

## Manual 'Student Assignments via AnatomyTOOL'

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## ***Types of student-assignments***

You can use AnatomyTOOL for the following types of student-assignments:

1. student creates questions (about certain subject matter)
2. student creates documents, images, pdfs (about certain subject matter)
3. student recommends online images or websites (about certain subject matter)
4. student outlines structures in virtual microscopy slides
5. student does quiz

## ***Why use AnatomyTOOL for student-assignments?***

Using AnatomyTOOL for student-assignments has the following benefits:

### **Ready usable tools**

Ready usable tools are available, for instance to let students create questions or outline and label structures in microscopy slides. Furthermore there are a [viewers](#) such as a microscopy viewer and a cross-sectional cryocoupe and CT viewer that work straight away in the browser.

### **Ready content**

As teacher, you can create a quiz without needing to create all questions (or any question) yourself, as questions on several topics are already present in the system and this collection will continuously grow.

Also a series of [virtual microscopy slides](#) are available that teachers can use in assignments.

### **Created questions provide active interaction, in a broad variety**

The question creation tool lets students create varied types of questions that 'work', i.e. they provide active interaction. This is probably more rewarding (and challenging) for the student than creating just a text document with multiple choice questions.

### **Student-generated content may be upgraded to permanent platform content**

A special value of using AnatomyTOOL for student-assignments, is that created material of sufficient quality might be 'upgraded' by a teacher to remain permanently in the platform. Then it will be usable for anyone and can be found by searching on the anatomical structures and the topics with which the item was tagged.

This has benefits on two sides:

- it is probably more interesting for students to create subject matter that is not discarded but might be used permanently.

- the production of open licensed content for general usage can be accelerated by applying student-assignments to generate content

### **Virtual microscopy labels remain available for reviewing at home**

Outlines and labels created by students on microscopy slides, for instance during practicals on campus, can be stored by the student and revisited by him or her at another time and from home.

### ***Cons to using AnatomyTOOL for student-assignments***

As everything, there also are cons:

#### **Beginning platform**

AnatomyTOOL is a beginning platform. It has the benefits of sharing content between institutions and of being open, and even though it is based on the widely used and proven Content Management System Drupal, it does not (yet) have the proven rigour with massive amounts of users as common institutional Electronic Learning Environments (e.g. Blackboard, Moodle, Canvas, etc.) have. Also, advanced tools as plagiarism control tools are not (yet) available.

#### **Use 'as is' without guarantees**

AnatomyTOOL is offered for free. It is hosted and maintained with quite limited resources from the collective Dutch and Flemish departments of Anatomy and with very limited staffing. Therefore it is offered on an 'as is' base without guarantees for its well functioning or for its fitness for any specific goal. The AnatomyTOOL Parties are not liable for damages arising out of or in connection with the usage of AnatomyTOOL. Check the [legal information](#) before using AnatomyTOOL.

#### **User management still imperfect**

There are no automatic links yet between institutional Electronic Learning Environments (ELOs) and AnatomyTOOL. Such links would importantly reduce user management administrative burden, by allowing students single-sign-on login from the ELOs to AnatomyTOOL and by transferring results of AnatomyTOOL quizzes back to the ELOs for storage in their gradebooks. Now, to make an assignment in AnatomyTOOL, students still need to create an account in AnatomyTOOL, a process that requires manual assigning of the student role by an administrator. This implies that usage of AnatomyTOOL presently is mostly limited to small numbers of students.

