

The Strategies for Teaching Digital Art in the Classroom as a Way of Enhancing Pupils' Artistic Creativity

Aber Salem Aboalgasm, Rupert Ward

Abstract—Teaching art by digital means is a big challenge for the majority of teachers of art and design in primary schools, yet it allows relationships between art, technology and creativity to be clearly identified. The aim of this article is to present a modern way of teaching art, using digital tools in the art classroom to improve creative ability in pupils aged between nine and eleven years. It also presents a conceptual model for creativity based on digital art. The model could be useful for pupils interested in learning to draw by using an e-drawing package, and for teachers who are interested in teaching modern digital art in order to improve children's creativity. By illustrating the strategy of teaching art through technology, this model may also help education providers to make suitable choices about which technological approaches are most effective in enhancing students' creative ability, and which digital art tools can benefit children by developing their technical skills. It is also expected that use of this model will help to develop skills of social interaction, which may in turn improve intellectual ability.

Keywords—Digital tools, motivation, creative activity.

I. INTRODUCTION

A look at research into the use of digital tools tells us that appropriate and effective tools are needed to allow the child to be in control, opening the world of technology to his/her perceptions and abilities and allowing him/her to think creatively. The teacher has a significant role to play in helping pupils to understand how the process of creativity can be developed through the use of digital tools, and in promoting awareness of how and when they can be used in the digital art classroom. With the objective of developing creativity through the use of digital learning resources, this article aims to help teachers understand, evaluate and assess the processes, practices and skills of pupil-authored digital art tools. This will enable them to develop their pupils' ability to use such digital tools, thereby improving their artistic performance.

A possible problem in this field is that education policies in most countries do not pay attention to children's creativity; in fact, education at the present time seems to be designed to obstruct creativity by focusing on exam results and formal school assessments.

Despite the fact that Art is a major educational subject and focus of research [1], no studies have looked at how children's

creativity may be promoted through digital artistic activity. A number of researchers have considered how digital technology can help pupils to develop their cognitive ability and improve their understanding [2]-[3], and some have suggested that a modern way of developing conventional lessons is to use digital tools more extensively as a method of pupil development, but the use of digital art methods has been relatively neglected.

II. NEGATIVE VIEWS

Some researchers have voiced the opinion that in art and art education, computer technology may actually impair creativity. Lanier [4] argues that technology can result in accepting the lowest common denominator, and mentions that after the Disney studios [5] had tried computer methods, studies found the results "too sanitized" and lacking in "the human touch".

Researchers who criticize computer artwork generally express the idea that technology destroys creativity because it puts a mechanical process between the artist and the finished work of art. This is linked to concerns about the use of 'instant art' and the temptations of easy reproduction due to the availability of programs such as Adobe Illustrator and Photoshop [6]. Some critics of computer art are concerned about the ever-increasing speed which technology allows, seeing this as a threat to the subtlety and complexity of ideas [2]-[7]. All warn that the creative use of computers depends on the people who are using them; they may be unimaginative, or might simply become too distracted by the endless possibilities.

III. POSITIVE VIEWS

However, computer technology does not threaten traditional drawing and painting tools [8]. Rather, the addition of this new technology should be seen as adding strength to traditional methods by developing a greater understanding of how we perceive the world and express ideas. In addition, these tools can help students who want to create art but have poor drawing skills. All researchers in the art field stress the basic importance of drawing, by any method. A further argument is that digital methods make it possible to adapt drawings more easily than by traditional methods. It is indicated that the teachers used the computer to support children's cognitive development by activities with computer in ICT room [9]. A range of effective and creative digital tools

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is available and accessible, and digital technology offers a huge choice of colors. Furthermore, digital drawing tools are very quick in comparison with traditional methods. Research has shown that children find tablets enjoyable and easy to use [10], and the work they produce is often better than expected. One study found that digital drawings were of great use in helping children to understand complex ideas in other school subjects [11], and other research similarly suggests that students working with digital tools are more successful in developing their understanding, especially when working together collaboratively. Finally, digital drawing methods can be used as a teaching aid, for quickness and clarity.

IV. THE PROPOSED MODEL

The proposed model is based on ideas from a review of literature and diverse theories in the areas of both artistic motivation and the effectiveness of digital art tools in developing children's artistic ability and promoting creative activity. It is intended to serve as a support or guide for teachers of art, and to expand the structure of teaching art through digital means. The proposed model will also enable the current generation of students to be better prepared for a workplace where digital art tools are commonly used.

The model incorporates several main elements. The children's characteristics, their motivation, the digital material used, and the guidance offered to facilitate their work all influence creative activity and the teacher's assessment of it. Ease of use and usefulness are important elements in assessing children's work. These factors are based on TAM theory, the Technology Acceptance Model [12], and influence children's attitudes to their creative work. The project on which this model is based combined qualitative and quantitative research strategies, involving a questionnaire, semi-structured interviews and narrative observation as the tools and techniques to collect data. This combination of methods was designed to achieve an accurate result.

