Can Teaching Colour Digitally Completely Replace Teaching Colour Traditionally?

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In the recent years, the Singapore government has great ambitions for the local digital media industry; they have placed big stakes of money to groom this fast-moving industry. The digital media industry – video games, animation and special effects - is experiencing double-digit growth rates worldwide, and was singled out by the Economic Restructuring Committee as vital to Singapore's economy in its 2003 report (Straits Times, 2003). The digital media products are heavily reliant on talent hence it is crucial that Singapore has enough skilled digital media professionals to help nurture the digital media industry. Various schools begin to increase their commitments and make the necessary readjustments to integrate digital content into the learning process. The polytechnics have heavily integrated digital content into their art and design curriculum. They have been aggressively producing many digital media graduates annually. The polytechnic graduates are expected to master a good skill in computer technologies so as to land entry-level positions in the following media: Animation, Games design and Interactive Media design. Animation is normally defined as the creation of an illusion of movement by assembling a sequence of still images. This sequence of still images may be generated by computers, or by hand drawing/painting illustrations. The development of information technology enables the multiple use of animation in various contexts ranging from movie-making, advertisements and games to learning materials. The games design industry is now a multi-billion dollar global business that is growing rapidly internationally. Some of the job as a game designer includes character design, background design for games, game strategizing, player psychology, 3D graphics and games scriptwriting. A games designer has to think about entertainment and using his/her imagination every moment in the vast world of mobile and video game contents. The interactive media is another fastest growing sector in the international economy. From the internet interfaces to interactive television and to e-learning environments there is a constant demand for experts who can navigate the new media world confidently and creatively, content development and interactivity design.

The Digital Media Design School in the Polytechnic has undergone a three months review and re-designing of a new art curriculum catering to the needs of the digital media industry. There is also a sign of high interest that today's teenage students are showing in digital media development. These students are willing to explore a possible new career path and gain practical skills for future employment. The curriculum committee presents a methodology for change. One requirement is that the traditional method of teaching must be evaluated and compared to an evaluation of the newer method – the digital method,

in terms of its relevance to the programme, the assessment of learning and what would be the benefit to the students.

The outcome of the evaluation is only a certain amount of traditional method is still seen as relevant to the school programme. Such as the traditional approach to drawing using pencil and charcoal on paper will remains as the core subject for the students going through the learning of digital media. However the traditional method of teaching colour will be replaced totally by the digital method. The question here is can teaching colour digitally completely replace teaching colour traditionally? In my opinion, I do not see this total replacement benefit in the students learning. Rather than seeing the computer as creative tools for the students, there is a risk we may turn them into a slave to the machine. Indeed in this modern society, we must expect great innovations to transform the entire techniques of the arts. However I am concerned such transformation if not properly carry out in the school; it may be affecting the younger generation's artistic invention itself and perhaps even bringing an amazing change in their notion of art creation.

Background

I have been teaching in the Digital Media Design School for the last 5 years. During this 5 years of teaching I have taught full-time in the areas of colour, drawing, design principles and digital imaging. Based on my teaching experience in the design school, I will put in plain words how colour was taught traditionally before the recent changes is made. Then I will explain why and what are the changes made to the colour syllabus in relevant to the programme, the assessment of learning and how it is supposed to benefit the students. I will also give an explanation to how the changes have affected the teaching setting, the learning environment and why the students are not gaining as much as the school wants it.

These students are aged between 16 to 20 and the majority has never received any basic training on drawing, colour and painting prior to the time they enter the school. It is a 3 years programme in Digital Media Design School. The students begin their first year training with subjects such as fundamental arts and design; and colour is one of the core subjects they have to fulfill during their first year. Once the students complete their fundamental stage, they get specialize in a particular area such as animation, interactive multimedia and games design.

There are approximately 20 students to 1 lecturer in a class. Each student is given a table to work on. There are lots of rooms for the students to move around to interact with each other as well as to gather in a cluster for group discussion. There are also lots of communications between the lecturer and the students. Without any barrier as such, he/she can demonstrate his/her skills to the students in the class and the students are encouraged to gather around him/her for discussion. All the time the students are expected to question the things they are looking at, to analyze the activities with their peers and lecturer.

