



**Interactive Music Science Collaborative Activities
Team Teaching for STEAM Education**

Deliverable 5.16

Final Demonstrators of iMuSciCA workbench toolkits

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Executive Summary

This deliverable reports on the new features integrated into the final version of the iMuSciCA Workbench, iMuSciCA management platform (IMP) and learning management system (LMS). It is aimed to work with the corresponding iMuSciCA deliverables D5.12 (final 3D musical instrument interactive design kit), D5.13 (final music activities based on mathematical equations and geometric curves), D5.14 (final Pen-enabled canvas for music and audio co-creation and interaction) and D5.15 (final Gesture and VR tools for music interaction and co-creation).

The final version of the Workbench can be accessed at:

<https://workbench.imuscica.eu/>

The main additions since the intermediate version are:

- a toolbar that take much less vertical space;
- the possibility to have two music or visualization tools simultaneously next to the main environment in use;
- an access to a global metronome;
- loading and saving for each environment;
- a guided tour directly available from the Workbench startup screen.

Version Log			
Date	Version No.	Author	Change
30-04-2019	0.1	Laurent Varin	Initial content
30-04-2019	0.2	Laurent Varin	Filling content
03-05-2019	0.3	Manuel Bouillon	Added metronome section
07-05-2019	0.9	Laurent Varin	Added guided tour screenshots + small updates
22-05-2019	1.0	Laurent Varin	Added one useful comment
21-06-2019	1.0	Vassilis Katsouros	Submission to EU

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LIST OF ABBREVIATIONS

Abbreviation	Description
2D, 3D	2-dimensional or 3-dimensional space
AJAX	Asynchronous JavaScript And XML
API	Application Programming Interface
LMS	Learning Management Platform
LRS	Learning Record Store
RESTful web services	Representational state transfer (REST) ful web services
STEAM	Science, Technology, Engineering, Art, Mathematics
UI	User Interface
WP	Work Package
ATHENA	ATHENA RESEARCH AND INNOVATION CENTER IN INFORMATION COMMUNICATION & KNOWLEDGE TECHNOLOGIES
UCLL	UC LIMBURG
EA	ELLINOGERMANIKI AGOGI SCHOLI PANAGEA SAVVA AE
IRCAM	INSTITUT DE RECHERCHE ET DE COORDINATION ACOUSTIQUE MUSIQUE
LEOPOLY	3D FOR ALL SZAMITASTECHNIKAI FEJLESZTO KFT
CABRI	Cabrilog SAS
WIRIS	MATHS FOR MORE SL
UNIFRI	UNIVERSITE DE FRIBOURG

1. Introduction

The Workbench gets a major upgrade since the intermediate release. While keeping the global principles, the user interface is enhanced to give an easy access to more features in a standardized way. It also integrates the final UI guidelines and graphics charter that include the feedback from the previous versions.

2. Workbench

2.1. User Interface update

The final version of the Workbench (see Figures 2-1 below) implements the following elements from the graphic charter:

- The Workbench Toolbar now has a much smaller vertical footprint, with a dropdown toolbar, called dock, to give access to the main environments, hence keeping the icons easily readable and accessible (see Figure 2-1a). This request was a major feedback during pilot testing, particularly on the new widescreens.
- Saving and loading the environments states are now available through the dropdown menu located in the Workbench Toolbar next to the current environment's name (see Figure 2-1b). Data is stored in the iMuSciCA Management Platform.
- All the common tools are now accessible via small icons to the right of the Workbench Toolbar. It includes tutorials (see 2.4), general music tools, visualizations, global metronome (see 2.5), sound recorder, microphone, global volume, clipboard and language settings (see top-right icons in Figure 2-1a).
- The right part of the screen that displays the common tools is now resizable and can display two tools simultaneously (see Figure 2-1c). This evolution allows many different pedagogical scenarios, while keeping UI simple for the students.
- The Workbench also provides a GUI library that each environment and tool can use to give access to specific functionalities in a standardized way (see Figure 2-1c).

