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**Eric Kirchner**  
**Automotive & Aerospace Coatings**

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**Digital Color Tools:  
Useful for Design?**

KIVI NIRIA & Stichting Material Design  
Special: "De Beleving van Kleur",  
13 November 2013



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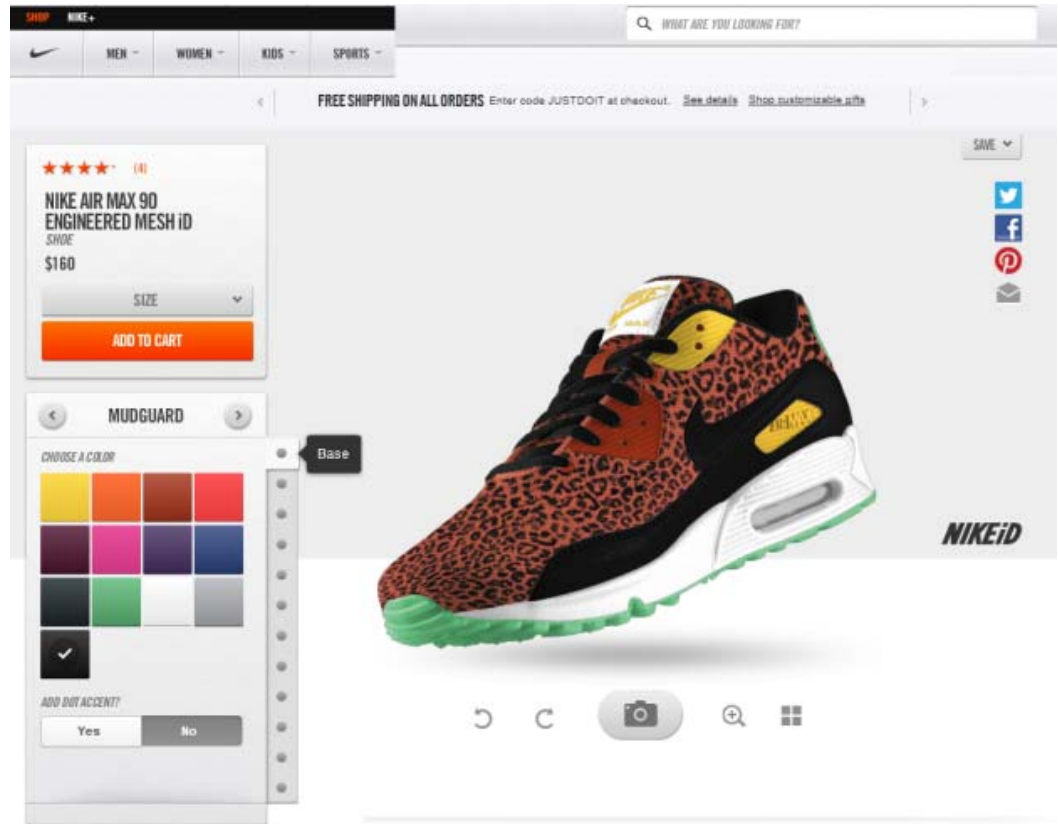
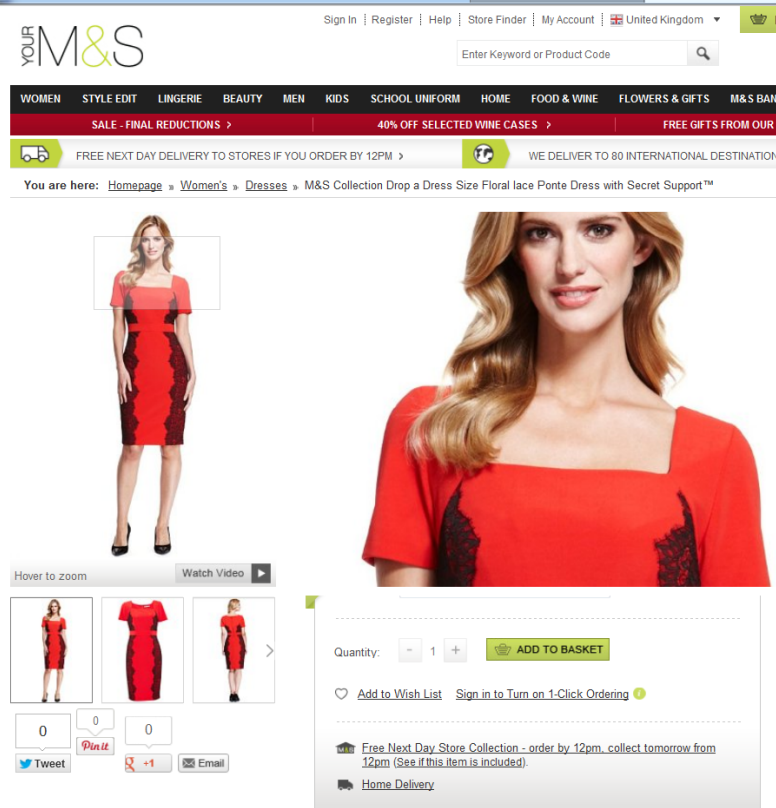
# Contents

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- Digital color tools for consumers
- Current Digital Color Tools for Design(ers)
- Experience within AkzoNobel Coatings
- How to mess up with Digital color tools
- Some benefits
- Conclusions