For the past five years, the objective of the colour syllabus is to explore the dimensions of colour with the paint application. The dimension of colour refers to the mixing of artistic colour wheel, the tints and shades of colour, the warm and cool contrast of colours, the impact of colour in composition, the combination of various colour schemes; and the psychological effects of colours, its symbolism, and its cultural influences as they affect our understanding and use of colour. The students are shown the different painting styles and experiment with different approaches to painting. The traditional mediums such as watercolour and gouaches are introduced to the students; and they are exposed to the mixing and rendering of colour using these wet mediums throughout the semester. If they show signs of wanting to explore further in a different aspect of work, they are encouraged to do so. Since it is a 45 hours module for 15 weeks, the students are not taught how to paint like a professional painter but rather to explore and understand the characteristics and sensitivity of the paint and its tactile surface.

Integrating Digital Content

The Digital Media Design School in polytechnic has placed lots of focus on producing students with the ability to be proficient and versatile in the area of digital media. To begin with the school decides to initiate a digital learning environment and to heavily integrate digital content into the curriculum.

The lecturers must adopt strategies to recognize the breadth of digital content and to integrate totally into the existing curriculum so that it is widely used and available in the classrooms. In the past, the digital content is introduced at a slower pace into the first year curriculum; the students are required to pick up certain computer skills only after they have gone through their fundamental stage learning skills such as drawing, color and design principles. Now computers skills and software are introduced to the students as early as in their first semester of school. The school has the belief by integrating digital content at an early stage can helps to foster productive and engaging learning. These in turn will support and promote the essential skills students will need later in their second and third stage of learning in school; and also to prepare them for the fast moving digital industry.

The colour syllabus is one of the subjects greatly affected by the changes. The changes are designed around the existing syllabus. The objective of the syllabus is now to explore the dimensions of colour using the digital media as the only media for exploration. The skills and software that the students need to learn in the colour syllabus is Corel Painter. The Corel Painter software is known for its natural-media painting and illustration. The tools are sophisticated and easy to learn. It features unique digital brushes, art materials and textures that mirror the look and feel of their traditional counterparts. It has the capacity of more than 30 brush categories, ranging from crayons, chalk and charcoal to acrylics, watercolor, artists' oils and liquid ink. Users can choose to customize their brushes for different needs, to control the texture of the canvas to achieve the paper grain similar to a natural media; and a mixer palette for colour

mixing that acts like a real artist's palette. With the undo features it makes the whole painting process much easier.

Lecturers are given a period of 2 months to master the software before transferring the skills to the students. The original classroom used for conducting color is replaced with a large computer lab of 40 stations of Power Mac G5 computers and 40 graphics tablets. Each computer station is Internet accessible; and it is equipped with the a variety of latest graphic software including Corel Painter, Photoshop, Illustrator, Aftereffects and etc. The classroom size of 20 students to 1 lecturer is now 40 students to 2 lecturers in a lab. Each student is assigned to a computer and a graphics tablet. Each lecturer will take care of 20 students and the 2 lecturers will take turns to conduct lecture.

Diagram: Computer Lab Layout
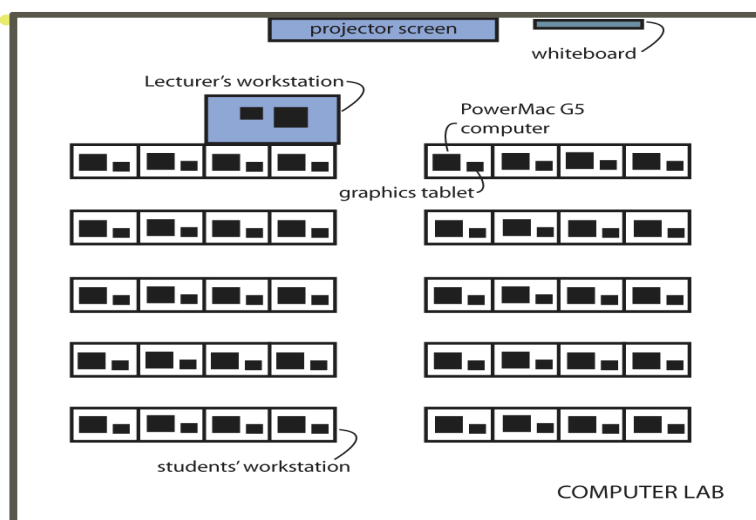
Pros and Cons of Integration

