Artists, designers and architects learn about colours, but the question is how much colour science (covering much more than just colour physics) should be included in their curricula.

The authors of this paper (a chemical engineer, a designer, a visual artist and an architect/designer) present a brief survey of the literature, including a review of the text books written for this public audience. With examples taken from their own respective teaching practice they describe and discuss the main topics they consider important to be included in the curricula of future visual artists, designers and architects.

ABSTRACT

During a short course for designers one of the authors was demonstrating additive mixing using three projectors. Suddenly one of the students exclaimed: “now I understand what RGB means on my computer”. Another time, doing the same demonstration for a different group of students one of them interrupted the show: “don’t talk about light, talk about colours”. This, of course, raised a host of questions. Is additive and subtractive mixing really too much for artists, designers and architects, or would they survive hearing about colour order systems, the trichromacy of vision or even (gasp!) the CIE system and colour measurement? Then came more profound questions. Obviously, colour theory must be taught in these courses. Or must it?

There are intriguing colour demonstrations which may raise the interest of even the most devoted anti-scientist – but you should not spoil the effect by pouring mathematical equations onto the students.

COLOUR SCIENCE FOR NON-SCIENTISTS

Although Alberti maintained that “it is enough for the painter to know what the colours are and how to use them in painting”, we rather accept Leonardo’s view: “practice must always be founded on good theory.”

In any profession, skilled workers know how. In the same profession, high level professionals (be they artists, architects, designers) also must know why.

INTRODUCTION

We have found it useful to start explaining the basics of colour physics with demonstrations (such as those illustrated by Figures 1. and 2.) and on this basis introducing the concept and the use of spectral curves (Figure 3.). Figure 1. shows how yellow light is composed of all the components of the full spectrum minus blue; Figure 2. shows how yellow objects appear yellow (by selectively absorbing the blue component of white light); and Figure 3. how to quantify this with a spectral curve.

In colour physics we should continue with the demonstration and the explanation of subtractive mixing, at the same time indicating that additive mixing is already in the realm of psychophysics. Trichromatic vision cannot be explained only by simple physical concepts.

FIGHTING MISCONCEPTIONS

In many of the books on colour written for non-scientist you will find one or more chapters on the basic facts of colour science – unfortunately many of them will be misconceptions. In modern colour education one of the most influential teachers was Johannes Itten, whose colour circle, so often reproduced and cited, is simply impossible to construct along the lines he explained.

What is even worse is that authors of these books (let alone web sites) do not listen to constructive criticism. Berns (2006) listed a number of errors in the third edition of the beautifully produced book on colour by Holtzschie. The fifth edition (published in 2017) continued with the very same errors. We must quote Kuehni (1979), who wrote about another beautifully produced book (by Klüppers), also full of errors: “It will set colour education and bridging-the-gap efforts back for decades.”

CONCLUSIONS

Colour science – physics, psychophysics, psychometrics, colour order, colour perception and possibly some psychology and maybe philosophy – should be taught also to non-scientist. These professionals also need to know why colour phenomena behave the way they do. It is not enough for them to learn the ‘cook-book’ – i.e. to know only how.

Teaching advanced concepts does not necessarily involve the use of complicated rules and formulae, to make teaching efficient it needs to be interesting and demonstrative, using simple charts, demonstrations and exercises.

REFERENCES