# Digital Color Tools for consumers



Start Over

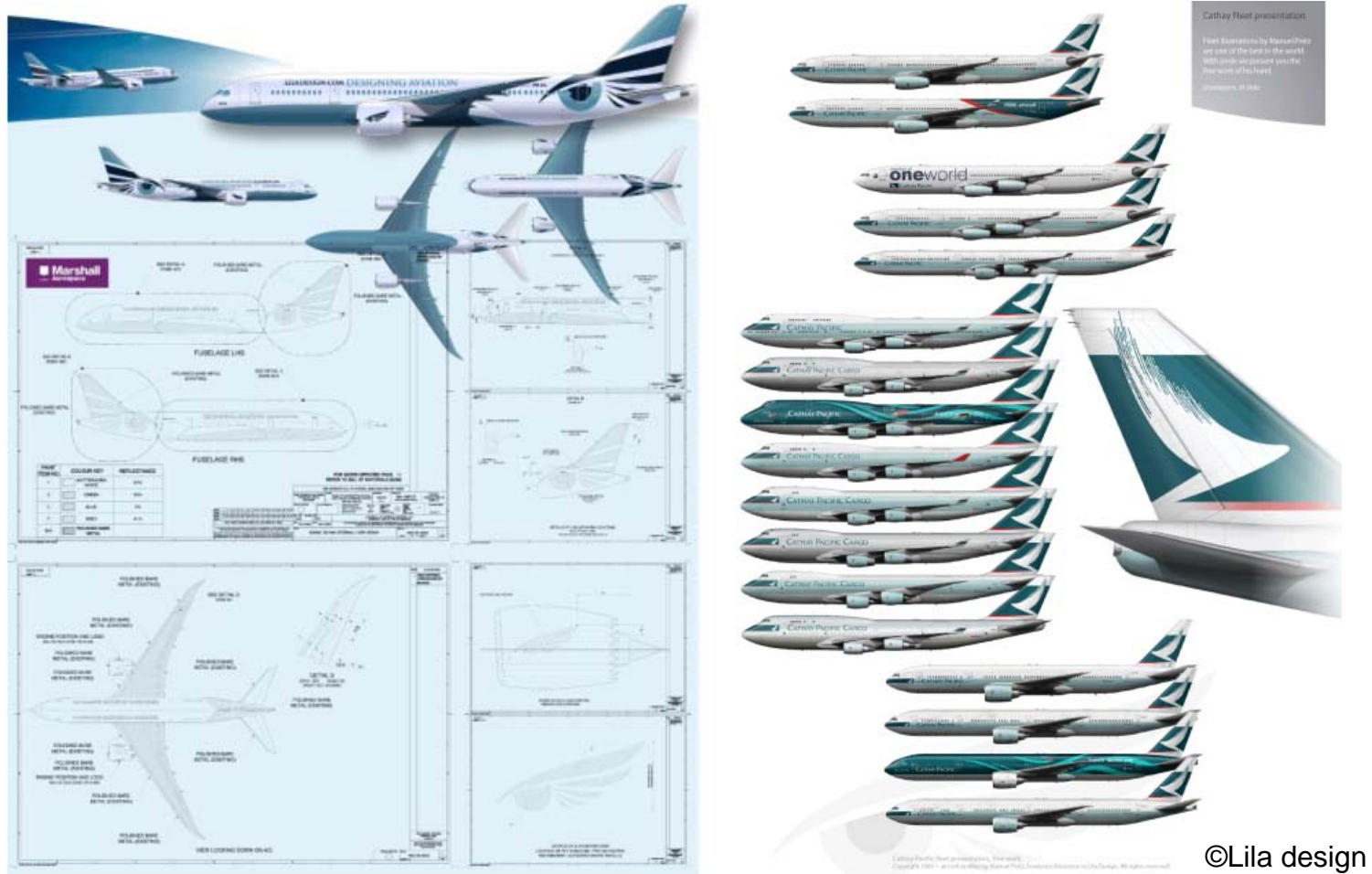
START WITH AN INSPIRATION



Consumers are getting very used to digital color.  
For example, when ordering through a website.