Both the traditional and new digital methods in conducting the colour subject have its pros and cons. The introduction of digital content to the students at an early stage indeed gives the students several experiences with the technology. The students need only a couple of weeks to get use to the software unlike the traditional media that will probably require double or more of their time to learn each medium. There is no need for pre-mixing of paint; with just a click on the mouse the students are able to pick any colour they need from the colour palette. It is now easy to achieve a flat colour with the fill bucket in the software. The students do not have to worry the exact consistency of water to paint anymore. There is also no need to worry about the problem of wet on wet or dry on wet. Time is saved on waiting for the paper to dry.

The traditional method involves teaching and creating art form using material(s) such as paint, pencils, crayon, watercolour, papers and etc. The beautiful part about traditional method is it has a physical component that requires our sensory involvement, such as the sense of touch. The touch of paints, materials and moving around the canvas; some artists even walk on their canvas to work, all these contribute to the joy of making art in a traditional way. I remember watching a documentary on Jackson Pollock years back. On seeing him working on his painting, walking around the huge canvas with paints dripping all over is truly inspiring. The traditional work of art keeps us wondering how it is made, what it is made of, what went before and came after; and how does an artist cover his own mistake when a wrong stroke of paint is added? In addition to the understanding of why painting in watercolour may be different from painting in oil, why clay respond differently to the artist's hand than does wood and glass – all these attribute to a richer appreciation of the artist's expression. A particular work can be composed of many elements – the type of materials use, the layers of brush strokes, the texture of the paint and its tactile experiences. Such tactile experience helps to stimulate one's imagination and metaphorical thinking. For example, how the texture of a certain medium can create a certain psychological connection with a certain feeling or an object.

While the traditional art form cannot be duplicated precisely and sometimes not easily distributed, the digital method is able to do so. The digital method involves teaching and creating art using computer in digital form. The term is usually reserved for art that has been non-trivially modified by the computer; it can be purely computer-generated, such as fractals, or taken from another source, such as a scanned photograph, or an image drawn using vector graphics software using a mouse or a graphics tablet. However the students will be imprisoned to a small working area and no more moving around a canvas. Long hours of sitting in front of the computers, their vision is confined only to computers screen. This may results eyestrain and the danger of radiation coming from the computers. There is no more mixing and smearing of paint on a surface. The only sense of touch the student can experience is the clicking on the mouse. There is a limitation in the exploration of other mediums in a computer except for whatever is displayed on the screen. The final output of the art is no longer built with layers of paint but simply a flat print of an image. Since this art form can be easily duplicated and distributed, to ask for an "authentic" painting from a traditional artist makes more sense then to ask a digital artist for an "authentic" print. Similarly to what Walter Benjamin (1936) once said in his writing, 'from a photographic negative, for example, one can make any numbers of prints; to ask for the "authentic" print makes no sense.'

The traditional method of rendering may take a longer tedious process. It usually begins with a pencil sketch of an image and colours are then slowly added to create an illusion of depth, light, shadow, volume and tactile surfaces. This requires a certain amount of understanding and handling of materials, such as paper, paint, water and any other mediums in order to achieve the 3-dimensional rendering effect by hands. Such experiences with the traditional method, the students will gain and grow in understanding

the complex relationships of forms, lights, materials, and presentation unique to this medium. With this firm understanding and foundation in traditional rendering, the students are then able to use computer as an additional tool to enhance what is initially created. After all the reason why computer tools make sense is that they spring from the traditional tools. Take for example the Corel Painter that the student needs to learn has all the capabilities originated from the traditional tools.