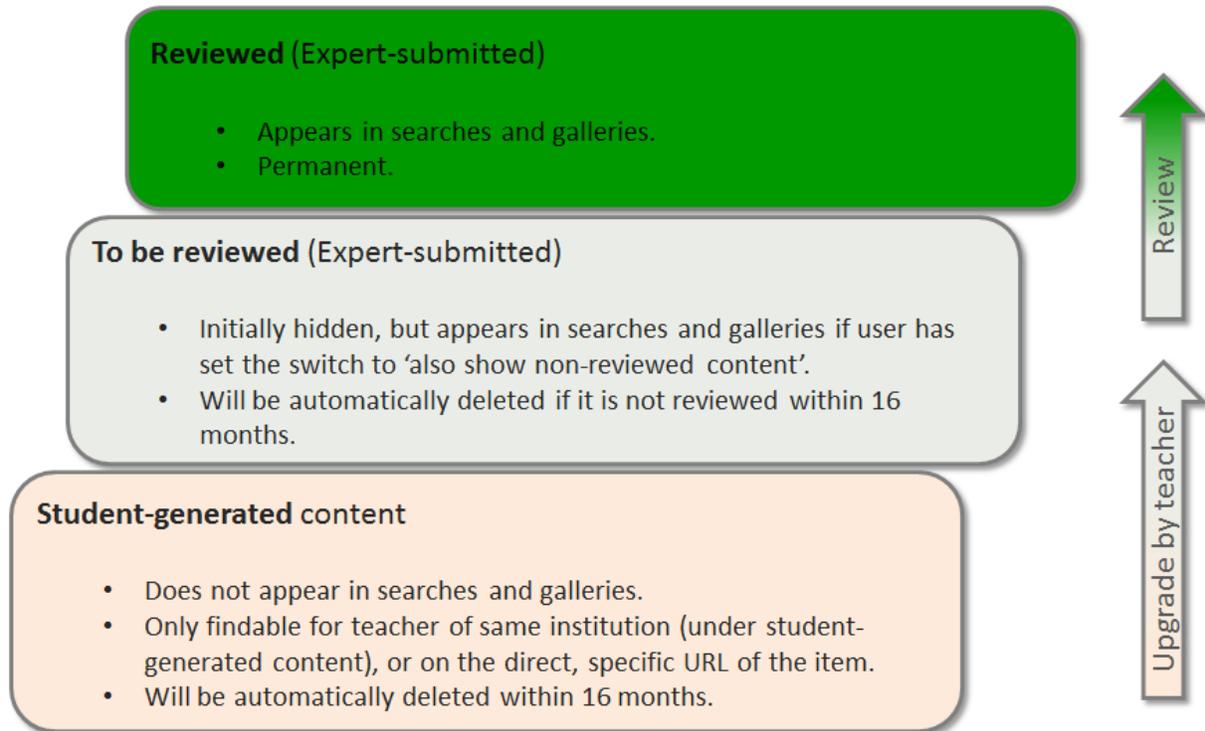
### **Not suited for summative testing**

The quizzes in AnatomyTOOL are only intended to be used for formative testing, i.e. for exercising. The technical format is designed for openness, not for the security required in summative testing.

## Student-generated content

### Three quality levels of content in AnatomyTOOL

Content in AnatomyTOOL can be present in one of three quality zones. Student-generated content is one of those three quality zones. The below graphic depicts these three zones:



The characteristics of student-generated content are discussed in the following section.

### Characteristics of student-generated content (display, deletion)

Student-generated content has specific characteristics with regard to its display and deletion.

- It will not appear in general searches or galleries on the platform.
- It is only *findable* for *teachers of the institution* of the student under the tab 'Student-generated content' in the 'Create and edit content' area.

ANATOMYTOOL Student-generated content

My documents My images My videos My interactive items My questions My learning paths My courses & Assign to users **Student-generated content**

Institution: Netherlands, Leiden – Leiden University Medical Center, Leiden University

Name:  Apply

Enter a comma separated list of user names.

Title	Created	Name	Institution		
Chamber of the heart	16 Jun 2017 - 04:07	student1	Netherlands, Leiden – Leiden University Medical Center, Leiden University	edit	clone
test	7 Jun 2017 - 02:55	student1	Netherlands, Leiden – Leiden University Medical Center, Leiden University	edit	clone
test question student	6 Jun 2017 - 12:12	student1	Netherlands, Leiden – Leiden University Medical Center, Leiden University	edit	clone

Note, however that the protection is only 'security by obscurity', it is not login-protected. If one knows the URL of a specific item created by a student, it is open accessible.

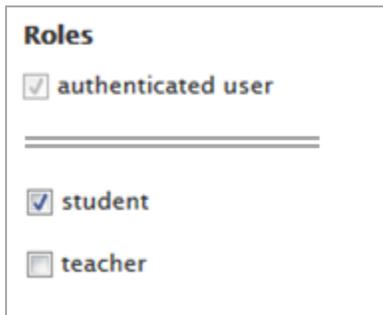
- It will be automatically deleted after 16 months. The student or teacher can however delete it earlier if one wishes.

If the content created by the student is qualitatively good, the teacher may decide to upgrade it from the 'student-generated content' area to the 'expert-submitted' area. Then it *will* be found in searches and displayed in the galleries. It should then be reviewed, just as all content in the 'expert-submitted' area to get a permanent status.