# Current Digital Color Tools for Design

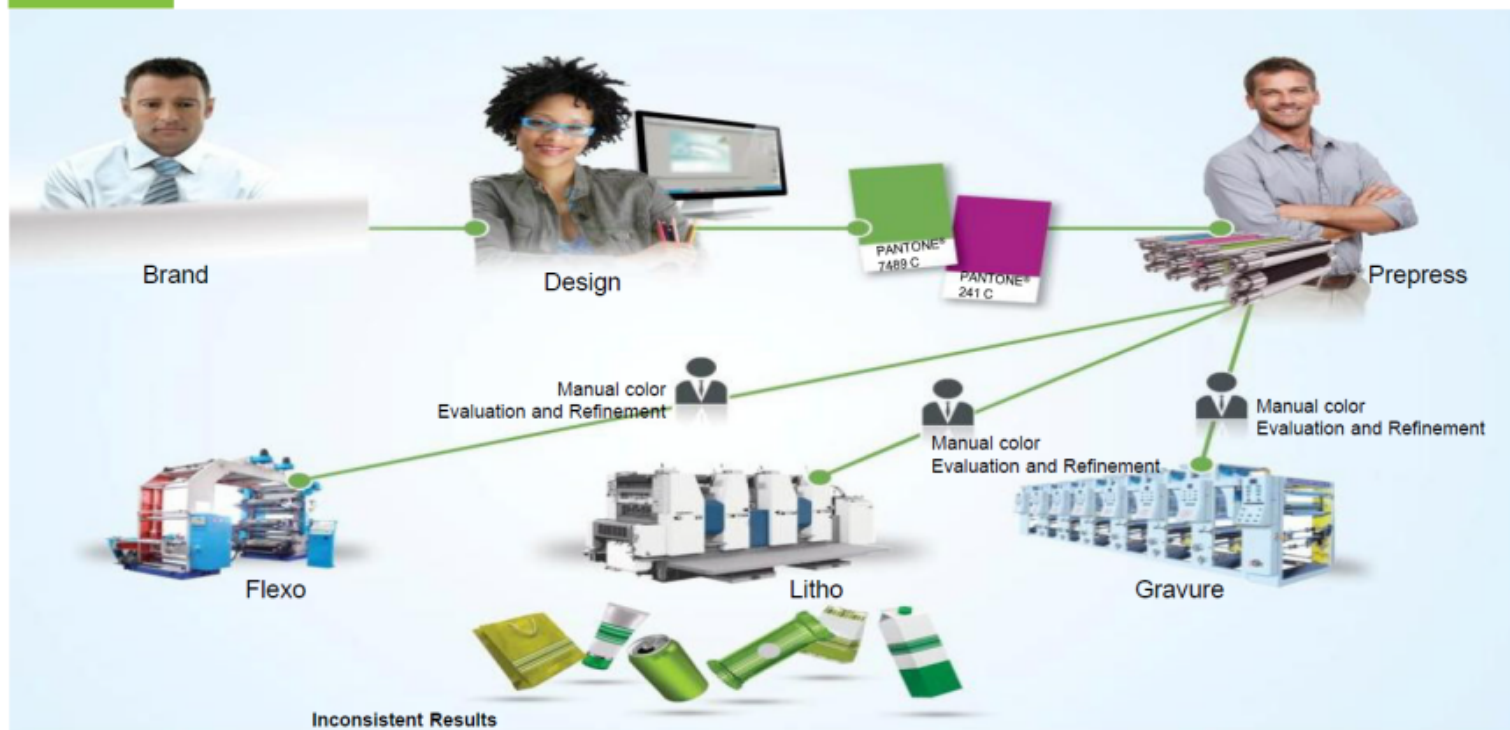


Also for designers, digital color tools are becoming more common.



# Current Digital Color Tools for Design

## BRAND TO PRODUCTION TODAY



Color Communication is often difficult between designers, production (“Hong Kong”), end-customer.

Digital Color Tools: Useful for Design?

# Current Digital Color Tools for Design



©X-Rite, Pantone

A company like Pantone considers Digital Color standards as the best way to improve Color Communication..

Digital Color Tools: Useful for Design?



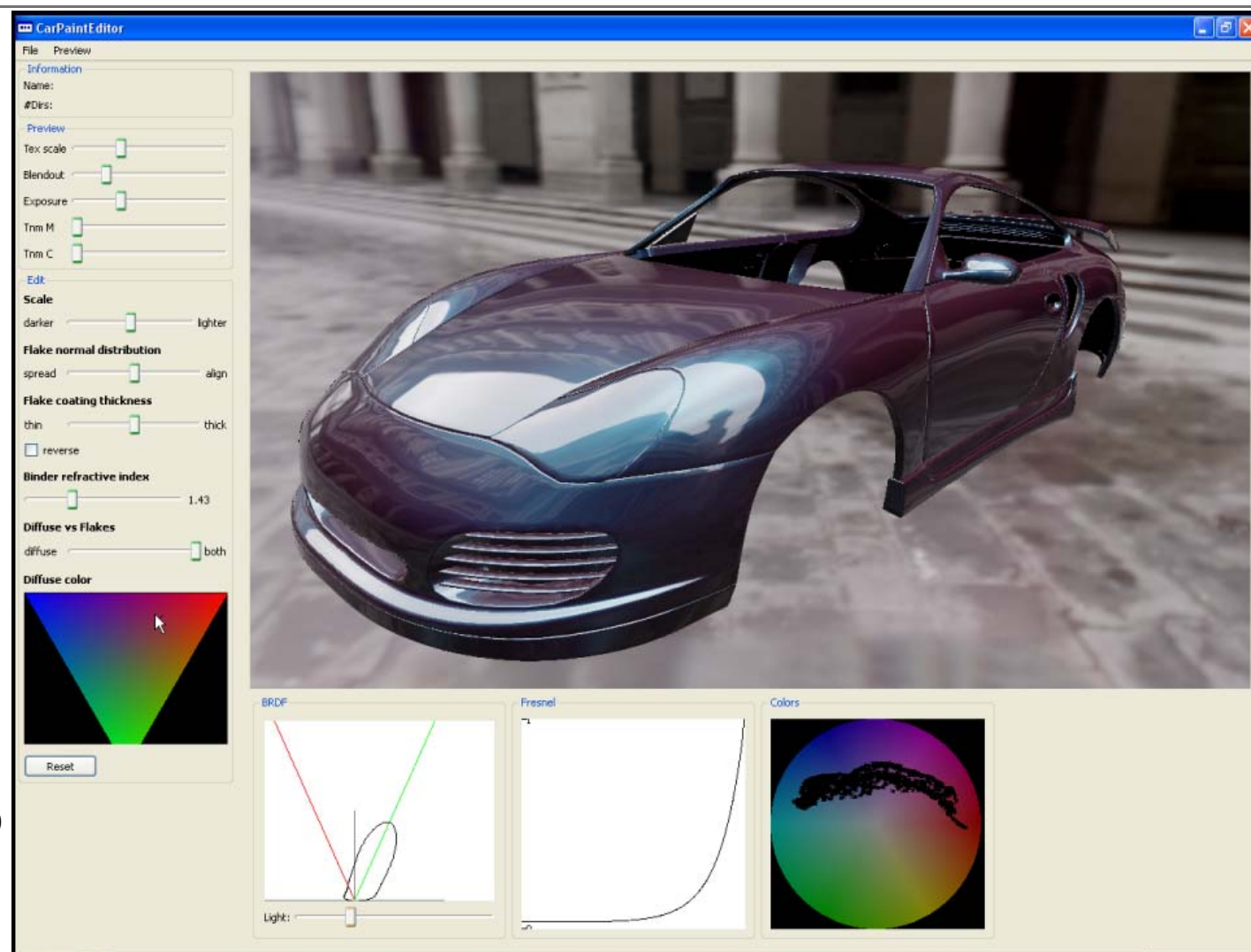
# Current Digital Color Tools for Design