To some students the traditional media can be rather unforgiving especially if the students has no prior basic training; and those who has accustomed to the use of computer, to pick up traditional media can become a difficult task. One wrong stroke adds onto the painting will require the student to start fresh on a new sheet of paper again. Finally, the end product looks raw and unpolished. This usually results to time waste, a great deal of pent up frustration and eventually lead to lost of determination and patients from the students. With the computer as a tool, it has all the capabilities to manipulate colour and texture, to duplicate, delete and add a stroke without having worries it will destroy the work itself. The outcome of the artwork turns out richer and more sophisticated looking. Ann S. Dana has mentioned in her article '*Introduction of Technology into the Art Curriculum*', computer graphic tools and capabilities for colour and textures manipulation resulted in richer and more sophisticated use of these elements than possible with the art class media. It is indeed visible in the colour subject that I am conducting. The class seems to show a positive sign of interest in the learning process. Perhaps with the various functions and tools available in the software, it has made learning more inspiring and engaging. However does that mean we will continue to confine the students to only using computer as a media? Are the students gaining as much compare to students who are exposed to both the traditional media and the digital media?

No, these students will not be gaining as much compare to those exposed to both the traditional and the digital media. The direct application of paints rely a lot on planning because the students must consider form and colour simultaneously in order to avoid mistakes which cannot be erased easily. Such experience will help to foster analytic abilities and refining their aesthetic judgment overtime. At an early stage, there is a need for them to figure out what will work and develop with each trial and error; and not lean upon the computers for an easy way out. We should not confine them to only the digital tool, which will only stifle their creativity. They should be given the freedom and flexibility to experiment and explore with a variety of media in order to realize their creative potential.

Integration of technology into the curriculum is necessary for a better understanding of its importance to the students of today (DeMichiell, 1990; Gibbons, 1988; Goodson, 1991) (Bruce, 391). Ragan and Rezabek (1987) expressed that as the computer allowed the user to adjust and revise, engage in precision activities, duplicate images, activate memory capabilities, and manipulate images, it was a tool for use in visual literacy (Bruce, 391). All these theories on the importance of computer are true if only digital content is introduced to reinforce the curriculum but not to completely replace the traditional media.

It should be in addition to the traditional art tools but not to introduce as the only working tools to the students.

Gunderson (1993) stated that students can be taught art criticism, aesthetics, art history and studio projects using different media including technology (Bruce, 391). Likewise students in the area of creating animation, interactive multimedia and games design, should also be exposed to different media including the traditional media. Many of the animations still require the use of the traditional skills in the CG effects. For example, the backgrounds of the recent Peter Jackson's movie 'King Kong', the CG effects appearing on the backgrounds are the results of combining both traditional and digital skills. While the school's main focus is to churn out digital media students proficient in the area of media design, traditional media may appear not so relevant to the programme any more. Jon M. Duff has pointed what used to be a perceptual-intellectual-manipulatory function is now handled in software. One student can produce more effective rendering on screen is not necessary as a result of superior knowledge or artistic, but simply as the result of more computer skills. With the help of sophisticated software, rendering is much easier achieved and output is naturally higher in quality. In other words what the school has produced are just a group of computer technically manipulative students that probably lack artistic skills. Computer technical proficiency alone does not produce the aesthetic statement. As mentioned in the article, _Technology in the Creative Classroom_, Michael Sullivan once wrote in a 1996 article for _Electronic Tools and Trends_, "The Sorry State of Design Education," the "new type of design graduates emerging from our colleges and universities," …"simply aren't able to master the vast array of tools needed to perform today's design jobs." Why? Because our students, in imitating the computerized, animated commercials on TV, or the fantastical images in the movies have depended on their computer applications to bridge what they lack in true artistic skills (Cameron, 3).

A first year student illustrates the image in sample 1. The sophisticated looking portrait is traced from a photograph with computer software Corel Painter. This assignment requires students to use a set of complementary colour to illustrate their portraits with few given expressions such as 'proud like a peacock'. The outlines of the portrait are created with a brush tool in one of the tool category from the software. The colour and the texture on the surface are digitally manipulated with some of the instant effects provided by the software. The 'fish bone' image on the background is taken from the Internet. It has been replicated and reused in the assignment. This student has indeed shown the intelligent use of colors in her work. The final outcome is brilliant for a first year student but how much of the work is originally created is indistinct. Is the student able to produce the similar quality of work without the use of computer? Or will she turned into a handicap as soon as the computer is taken away from her?