## ***Account for the student***

Anyone can create an account on AnatomyTOOL for free. Such a basic account only gives permission to write comments. To be able to create content, as is the case in these student-assignments, the account needs to be upgraded to the 'student' role. The 'student-role' grants permission to create documents, images, videos, interactive items and questions.

At present there is no automated way yet to give students this role, so students will need to mail to the institutional AnatomyTOOL administrator who should then upgrade their account.



The image shows a screenshot of a web interface titled "Roles". It contains a list of roles with checkboxes next to them. The roles listed are "authenticated user", "student", and "teacher". The "authenticated user" role has a checked checkbox, and the "student" role also has a checked checkbox. The "teacher" role has an unchecked checkbox. There are two horizontal lines above the "student" role.

Role	Checked
authenticated user	Yes
student	Yes
teacher	No

## Assignment type 1. Student creates questions (about certain subject matter)

A common assignment method is to let student create questions about the subject matter. This stimulates active working with the subject matter. With AnatomyTOOL, this can possibly be nicer to do for the students because different question types are possible, the created question can be seen 'working' directly, and the work may get a permanent usage, if the questions are so good that they are upgraded to the 'expert submitted' level.

A ready to use example of such an assignment (presently only in Dutch) is available [here](#).

[Example](#) of a question originally created by a student (adapted by staff)

The pancreas receives blood supply from several blood vessels. Which artery usually forms the main supply for the body (corpus) and tail (cauda) of the pancreas?

Superior mesenteric artery

Splenic artery ✓

Indeed, several branches from the splenic artery (e.g. the dorsal splenic artery and several smaller arteries that arise from the splenic artery, as it passes along the pancreas), usually supply the body and tail of the pancreas. Note however that in most cases some blood is *also* received (via intermediate blood vessels) from the region of the head of the pancreas (which is supplied by the common hepatic artery and the superior mesenteric artery) and that variants are common, with on one extreme exclusive supply of the body and tail of the pancreas by the splenic artery and on the other extreme no supply at all of the body and tail of the pancreas by the splenic artery.

Inferior phrenic artery

Common hepatic artery

 You got 1 of 1 points

[Download](#) [Embed](#) H-P

By: Leiden University Medical Center

## Assignment type 2. Student creates documents, images, pdfs (about certain subject matter)

One can have students create documents about subject matter and upload them.

[Example](#) (Part of winning poster created by a student in the AnatomyByStudents contest Spring 2017)

# Examination of the ankle - anatomical background

### Introduction

The aim of this poster is to provide medical students with basic knowledge of anatomical constructs in order to more efficiently conduct a physical examination of the ankle. This poster will first show what bones and joints the ankle and foot consist of, after which it will continue to show the most clinically relevant ligaments and muscle insertions. The third section will treat the movements that the foot can make. The final section will explain some of the more specific tests of the ankle.

Hopefully, by the end of this poster, you will have gained insight into the anatomical background of the physical examination of the ankle, along with insight into some more specific tests.

### Bones of the ankle and foot

- Ossa phalanges
- Ossa metatarsales
- Ossa cuneiformes
- Os naviculare
- Os cuboideum
- Os talus
- Os calcaneus
- Os tibia
- Os fibula

1 Articulatio talocruralis  
2 Articulatio talocalcaneonavicularis

Figure 1: Dorsal (left), lateral (top right) and medial (bottom right) view of the bones of the foot. The individual bones have been coloured accordingly. The articulatio talocruralis (talotibial joint) and the articulatio talocalcaneonavicularis made visible with darker, numbered lines.

### Movements

Figure 3: Movements of the foot. The arrows show dorsiflexion, plantarflexion, inversion and eversion (for joints, see fig. 1). Pronation and supination are not shown. These are more complex movements: pronation consists of eversion of the hindfoot, abduction of the forefoot, and dorsiflexion of the talocrural joint. Supination consists of inversion of the hindfoot, adduction of the forefoot, and plantarflexion of the talocrural joint. Easier to remember is that pro- and supination are movements of the entire foot, e- and inversion are movements of the talocalcaneonavicular joint.

### Insertions and ligaments

Figure 2: Lateral (top) and medial (bottom) view of the bones of the foot. Visible are the ligaments in greyish blue and the muscle tendons in red. Only the ligaments that are vital to perform a decent physical examination of the ankle are shown. Ligaments such as the metatarsal ligaments will not be treated, since these have relatively low clinical significance (read: you won't encounter many patients with metatarsal ligament ruptures. If you do, well, good luck then, to you and your patient).