C. Shimizu, PhD thesis, 2009



# Current Digital Color Tools for Design

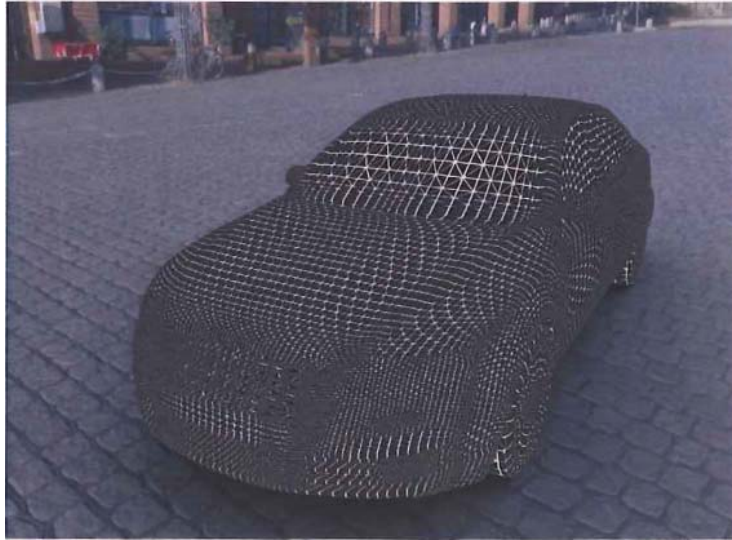


C. Shimizu, PhD thesis, 2009





# Current Digital Color Tools for Design



©Spheron



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# Current Digital Color Tools for Design

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University of Bonn

**AkzoNobel**

Tomorrow's Answers Today

# Current Digital Color Tools for Design

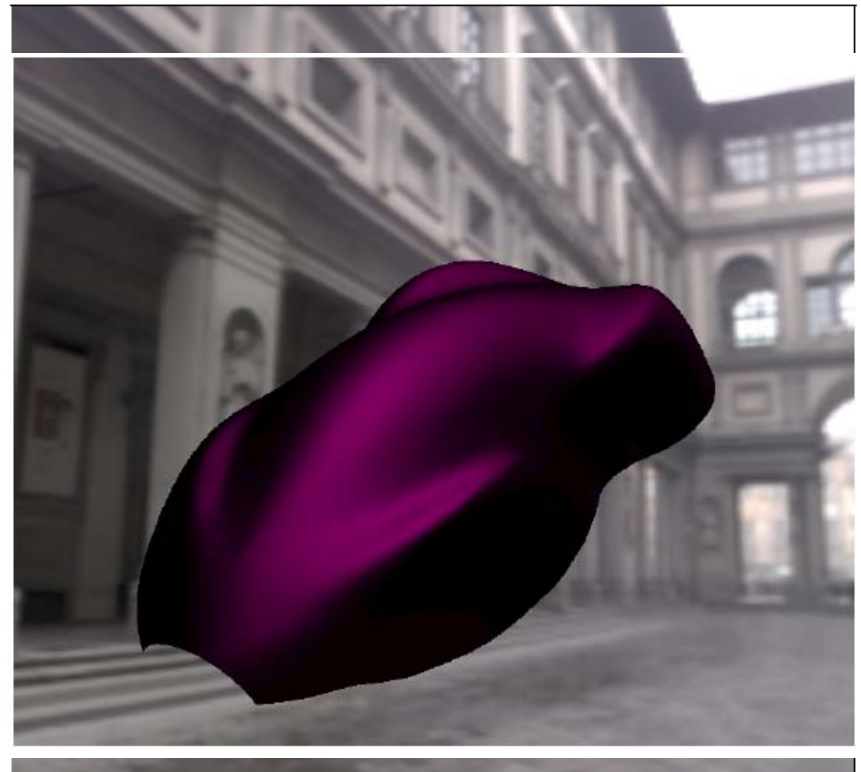


Advertisements can be made immediately after the design phase.

Digital Color Tools: Useful for Design?



# Current Digital Color Tools for Design

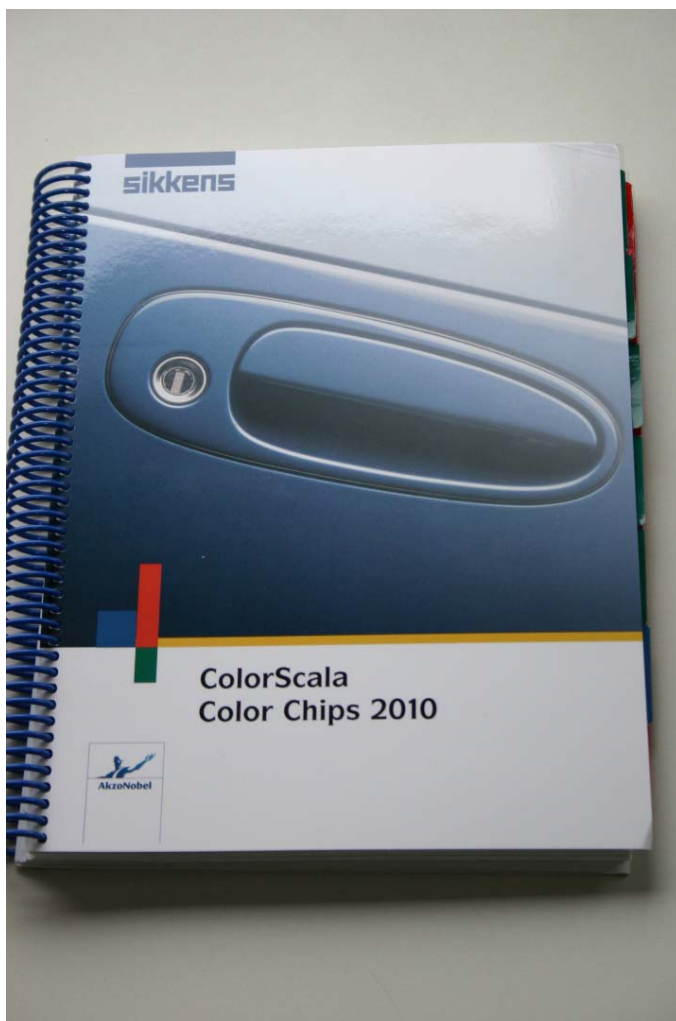


C. Shimizu & G.W. Meyer, Proc. Color Imaging Conference 2010



Also early in the design phase, digital color tools may be helpful.