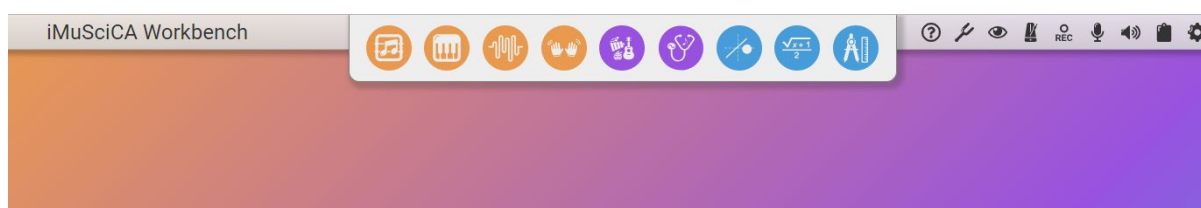


Figure 2-1a: Workbench Toolbar, with the main environments icons deployed at the center, and common tools icons on the right side.

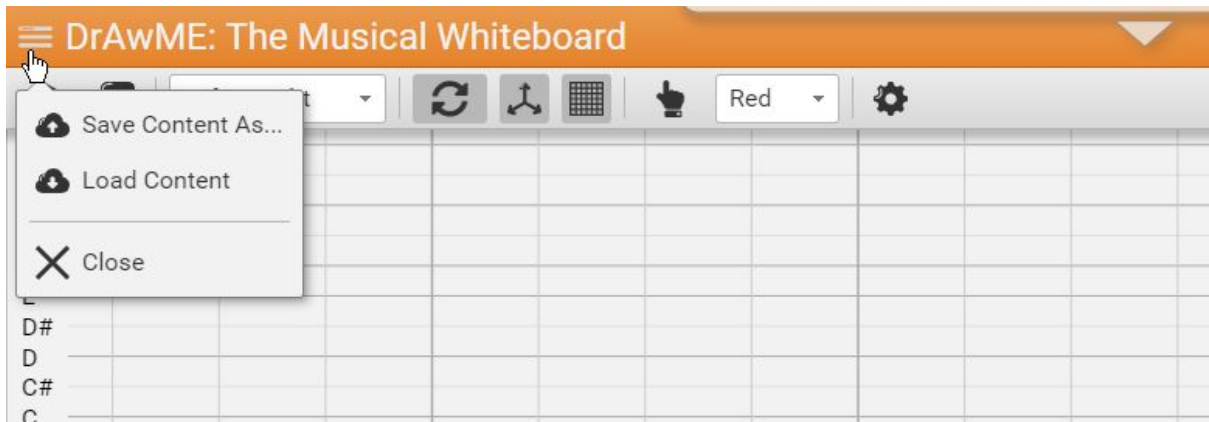


Figure 2-1b: Workbench with DrAwME environment opened, dropdown menu on the left opened, and environments icons toolbar hidden (which can be made visible by clicking on the arrow on the top-right).