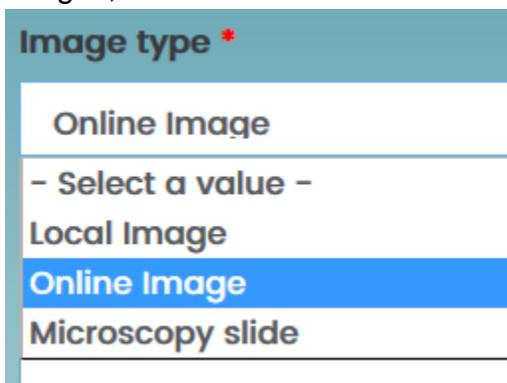
By: Daan Janssen, student Maastricht University

### **Assignment type 3. Student recommends online images or websites (about certain subject matter)**

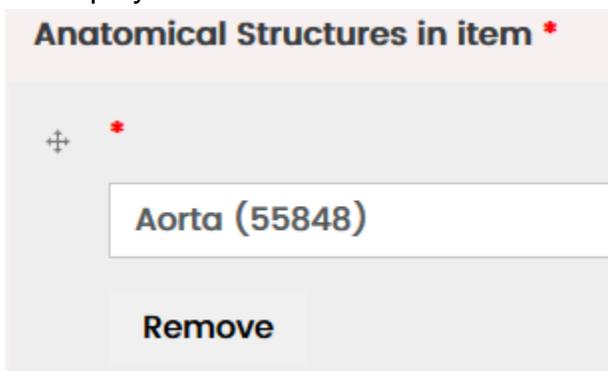
A Google search on an anatomical structure provides thousands of hits in a wink of an eye. At inspection of the hits, some appear good and relevant but some meagre or irrelevant or even outright incorrect. Often it is difficult for students to distinguish between correct or incorrect. In fact, even for anatomists or physicians, if it is somewhat outside their daily field of work, it may also be difficult. AnatomyTOOL strives to collect not only original material but also reviewed references to quality online anatomical material. This will enable students (and others) to quickly find relevant quality assured images, videos and documents on specific anatomical structures.

Students can be requested to search for and recommend online images on anatomical structures as an assignment.

In AnatomyTOOL such recommendations can be made by entering *online* documents, images, videos and interactive items in these respective categories.



They are then tagged by one or more anatomical structures, which will make the item to be displayed with those anatomical structures.



This principle of having students recommend online images which will then be displayed together with the anatomical structure was applied in the platform AnatomicalTerms.info (see example below).

[Example \(outside AnatomyTOOL\)](#)

Recommended Images<sup>[?]</sup> **IMAGING** **MICROSCOPY** **VIEW** **SPECIAL** **LICENSE** **ALL**

You can recommend online images for this concept/structure (login needed). **ARTWORK** **ANATOMICAL** **CLINICAL** Hide comments

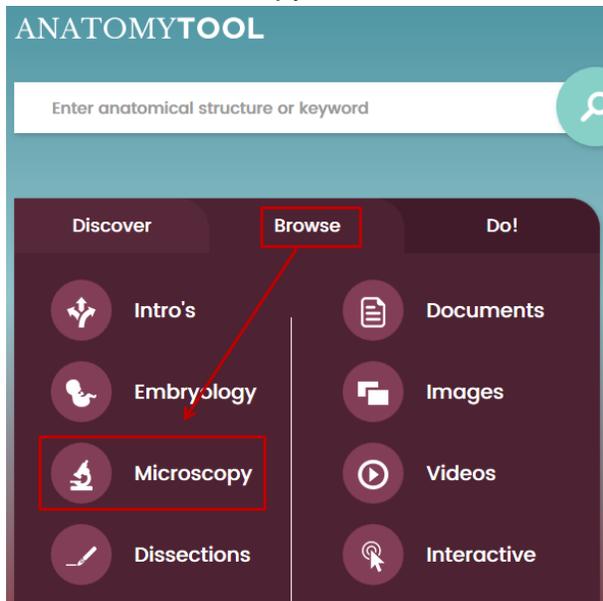
<b>ARTWORK</b>  <p>19 May 2014 2:10 O. Paul Gobée, MD., Anatomist, e-learning developer, Netherlands Attractive 'three-dimensional' drawing that shows the femoral artery with its branches, from its origin at the inguinal ligament where it arises from the iliac artery. The relation of the artery to the</p> <p>★★★★★ 4.5 (1 Rating) 3 comments</p>	<b>ANATOMICAL</b>  <p>19 May 2014 2:33 O. Paul Gobée, MD., Anatomist, e-learning developer, Netherlands This good dissection photo is animated. The femoral artery is pointed out and slightly compressed, allowing to appreciate its dimensions and structure, also in relation to the adjacent femoral vein. The vein shows a little node</p> <p>★★★★★ 4.5 (1 Rating) 4 comments</p>
<b>IMAGING</b>  <p>19 May 2014 2:57 O. Paul Gobée, MD., Anatomist, e-learning developer, Netherlands This radiography clearly indicates the position of the femoral artery in relation to the femoral head, 27 Oct 2016 9:20 Anonymous</p> <p>★★★★☆ 3.5 (1 Rating) 2 comments</p>	<b>CLINICAL</b>  <p>19 May 2014 2:49 O. Paul Gobée, MD., Anatomist, e-learning developer, Netherlands This photo shows the palpation of the femoral artery pulse during physical examination. This is also the location to compress the artery as an emergency measure in severe distal bleeding.</p> <p>★★★★☆ 3 (1 Rating) 3 comments</p>