Sample 1

Digital imaging diminishes the customary differentiation between unique originals and multiples, as much as photography affected painting in the nineteenth century (Witte, 403). Replication is precise and indecipherable from the original. Appropriation is quick, effortless, and can be seen as a concern or an opportunity (Witte, 403). Computer and its accompanying software offer students prepackage solutions to design problems and students are tempted to use them once they discover its usefulness. Software comes with so many fonts, styles, graphics effects, filters and other visual manipulations that students want to use them. Those who say they cannot draw straight line with a pencil, suddenly produce precise lines and more. The digital image is easy to manipulate, recombine, and transform. With this versatility and control, the knowledge is quickly passed from one to another student. Students are beginning to make copies of works that have similar rendering techniques and style confining within the capabilities of what the computer can offer. Instead of encouraging them to develop their own imagination and be independent in their critical thinking skills, we have indirectly cultivated in them the habit of relying too much on the computer for solution.
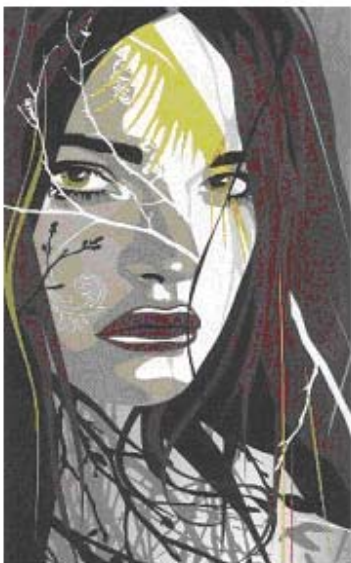
Professional illustrators using the computer as a tool create the two illustrations on the left.

Instead of creating their own styles, very often students would borrow these ideas and styles to incorporate them totally or partially into their own works.

If a student is not careful such copying neither facilitates learning nor enhances self-expression.

Sample 1 has clearly shown student is adapting the similar style the professional illustrators are using.

Usually in a typical colour class, the lecturer will begin with instruction in the lab first by sitting in front of the lecturer's computer, where the day's task gets introduced. Sample images of works that is relevant to the topic discussion and demonstration on the use of software are projected onto the lab projector; and it can also network to individual student computer allowing students to either view through the projector or from their own computer screen. Each computer has an access to Internet and it makes research convenient and easy. However it encourages the students to venture away from the lecture to do their own research before the lecturer can finish his/her instructions. Very often lecturer begins to loose the students' attention, as many of them will rush off to execution rather than spending time brainstorming, generating ideas, and "concepting' with their peers and lecturer. The new arrangement (see **Diagram: Computer Lab Layout**) with a computer places on individual desk provides no space for students to work in a cluster. It also creates a physical distance between the lecturer and the students. The opportunity of having lecturer and students to gather for discussion is lessen as the computers are now competing for attention in the classroom; students are spending more time accessing Internet rather then taking the initiative to approach their lecturer for suggestions and help.

Many of these students have made use of the computer's ability to 'shortcut' their way to a finished design piece. It takes incredibly less energy for students to search the Internet for materials such as graphic and clip art, and to use them for supplement in their works.

Sample 2

In one of the colour assignment, the students are told to use monochromatic colour to illustrate a landscape based on a given theme. They are refrained from using any images taken from the Internet. In sample 2 above, the first year student has gone ahead to source his desired images from the Internet and shortcut his way to a finished piece. Once again these images are manipulated with the software, recombined and replicated in the assignment. If the images are not original, one can still argue that the colour is. However is the colour still considered original if all he needs is just to pick his desired colour and depend on the computer to adjust its intensity and level to achieve the result?