# Experience within AkzoNobel Coatings: Car Refinishes



Current color documentation for car repair shops.



Digital Color Tools: Useful for Design?

# Experience within AkzoNobel Coatings: Car Refinishes

**Search Criteria**

OEM Color Code | Color Description | **Vehicle** | Color Map | Advanced

Make: Toyota | Model: Yaris Verso | Year: 2005 | Color Group: [Dropdown]

**Search Results (10 results)**

TOY068 Toyota Yaris Verso 2001 - 2005 NOR0000758 White	TOY3P0 Toyota Yaris Verso 2001 - 2005 ACB0111403 Red	TOY1E7 Toyota Yaris Verso 2003 - 2005 NOR0005782 Grey	TOY583 Toyota Yaris Verso 2001 - 2006 ACB0111404 Yellow	TOY199 Toyota Yaris Verso 2001 - 2006 ACB0037546 Grey
TOY1D2 Toyota Yaris Verso 2003 - 2005 ACB0111409 Grey	TOY3P1 Toyota Yaris Verso 2001 - 2005 NOR0000401 Red	TOY6R4 Toyota Yaris Verso 2001 - 2006 ACB0038117 Green	TOY8M6 Toyota Yaris Verso 2001 - 2005 ACB0037931 Blue	TOY209 Toyota Yaris Verso 2001 - 2005 ACB0038116 Black

Custom | Sungun

localhost 17300 main.cli 1.2.2.1 db20100106105247\_europe db20100106105247\_europe datastore Moving over Item of TOY199 2011-01-28 03:46



Digital color documentation, introduced early 2012.

Digital Color Tools: Useful for Design?

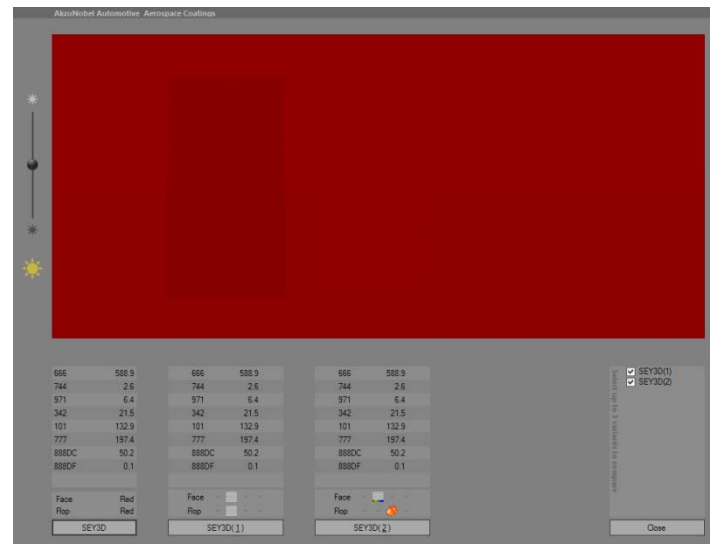
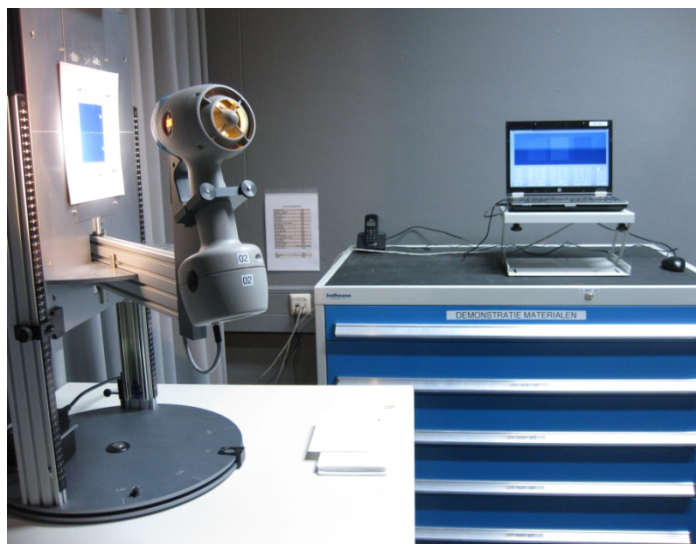
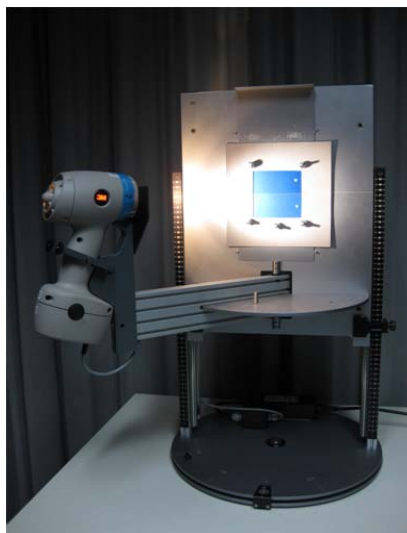
## Experience within AkzoNobel Coatings: Car Refinishes



Innovative research for introducing the digital tool.

Digital Color Tools: Useful for Design?

# Experience within AkzoNobel Coatings: Car Refinishes



Digital Color Tools: Useful for Design?



## Experience within AkzoNobel Coatings: Car Refinishes



Practical testing before market launch.

Digital Color Tools: Useful for Design?