## Assignment type 4. Student outlines structures in virtual microscopy slides

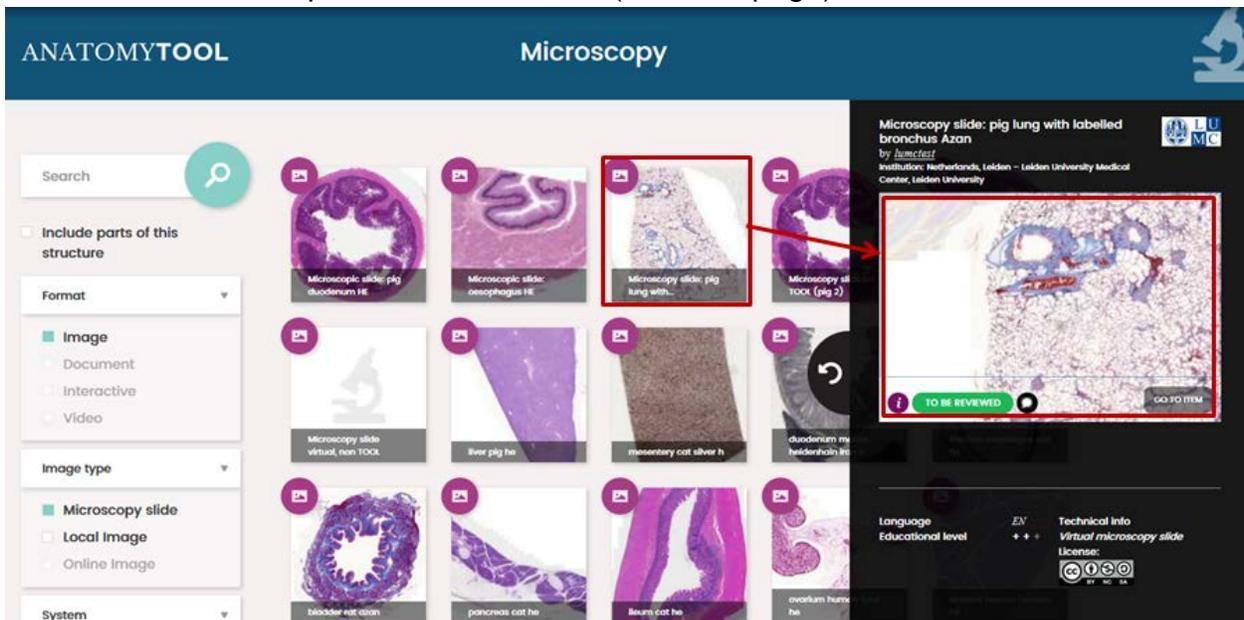
In a practical or at home, one can require students to outline structures in a virtual microscopy slide and discuss those in class-room, or submit them for teacher check, or store them for own referral.

