# Thematic analysys of the redesign process of the "Chowndolo"

The present document contains the thematic analysys that it's been conducted by as part of the research project entitled "Redesigning the Chowndolo: a Reflection-on-action Analysis to Identify Sustainable Strategies for NIMEs Design".

## Theme 1: Building the DMI in a Sustainable Way

This theme focuses on strategies to render the DMI more sustainable while building it. After finalizing this theme, we realized that this corresponds to the *"In Design"* strategy proposed by Mankov et al [1], thus we renamed it "In Design". Three sub-themes compose this theme. We reported quotes from each session: S stands for season.

### Subtheme 1.1 Standards and Interoperability

*actual connectors with more commonly used hardware such as audio jack/minijack* - S2

*After a brief discussion we opted for using a USB C connector for power and a mini jack for audio out.* - S6

### Subtheme 1.2 Hardware Optimization and Durability

*smooth the corners in order to avoid fragile spots of the instrument* - S2

*To carry on this process, Nicolò experimented a new FreeCAD Addon called "sheet metal" and that allows the designer to easily design folding patterns* - S9

## Theme 2: Aesthetic Suggestion of Reparability

This theme highlighted aesthetic features that can suggest that the DMI is an hackable product. After finalizing this theme, we realized that this mirrors the "Through Design" strategy proposed by Mankov et al [1], thus we renamed it "Through Design". This theme is composed of only one subtheme.

*suggests a new solution where the pcb it's not hidden by the shell but only supported by it, this piece it's been named "the V piece" as it goes between the pillars that forms the structure of the Chowndolo.* - S9

*Nicolò also hypothesise the possibility of just attaching the PCB directly to the structure, and take an extra effort to design a PCB that is a sort of piece of PCB art [...] In fact the PCB could also be attached to the base as that would be probably the best spot to show a piece of PCB Art. - S10*

*The conversation then moved towards a more conceptual debate around the topic of how the PCB should be visible, here Nicolò tried to make a sort of "open access scale" where he explained that we could go for a maximum accessibility (PCB attached on the base and fully visible) to  minimum accessibility (where the PCB is completely hidden), and a step in between where the PCB is visible, but not so easily accessible. - S10*

## Theme 3: Process Based

### 3.1 Digital Fabrication

*[...] to be built in a Fablab/Makersspace, so that the production of the instrumets could happen virtually anywhere and that the outcomes of the design process could be easy to share among the future instrument's buyers and allow them to easily fix and/or hack the instrument if in need.-  S4*

*desire of not having multiple manufacturing methods to produce the instrument, and invited Nicolò to design something doable exclusively with a laser cutter machine. S6*

### 3.2 Customizable Circuits

*This statement sets the basis for a new research focused on designing some lasercut supports that could keep the PCB in the right position by allowing the user(s) to easily use some screws to remove it, changing it and attach it. - S11*

### 3.3 Documentation and Repository

*The session ended with the share of the documentation that describes the instrument  -S2*

*The original documentation provided by Giacomo is not very clear about the assembly process. -S2*

*Nicolò decide to turn improve the current documentation by importing the PDF files into a parametric 3d modeling software (FreeCAD) and make a 3D model of the Chowndolo* - S3

### 3.4 Open Source

*importing the PDF files into a parametric 3d modeling software (FreeCAD)* - S3

*Nicolò used open source software (FreeCAD) to make a first 3D model of the main structure,* S5

*CAD session where he use FreeCAD and KiCAD together (through a FreeCAD addon called "KiCAD stepup")*  - S8

[1] J. C. Mankoff, E. Blevis, A. Borning, B. Friedman, S. R. Fussell, J. Hasbrouck, A. Woodruff, and P. Sengers. Environmental sustainability and interaction. In CHI '07 Extended Abstracts on Human Factors in Computing Systems, pages 2121–2124, San Jose CA USA, Apr. 2007. ACM.