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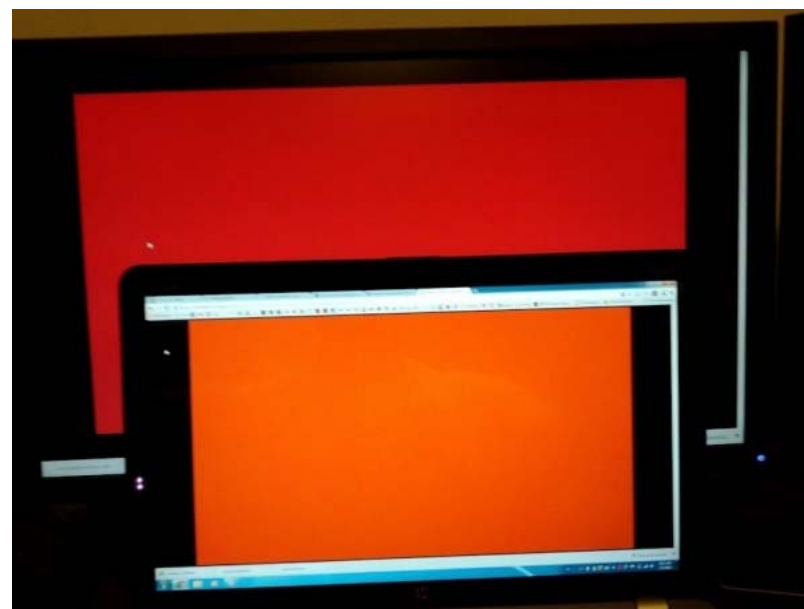
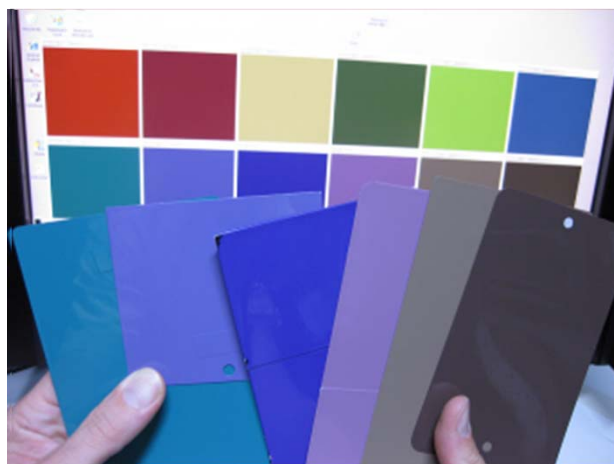
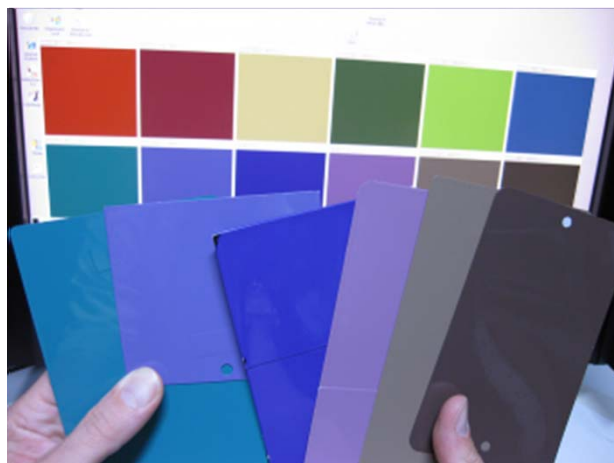
## How to mess up with Digital color tools

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- Use uncalibrated displays
- Ignore light spectrum and intensity
- Ignore visual effects
- Forget the reality check



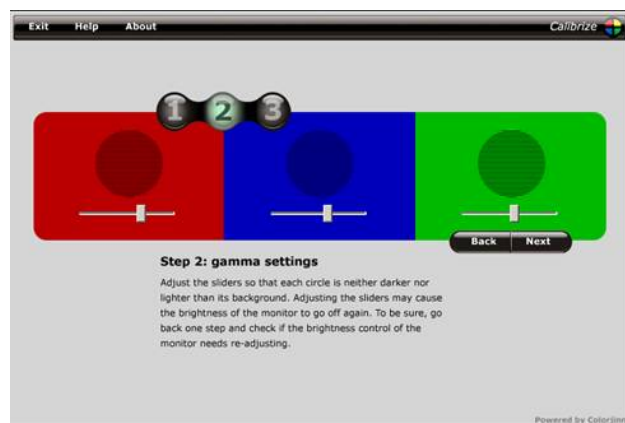
## How to mess up: Use uncalibrated displays



Color calibration are essential for getting accurate digital colors.  
Displays are often very different!



# How to mess up: Use uncalibrated displays



Color calibration of displays: hardware or software based.

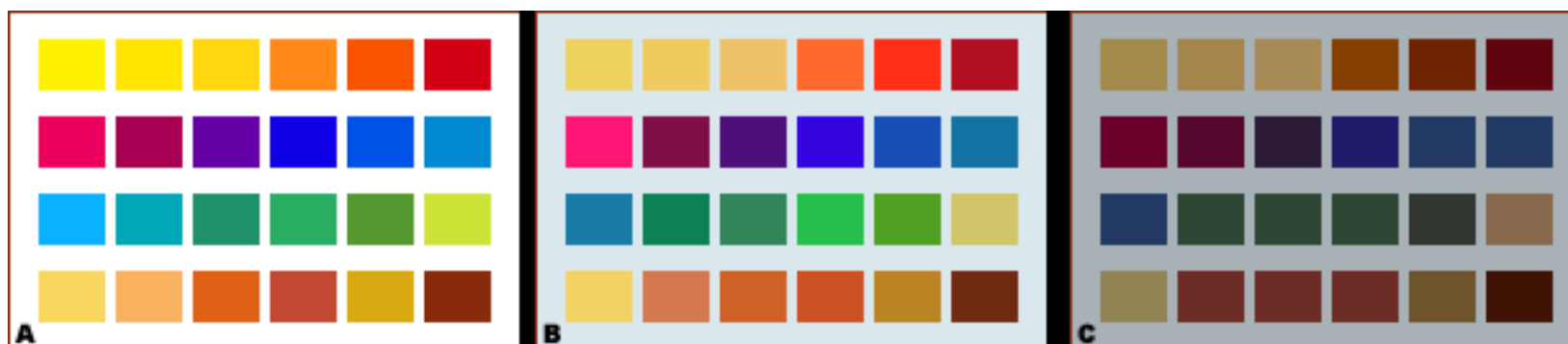
## How to mess up: Ignore light spectrum



The importance of the light spectrum is often forgotten.