The workflow is:

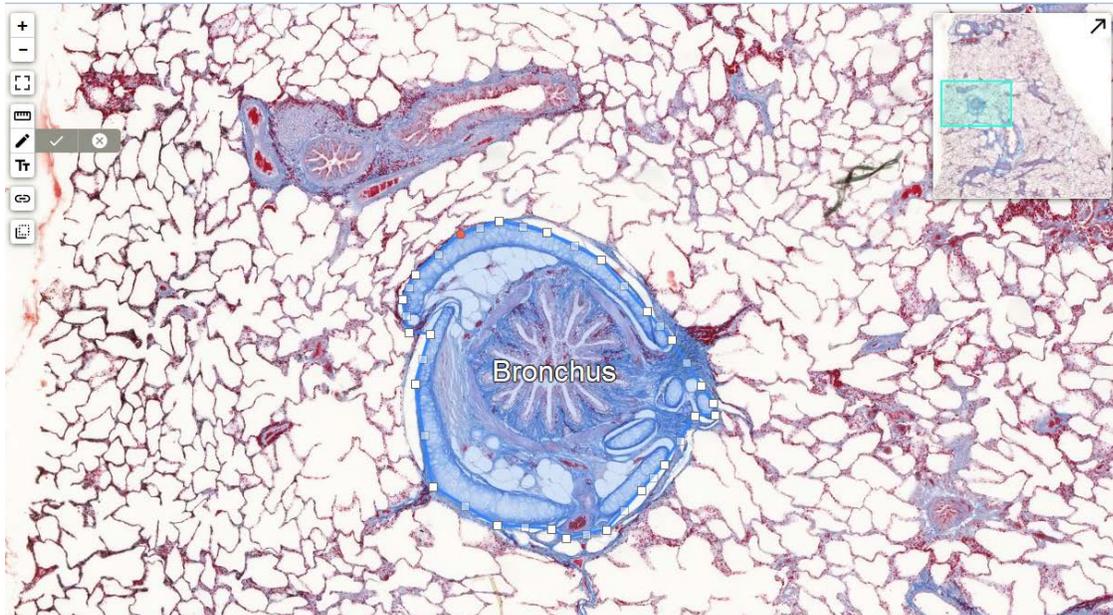
Browse > Microscopy



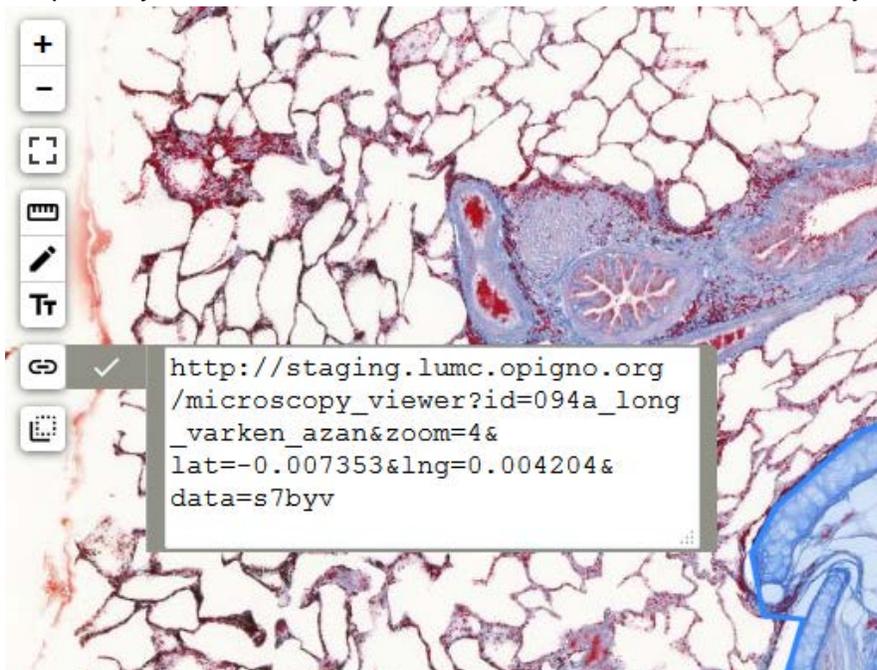
Select a slide, it will open in a new window (see next page)



In the virtual slide, find the intended structure, click the 'draw' icon  and outline a shape around the structure by clicking point after point. Close the shape by clicking on the first dot.



Then, click the 'hyperlink' button . A specific hyperlink will be created for exactly this slide view, including all annotations and labels, made so far. This URL can be submitted for plenary discussion or can be sent to the teacher for later judgement.



## Assignment type 5. Student does quiz

You can create a quiz for your students to do. You could use this as preparatory activity prior to a class activity or practical, or as a separate assignment.

An important benefit of using AnatomyTOOL is that questions on several topics are already present in the system and this collection will continuously grow. Hence, as teacher, you can create a quiz without needing to create all questions (or any question) yourself.

