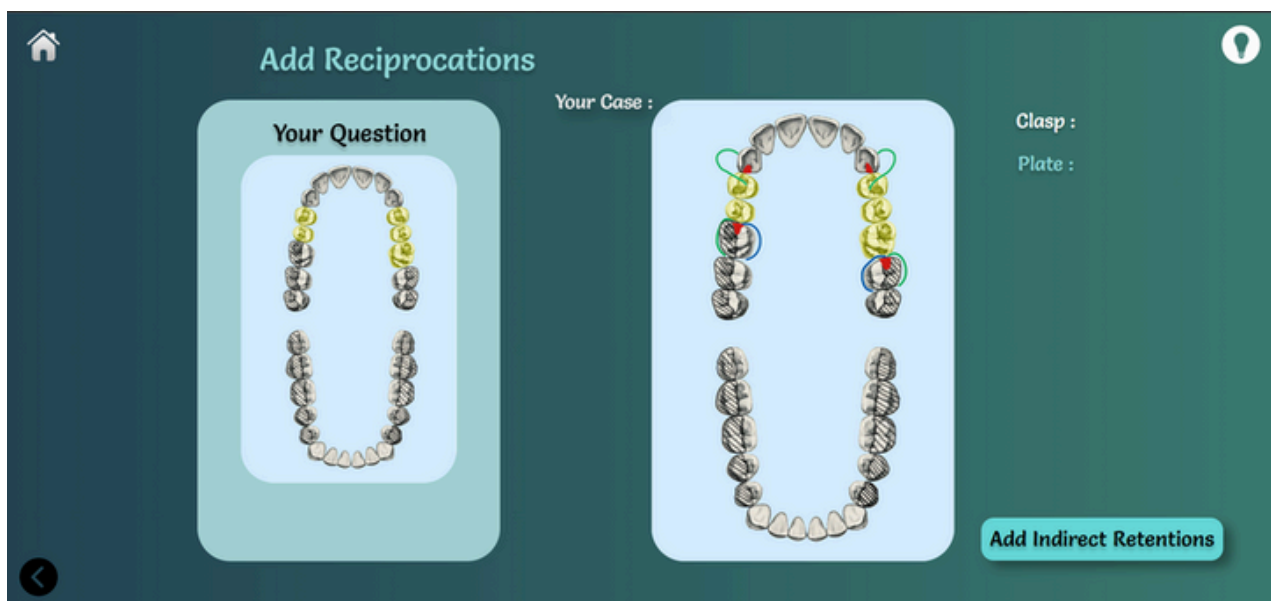3. Go to "Add Retentions" for the next step.

STEP 2: ADDING RETENTIONS

1. Select the retention type on the list on the right
2. Click on the starting point of the retention (For a gingivally approaching type this would be a missing tooth)
3. Click on the side to which you want to add the retention. (For an occlusally approaching type this would be either palatal or buccal; and for a gingivally approaching type it would be forward or backward on the buccal side)

STEP 3: ADDING RECIPROCATIONS

1. Select the reciprocation type on the list on the right
2. For a clasp, process is similar to the retention. For plates only the side is specified.
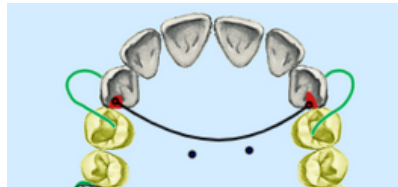3. Go to "Add Indirect Retentions" for the next step.

STEP 4: ADDING INDIRECT RETENTIONS

1. Follow the same process of adding rests.
2. Click on "Add Connectors" to move forward

STEP 5: ADDING CONNECTORS

1. Select the connector type, Upper or Lower and then Major or Minor.
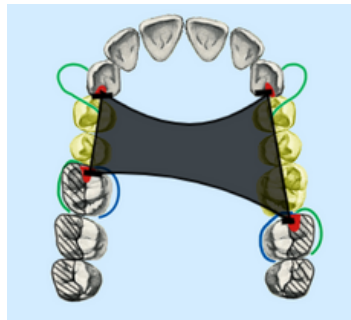2. For Upper Connector;

- Upper Major;
  - draw the each line, and adjust their curvature by moving the dots in the middle of each line.

  - You need to draw a closed shape enclosed by the lines.
  - When you have correctly drawn the upper connector, it would be shaded .
- Upper Minor;
  - Draw them as horizontal line segments connecting the necessary components
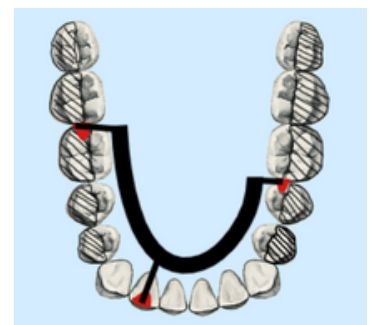
A completed upper connector would look like following:

3. For Lower Connector;
- Lower Major;
  - Draw a line connecting the endpoints.
  - Adjust the curvature using the dots
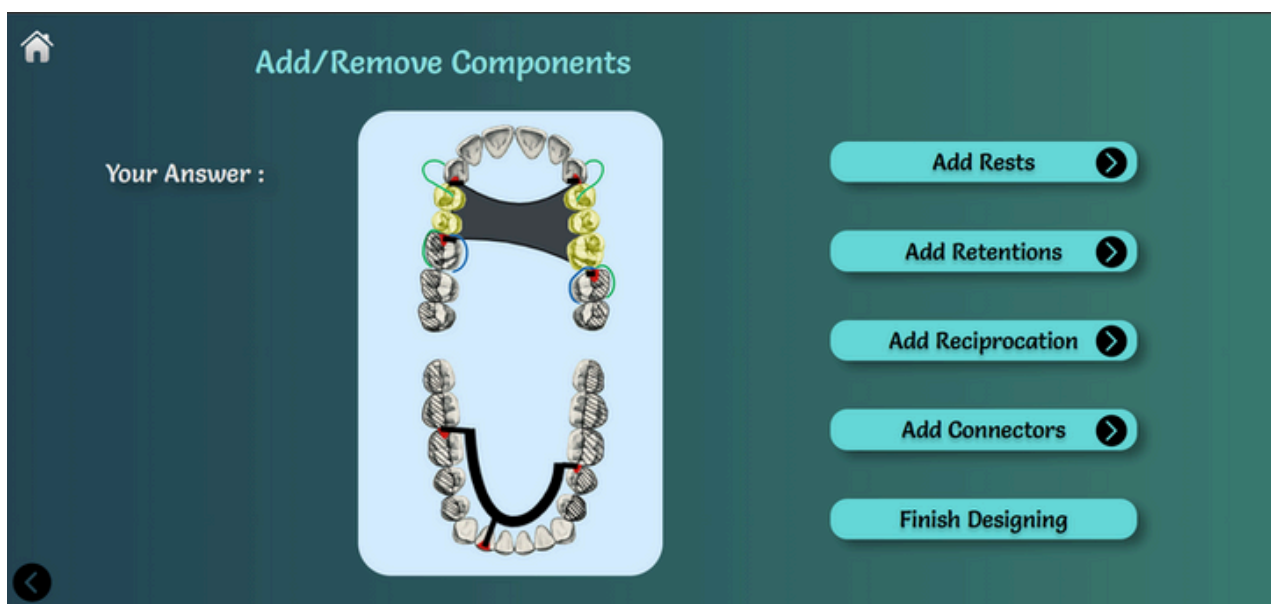- Lower Minor
  - Same way as the upper minors

A completed upper connector would look like following:

After the connectors are added, select "Done" to go to the review page.

STEP 6: REVIEWING ANSWER

You can now go back to each step and correct any wrongly placed items or adding more components if needed be.
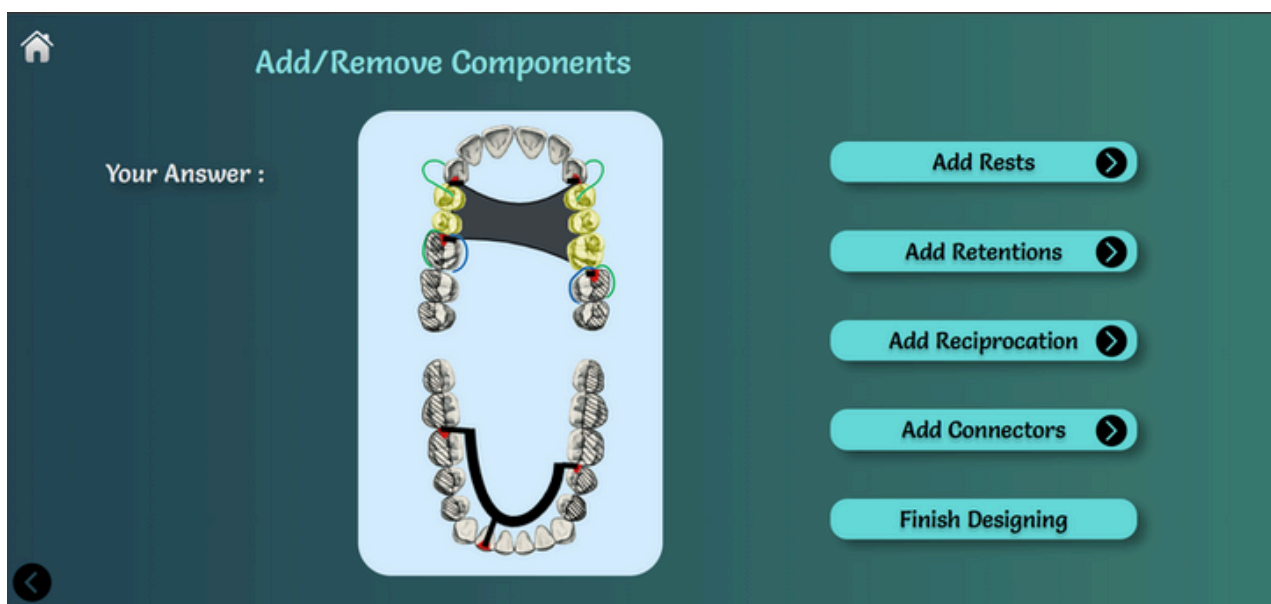
After completion, click on "Review Answer" button at bottom right corner of the page at each step.

Click on "Finish Designing" after review.

After the connectors are added, select "Done" to go to the review page.

STEP 6: REVIEWING ANSWER

You can now go back to each step and correct any wrongly placed items or adding more components .

After completion, click on "Review Answer" button at bottom right corner of the page at each step.

Click on "Finish Designing" after completion.