Sample 3
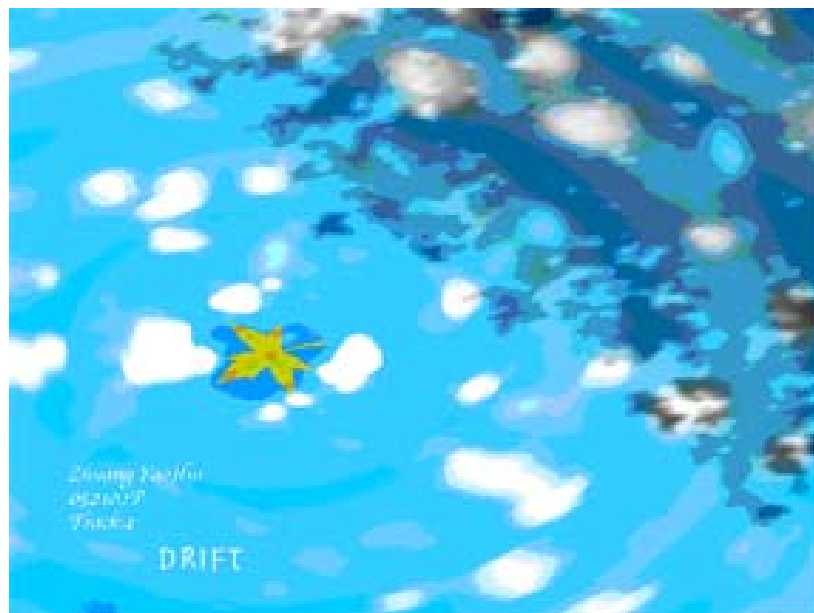
Sample 4

In sample 3 and 4, an image of a maple leaf taken from the Internet is commonly used among the students. There are incidents similar clip art is seen replicated in another's work if one is not careful to transform the image each time when they use it. With the help of the computer effects and digital manipulation, the students have managed to create the images of water with very little difficulty (see samples 3 and 4). Which would usually take a person months or sometimes years to achieve that similar look using a traditional medium. The computer has indeed make learning easy and convenient. However here is again the question of how much is considered originally created by the students? How much the students have gained during the process of learning is truly doubtful.

Sample 5

In a similar assignment, another student follow the instruction of not using images from the Internet. This student is faced with the challenged of creating an images from scratch without the help of using any effects available in the software. This is the kind of work a lecturer would usually encountered when a student does not take basic art courses before. This is where a student should begin their learning and to eventually use the capabilities of the computer to help them enhance their work. Only after they have understand the logic behind in creating art from scratch even if this means to make many mistakes before arriving at a satisfying piece; then we introduce the computer to the students.

Conclusion

The availability of computer as a rendering tool has caused a fundamental change in the pedagogy of teaching rendering and in evaluating a student's development as a media design students. It may in fact be considered advantages in a professional setting but students need to first learn how to manage all the freedom and power that computers put in their hands. In other words a tool that is a practical necessity in the industry may prove to be an impediment to the students learning. The computer and other hardware such as laser printers and scanners are able to create a polished output almost at once. This superficial precision can lull students into a false sense of skill or accomplishment (Lloyd & Barnhurst, 235). As Lloyd and Barnhurst mention in the article, *Accommodating Technology in the Visual Literacy Classroom*, the output by hand is never so dazzling as to lull students into thinking prematurely that the problem is solved. They can now use ready images from the Internet to add into their works. With little manipulation and the help of software application such as Adobe Photoshop and Corel Painter they are able to make the elements of their designs 'perfect'. Cameron, Steven G. said in the article, *Technology in the Creative Classroom: "*That in and of itself creates a problem for these students – because everything comes together so fast, many have never learned to struggle with a design. They feel it is complete long before it truly is." Indeed digital rendering is easy to produce images that appear 3-dimensional by applying material, texture and surface lighting with just few clicks here and there. Then again how much is originally created with an in-depth understand in rendering we are not able to know. Students often repeat mottoes, create categories, and make generalizations about arts before understanding the complexity of their related concepts (Freedman, 134).

The purpose of pedagogy is being jeopardized when the school is developing its curriculum not based on the learning needs of the student. With its already existing set of digital content curriculum, the school still sees a need for further digital content integration into its curriculum. The main objective is to produce a group of students that are able to meet the demand of the industry. For this reason the relevance of traditional art is being question. While there is also an important need to get the students exposed to technologies to meet the demand of the industry; it is also sobering to consider how our arts students may be becoming programmed to think that only the 'cut and paste' – the digital approach can work for them.

The computer technology is vital but not the final. It should not be introduced, as the only tool the student should be learning. It should be introduced as an additional tool to reinforce the colour syllabus previously experience in the classroom. It is important for the school to see the need to provide an alternative for the students. That is lesson should be designed to gives students several experiences with both traditional and digital methods. The two methods should be complementing each other and not seen as one being more superior to the other. The school should impart this knowledge to the students right from the beginning in the first year of their programme. They should not be given the impression computer is the only creative tool to their artistic imagination. Instead they should be given the opportunities to get expose and explore with other creative expressions.

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