## Create quiz

See the [Manual 'Create Learning Path \(lesson, quiz\)'](#) to learn how to set up a Learning Path, the overarching mechanism that includes creating quizzes.

## Example



### Quiz 'Digestive System'

Your score: 100 %

A quiz with a number of questions about the anatomy of the digestive system.

The questions in this Learning Path / quiz:

Click on a part of the colon that is secondary retroperitoneal



Which structure is indicated with a question mark?

- Jejunum
- bursa omentalis (lesser sac)
- Pancreas

[Check](#)

Which of the following structures are made of peritoneum?

- Mesentery
- Transverse\_mesocolon
- Meso-appendix
- [Gastrocolic\\_ligament](#)
- Hepatogastric\_ligament
- [Falciform\\_ligament](#)
- Round\_ligament\_of\_liver
- Coronary\_ligament
- Greater\_omentum
- Omental\_bursa

[Check](#)

A 12-year-old boy is taken to the Accident & Emergency department, presenting with fever, nausea and abdominal pain. The symptoms and additional examination (leukocytes) quickly lead to the diagnosis 'acute appendicitis'. A CT scan shows an inflamed appendix in retrocaecal position, surrounded by oedema. The boy is taken to the OR for laparoscopic appendectomy. Ligation of the branches of which artery is required in order to prevent excessive blood loss during the procedure?

- Superior epigastric artery
- Inferior epigastric artery
- Coeliac trunk
- Superior mesenteric artery
- Inferior mesenteric artery

[Check](#)

Drag and Drop



Which structure is indicated with a question mark?

- Ductus hepaticus / Hepatic duct
- V. portae / Portal vein
- V. hepatica / Hepatic vein
- A. hepatica propria / Proper hepatic artery
- Ductus choledochus / Bile duct

[Check](#)

A 35-year-old man suffered from sharp abdominal pain and had been vomiting blood for two days before he died without seeking medical help. The autopsy report mentions that a perforated ulcer in the posterior part of the first portion of the duodenum had damaged an adjacent artery. Which artery is this most likely?

- Gastroduodenal artery
- Short gastric artery
- Left gastric artery
- Splenic artery
- Left gastroepiploic artery

[Check](#)

Click on the bile duct!

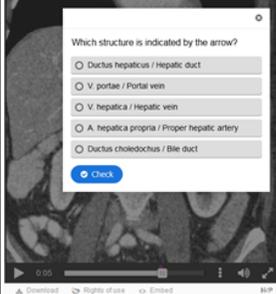


Which structures can be seen on this Endoscopic retrograde Cholangiopancreatography?

- Ductus choledochus / Bile duct
- Major duodenal papilla (Vater)
- Pancreas
- Ductus hepaticus dexter / Right hepatic duct
- Ductus cysticus / Cystic duct
- V. portae / Portal vein

[Check](#)

Which structure is indicated by the arrow?



Supplied intestine at B:

Supplied intestine at D:

[Check](#)

## Judging student's work

### Judging questions or content (assignments types 1-3) created by students

Via Browse > Do! > Create and edit Content go to tab 'Student generated Content'

Title	Created	Name	Institution		
Chamber of the heart	16 Jun 2017 - 04:07	student1	Netherlands, Leiden - Leiden University Medical Center, Leiden University	edit	clone
test	7 Jun 2017 - 02:55	student1	Netherlands, Leiden - Leiden University Medical Center, Leiden University	edit	clone
test question student	6 Jun 2017 - 12:12	student1	Netherlands, Leiden - Leiden University Medical Center, Leiden University	edit	clone

You will find content created by students of your institution. Click the name of an item to view it. Then you can judge it.

### Judging a quiz (assignments type 5)

The questions in quizzes are automatically checked by the system.

You can find the results of the students under the specific quiz, under the tab 'Results'.

