PREVISIBILITY OF TONALITIES IN THE DECORATION OF CERAMIC GLAZES

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The traditional ceramics industry uses a variety of dyes and pigments to decorate the products. Several tonalities are often used to satisfy the decorative needs in ceramic glazes, and ways are constantly being sought to reduce to a minimum the pigments needed to obtain these tonalities, albeit in an empirical way. The reproducibility of tonalities in different batches is of great importance for several industries. Scientific research into ceramic glazes has been conducted since the seventeenth century, but today the ceramic industry faces a special difficulty in forecasting and obtaining the desired tonalities in its products. The reasons for this difficulty are the great variety of ceramic frit typologies, the continuous technological development, the physical and chemical processes during firing, and also the specificities of the raw materials and ceramic processing itself. The main objective of this work is the development of a methodology to foresee a desired tonality, starting at the graphical stage of the decorative project, in substitution of trial-and-error, which is very common in the ceramic tile industry. The adopted methodology starts with the characterization of the chromatic features of glazes with a reflectance spectrophotometer, creating a database of chromatic coordinates and the reflectance curves. From this base, it is intended to construct a model to correlate the colour space used to foresee the tonality of glazes and those used in the graphical creations. In addition, case studies of the decoration projects will be conducted to validate the considered model. This approach aims to make a link between graphical computing, as a tool for the ceramic decoration process, and the execution of the glazed decorated ceramic prototype, with a special emphasis on the development of a rational methodology that allows ceramic designers to foresee tonalities in the finished product. A correlation will be established between the created database and the colorimetric models usually adopted in graphical creations (image capture through scanning, image display and printed image - RGB and CMYK models, respectively). The CIE-L*a*b* system will be used as a tool to establish, comparatively, these correlations and to quantify colour differences. The reflectance curves will be useful for the calculations of expected colours from mixtures of two or more pigments. The proposed methodology will be validated by the accompaniment of creation processes, from the graphical conception to the attainment of the decorated ceramic product. In this manner, in the end, the resultant colours of the finished products will be compared quantitatively to the original colours of the printed images and displayed digital images of the graphic project, establishing the proposed methodology to enhance the capability of the creative process, with a view to providing a useful tool for ceramic design. From the observed deviations, a new colour space derivative of the CIE-L*a*b*, is expected to be obtained, this being more reliable in regard to deviations due to chemical interaction between the different pigments that occur during firing of the material. Those are the steps that are applied in this project:

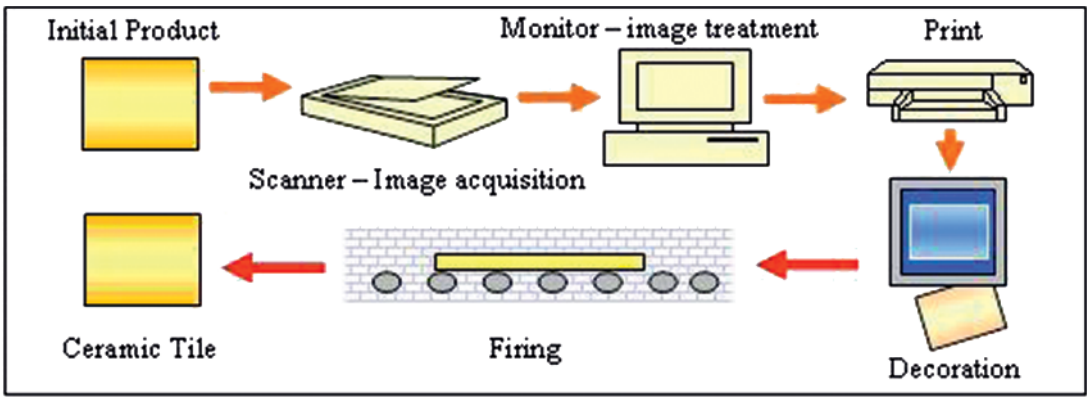

Figure 1. Correlations used in the development of the project.