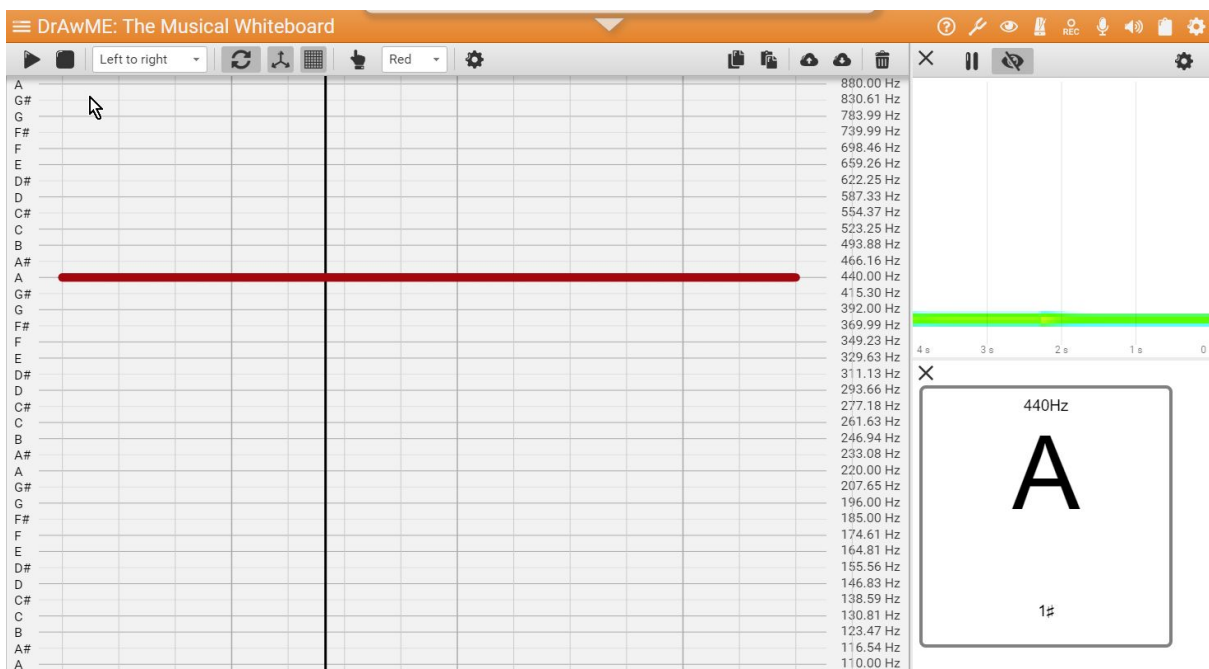


Figure 2-1c: Workbench with DrAwME tool in use on the left, and a visual analyser and tuner on the right. DrAwME uses the Workbench GUI library to give access to environment specific features in a top grey toolbar.

2.2. Workbench engine update

This version has the following changes and improvements:

- The Activity Book Player is loaded only if needed (Workbench UI is now a standalone library and application).
- The final version implements the so-called snapshotting, that allows an environment to load and save its state (this way an environment can be unloaded from memory and reloaded later in the same state).

2.3. Activity Book Player update

The Workbench integrates an activity book player, which can be used for guided lessons, or to display any content created using the Authoring Tool (see Figure 2-3). The final version integrates the following improvements:

- An Activity Book can be loaded automatically from a URL, or manually from the local file system (by specifying “lesson=local” in the URL query string, the Workbench opens an empty Activity Book with an *Open File* icon in its toolbar, which can be very handy during content creation process).
- While displaying an Activity Book, the dock (Workbench Toolbar) is still available. One can open any tool or environment, and return immediately to the current page of the Activity Book by closing the tool or by selecting the Activity Book icon in the Workbench Toolbar (this icon is visible only if an activity book is loaded).
- The Activity Book Player now has a toolbar displaying the current page name, and buttons to go to the previous and next page. Those UI elements delegated to the player toolbar simplifies content creation.
- Sounds and videos included in an Activity Book are linked to the Workbench audio context, so that played sounds can be analysed using visualizers and general music tools.
- The Activity Book Player can open any environment through buttons added in the content pages.
- Copy and paste of numbers are available through the Activity Book toolbar.
- Several display bugs specific to iMuSciCA contents are fixed.



Figure 2-3: Workbench playing an Activity Book (content used in French school for the pilot testing, also embedding a video from Belgium).

2.4. Welcome screen and tutorials

The Workbench now includes

- a welcome screen, available if the Workbench is opened without an Activity Book (see Figure 2.4a);
- a guided tour (see Figure 2.4b and Figure 2.4c);
- video tutorials for each environment.

The guided tour is accessible *via* the welcome screen and includes the video tutorials with some complementary information about the Workbench and the different environments.

The video tutorials are also available *via* the help icon in the Workbench Toolbar, opening the tutorial video of the currently opened environment.

Finally, all the video tutorials are directly available in a YouTube playlist:

<https://www.youtube.com/playlist?list=PLkkf-YUOSQ7F5nMxqBeJ1UPJ-yjGHHDCi>

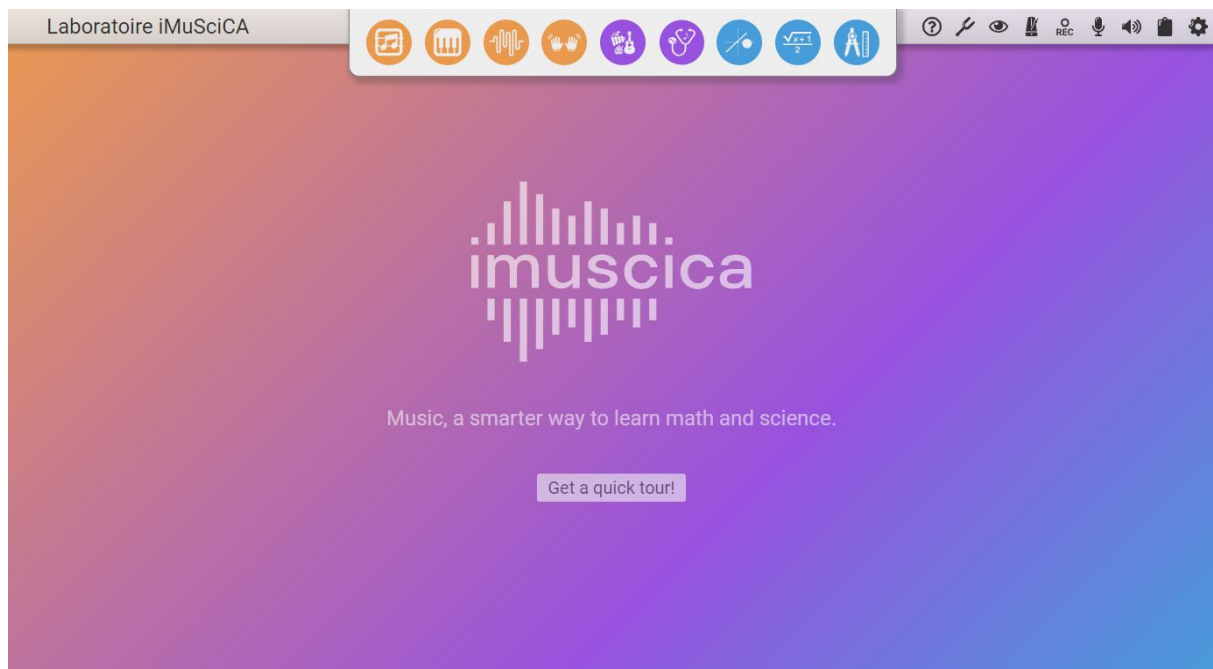


Figure 2.4a: the welcome screen includes a button to open the guided tour.