Username	Started	Finished	Score	Evaluated	Institution
teacher1	3 Jul 2017 - 01:32	3 Jul 2017 - 01:34 (Duration: 0:02:30')	100 % Passed	Yes	Netherlands, Leiden - Leiden University Medical Center, Leiden University

## ***Upgrading student-generated content to 'expert-submitted content'***

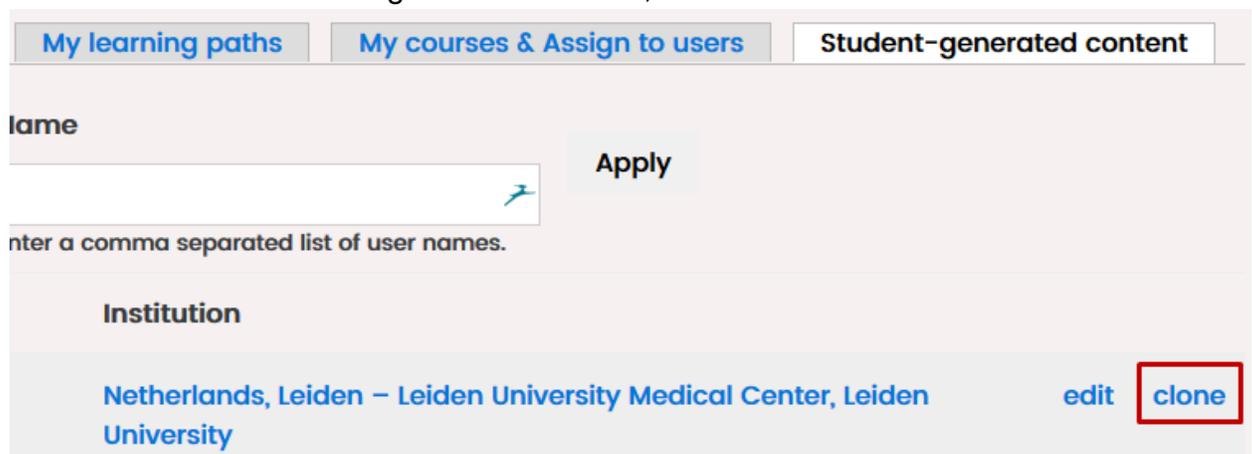
If content created by a student is so good that it is worth while to preserve it for the AnatomyTOOL platform, a teacher can upgrade it from the level 'Student-generated content' to the level 'To be reviewed (Expert submitted content)'.

Note that when the item was created as part of an obligatory assignment, written permission of the student should be obtained for this reuse of the content created by him/her and the judgement of an assignment should not be influenced by the granting or not granting of such permission by the student. In the [example assignment \(separate file\)](#) already a wording to ask for this permission is present.

There are two ways to upgrade the content:

1. Method 1. The teacher creates a **clone** of the item.

How? In the list of student-generated content, the teacher clicks '**clone**':



The screenshot shows the AnatomyTOOL interface with three tabs: 'My learning paths', 'My courses & Assign to users', and 'Student-generated content'. The 'Student-generated content' tab is active. Below the tabs, there is a search bar with the placeholder text 'Name' and an 'Apply' button. Below the search bar, there is a text input field with the placeholder text 'Enter a comma separated list of user names.' Below this, there is a table with the following content:

Institution	edit	clone
Netherlands, Leiden – Leiden University Medical Center, Leiden University		

The following holds in this case:

- a. the teacher becomes the author of the cloned item.
- b. the teacher can edit the cloned item without affecting the student-generated item. The student cannot edit the cloned item.
- c. The teacher should put the student's name in the Credit's box to credit the student, if the student wishes so.

Credits

If other people besides yourself have contributed to the item you upload or create now, you can give credit to them here. This will be shown together with the item.

- d. the cloned item is in the expert-created zone, hence findable,
- e. The teacher now becomes responsible for getting this content-item reviewed.
- f. The original item created by the student remains in the student-generated zone and will be auto-deleted after 16 months.

**Note.** The license as set by the student must be followed. When the student has chosen a Creative Commons license with a SA (ShareAlike) tag, the same license should be applied to the clone.

2. Method 2. The teacher can **upgrade the original item.**

How? In the item *itself*, the teacher switches the setting 'student-generated-content' to 'content submitted content by expert'.

Quality level and permanency \*

- Student-generated content (does not appear in searches and galleries, automatically deleted after 16 months)
- Content submitted by expert (not reviewed, default hidden in searches and galleries, automatically deleted after 16 months if not reviewed)

The following holds in this case:

- a. the student remains the author of the item. Hence the student's name will automatically be shown with the item as author.
- b. the item is now in the expert-created zone, hence findable.
- c. the student will be responsible for getting the item reviewed. If the item is not reviewed within 16 months, it will be deleted as all non-reviewed material.
- d. The student can still edit or delete the item at all times.

One might ask the student which method he or she prefers for his or her work. Generally spoken, material created in obligatory assignments will probably be best handled by the first method, whilst material created voluntarily by students, of which the chances are greater that the student takes pride in it, will probably be better handled by the second method.