## How to mess up: Ignore light intensity

Light intensity influences brightness and colorfulness.



Hunt effect

This must be accounted for when calibrating the display.



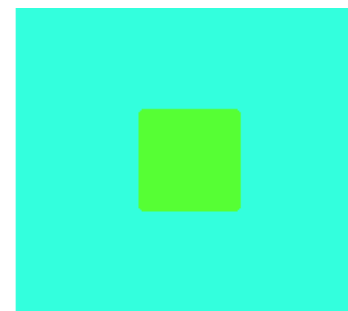
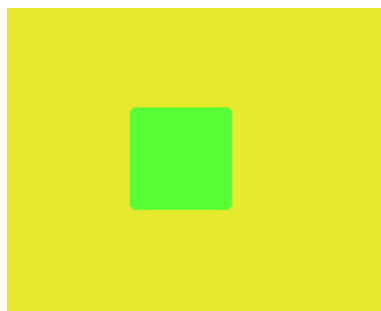
## How to mess up: Ignore visual effects

Surrounding colors also affect color perception.



**Simultaneous contrast effect**

Therefore colors surrounding digital colors strongly affect their color.



# How to mess up: Forget the reality check

## Integration of the Front Bumper into the A4





# How to mess up: Forget the reality check

## Integration of the Rear Bumper into the A4



## How to mess up: Forget the reality check



R. Gascón López, Thesis 2013, University of Alicante

Digital Color Tools: Useful for Design?



## Benefits from using Digital color tools: Find the right color



The number of color chips can be overwhelming...

# Benefits from using Digital color tools: Find the right color

The screenshot shows the AkzoNobel CR Color Manager - Chipbook Demo application. The search criteria are set to Toyota Yaris Verso 2005. The search results are displayed in a grid of 10 items, each with a color swatch and associated information.

OEM Color Code	Color Description	Vehicle	Color Map	Advanced
TOY068	Toyota	Yaris Verso 2001 - 2005	NOR0000758	White
TOY3P0	Toyota	Yaris Verso 2001 - 2005	ACB0111403	Red
TOY1E7	Toyota	Yaris Verso 2003 - 2005	NOR0005782	Grey
TOY583	Toyota	Yaris Verso 2001 - 2006	ACB0111404	Yellow
TOY199	Toyota	Yaris Verso 2001 - 2006	ACB0037546	Grey
TOY1D2	Toyota	Yaris Verso 2003 - 2005	ACB0111409	Grey
TOY3P1	Toyota	Yaris Verso 2001 - 2005	NOR0000401	Red
TOY6R4	Toyota	Yaris Verso 2001 - 2006	ACB0038117	Green
TOY8M6	Toyota	Yaris Verso 2001 - 2005	ACB0037931	Blue
TOY209	Toyota	Yaris Verso 2001 - 2005	ACB0038116	Black



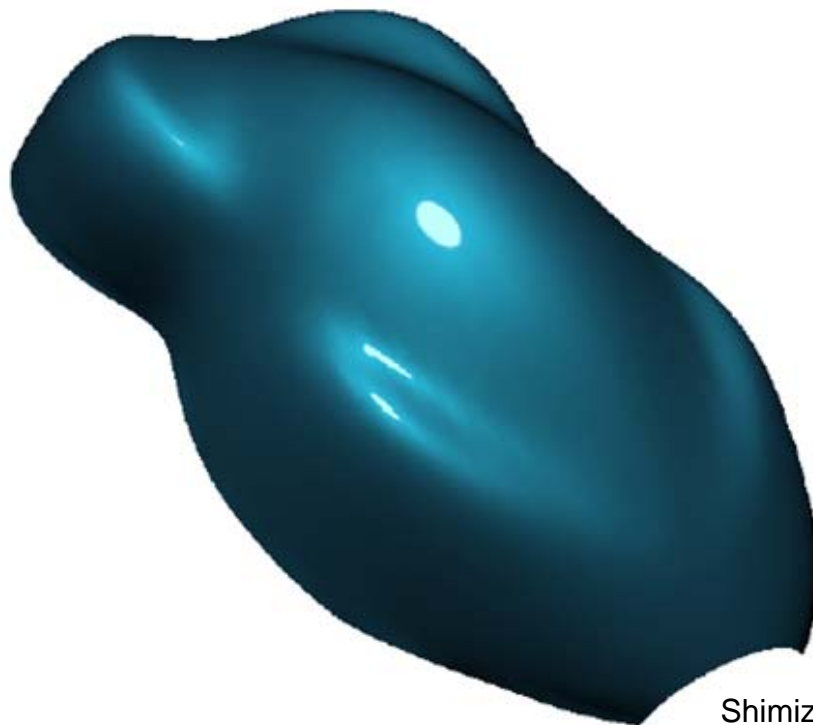
Digital color tools allow you to “Google your color”.

Digital Color Tools: Useful for Design?

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## Benefits from using Digital color tools: Faster iterate to the best color

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Shimizu, PhD thesis, 2009

In the design phase, digital color tools allow you to iterate faster to the best color.