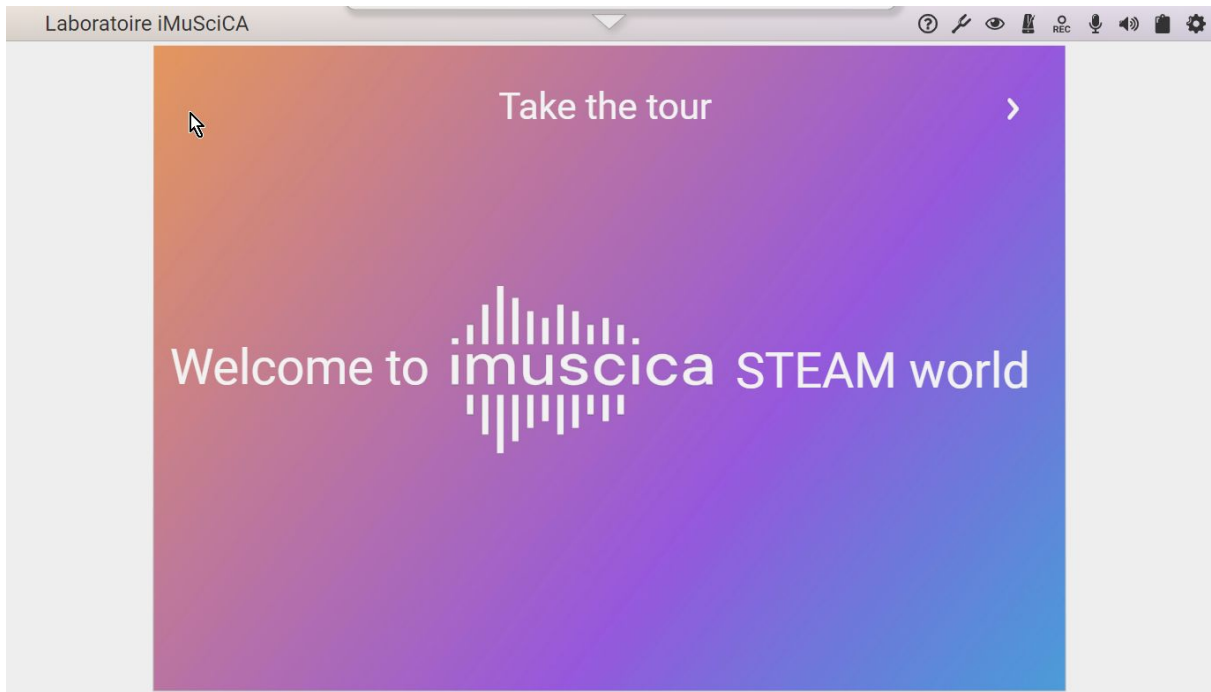


Figure 2.4b: the guided tour is opened as an Activity Book, directly in the Workbench.

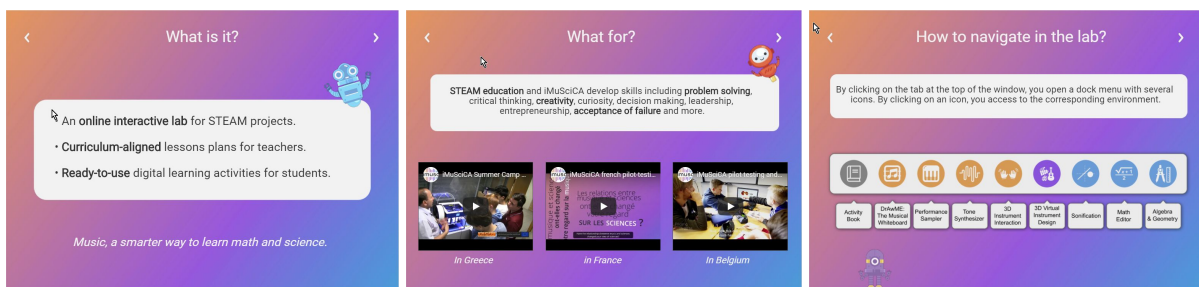


Figure 2.4c: the first pages of the guided tour.

2.5. Global metronome

The Workbench now includes a global metronome tool (see Figure 2.5) that enables to:

- Play/stop/mute the metronome sound.
- Change the metronome configuration and automatically broadcast it to all tools.
- Synchronize the different tools so they can play synchronously.

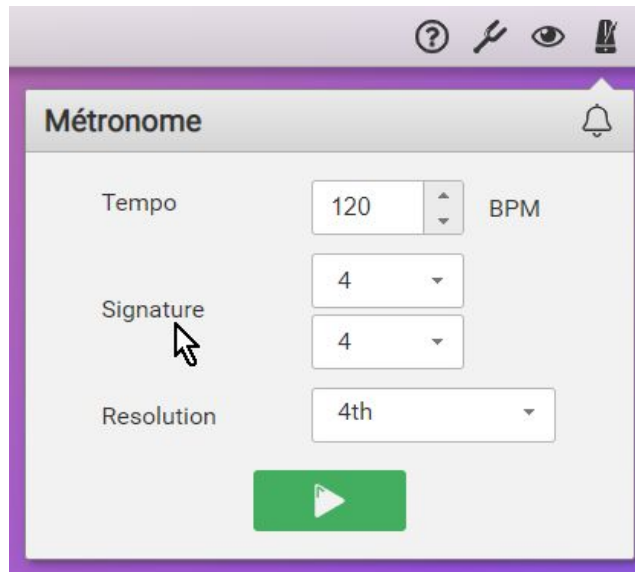


Figure 2.5: Global metronome and its parameters, shared among the iMuSciCA tools.

3. Learning Management System (LMS)

The moodle installation that we use as a learning management system is accessible at the following URL: <https://lms.imuscica.eu>. It was used for the pilot tests in schools when they didn't have any LMS available.

4. iMuSciCA Management Platform (IMP)

The intermediate implementation of the iMuSciCA management platform (IMP) API is located at the following URL: <https://platform.imuscica.eu/api/> (**API for AJAX requests, not to be accessed with a browser**).

Changes in this version:

- Saves have a type to enable filtering by the workbench to only display the saves that can be handled by the active environment.
- Tracking information are now stored in CSV format for easier postprocessing.