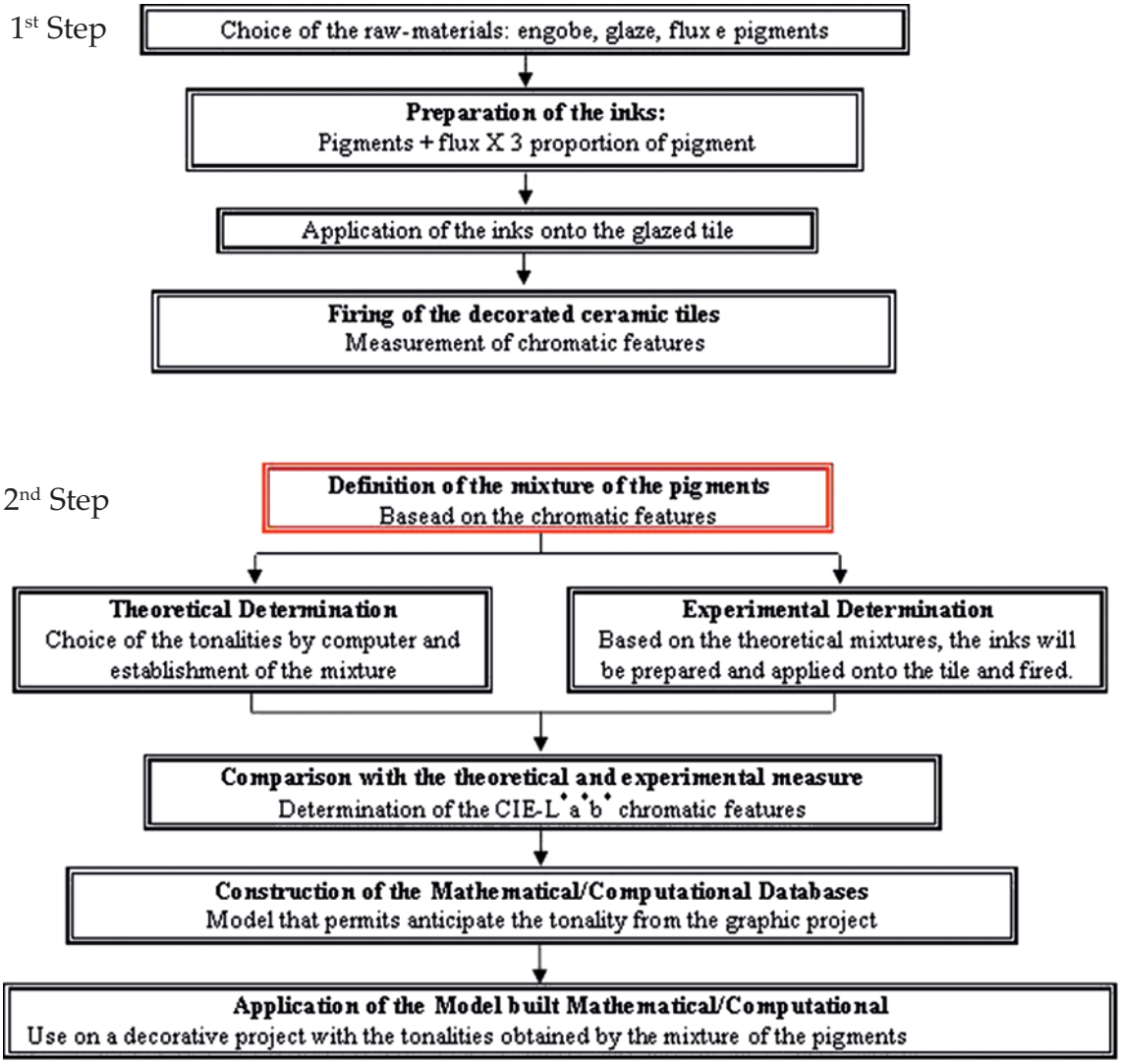

Figure 2. Diagram of the activities of the project.

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