## Benefits from using Digital color tools: Size effect of color appearance

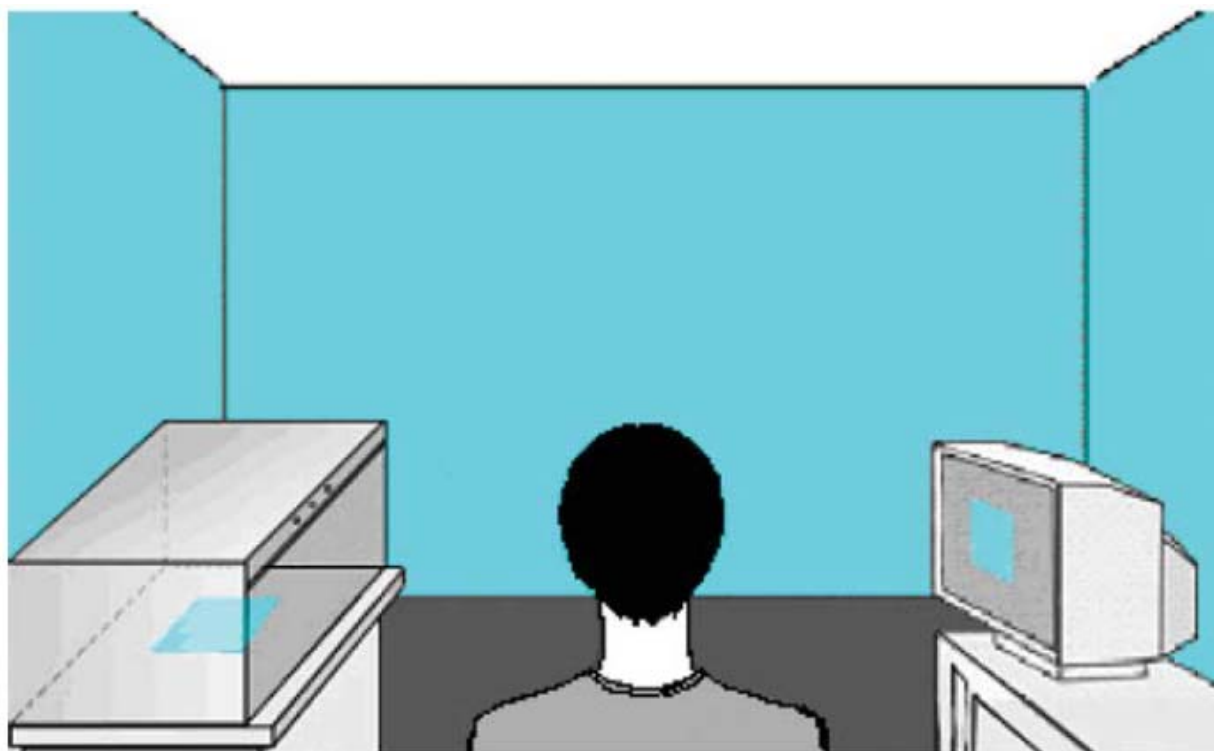


Berrier, PhD thesis, 2012

With paper color documentation, even if you do find the right color chip...



## Benefits from using Digital color tools: Size effect of color appearance

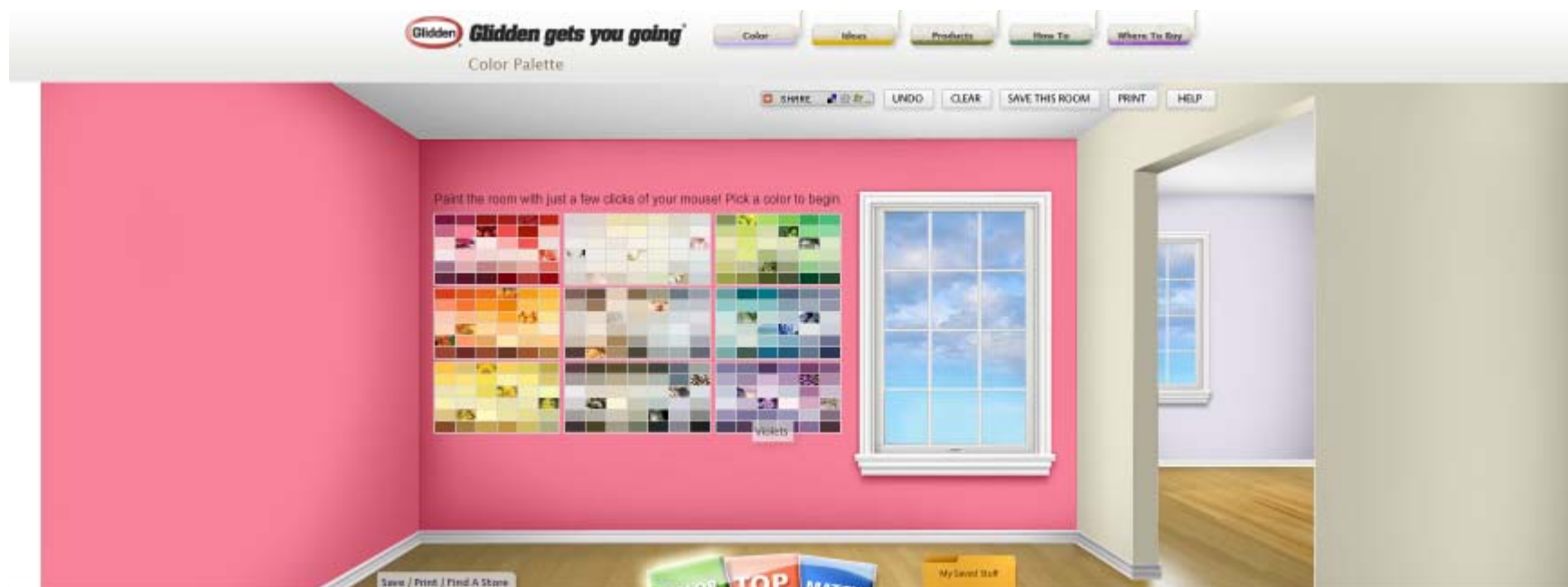


Xiao, Luo et al., Color Res Appl 2010

... most large size wall colors look lighter and more colorful than small sized chips with the same paint.



# Benefits from using Digital color tools: Size effect of color appearance



Digital color tools can help you with this as well.





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## Conclusions

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- Digital color tools are there, for consumers and designers
- It is easy to mess up with digital color tools
- If you use them correctly, digital color tools can help you to find the best color faster