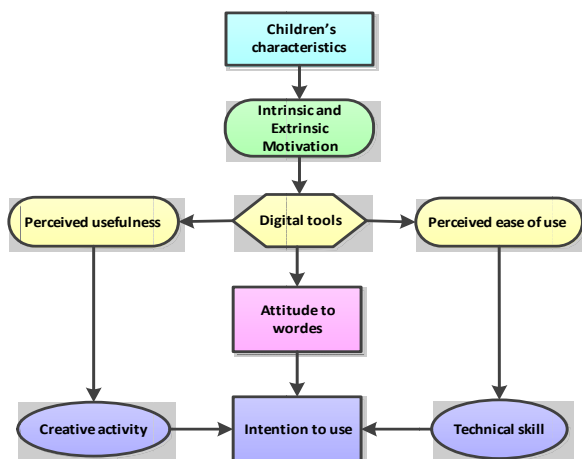


Fig. 1 Strategy of teaching art in the ICT room

V. STRATEGY FOR TEACHING ART IN THE ICT ROOM

In order to explore how the use of digital and traditional tools can help develop children's cognitive ability, a necessary stage was to flesh out the details of precisely how to include children in evaluating the design of digital tools and products. Another aim of the research was to study the role of the teacher in the digital art classroom. It is essential to consider how teachers evaluate and assess the processes, practices, skills and competences shown in the form, structure and content of pupil-authored digital artwork, as well as how they can develop children's ability to use digital tools and improve their performance.

The observer visited schools in order to test both traditional and digital art tools and pupils' use of them. By gathering data from observations, interviews and questionnaires, the aim was to discover which tools children found most useful, which they found easiest to use, and why. The test results would allow the observer to assess the digital drawing tools used, to determine which were the most effective in encouraging children to explore their functionality, and to assess the process of the pupils' work, particularly in terms of how effectively the tools promoted artistic creativity. This assessment was conducted using a mixed method, qualitative and quantitative, research approach [13]. The resulting model may be used as a new way of both assessing children who have talent, as a means of enhancing their artistic creativity, and encouraging those who have little talent or experience to begin practicing art.

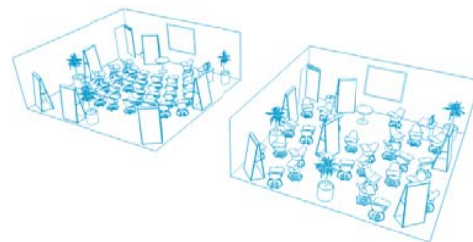


Fig. 2 Suggested layout of the digital art classroom

VI. ROLE OF THE TEACHER IN COOPERATIVE ARTISTIC CREATIVITY

A. Working as a Group

Group work is a powerful means of encouraging pupils' investigative skills as well as their creative ability. Like the current project, a similar study conducted by [14] involved children throughout the whole design process. In that study, it was intended that the children should be 'partners in design', using both traditional and digital drawing tools such as 'Magic Wall' to teach them to collaborate and produce a new piece of technology, and resulting in the creation of a story-based 'Game Fun House'. The method adopted was to work with separate age groups (4-6, 7-10 and 11-13) in order to teach the children to collaborate, and using traditional drawing tools, the children were gradually placed in larger and larger groups to combine their ideas. Another study by [3] found that students working together as a group, drawing on one piece of paper,

showed excellent development of understanding and communication with each other. It has been found that sharing ideas can be a powerful means of cooperative inquiry with young children, and makes them more creative, though occasionally adult guidance is needed. Indeed, ideas that come from children's drawings can be more powerfully creative than what they may produce with their limited writing skills, or even verbally [15]. However, children need a teacher to help them be in control of their art work, and to help them think visually and creatively. They may find it difficult to decide which tool they should start with, or have trouble in switching devices. Deciding which tool is easy, or which is useful, requires the student to reflect, consider and discuss issues under the supervision of the teacher in order to find an appropriate solution by a specific time within the lesson.

VII. EFFECTIVE USE OF ART LABORATORY / ICT ROOM EQUIPMENT

Teachers should use laboratory equipment as effectively as possible. For example, the teacher may ask children to collect ideas by taking photos using a digital camera, or to gather pictures for a project by scanning them on their computer and saving them in their own folder, or to simply draw an idea using paper and pencil. Once they have formulated their idea, it will be easy to insert it into software and work with it. There are many digital art tools that pupils can use for such projects. Research has also shown how drawing using traditional tools, singly or among groups, can create deeper personal thought [16], as well as more complex ideas and thought processes. A study using Vygotsky's [17] theory demonstrates a link between thinking, drawing and the development of visual thought, suggesting that "drawing is an important mediation tool for thinking".

The important factor is to give the child responsibility for his/her own perception of the artwork. The teacher's role should be to keep the children on task and motivated, and to enhance their creativity.

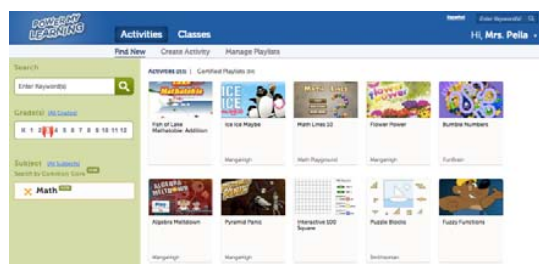


Fig. 3 Example of digital art software

VIII. MAKING THE LESSON EXCITING BY USING DIFFERENT TOOLS

The children should work with a variety of traditional drawing tools, used both separately and in conjunction with digital tools. They can share the use of a scanner and printer. Digital drawing tools include the interface and its various components in the Tools panel, including Pencil, Eraser, Line,

Brush and Colors. The children create drawings related to the topic under the instructor's supervision, and the users should have individual tool sets, allowing them to work effectively. It has been demonstrated [9] that digital tools are a good way to build artistic creativity and is easier to use in circumstances when great flexibility is needed in terms of resources, materials and techniques. A variety of different materials can be used in combination with digital drawing tools, and it is possible to rearrange, select, add-on, repeat, vary, delete, cut, multiply, replace, juxtapose, suggest and even represent much more easily than by traditional methods. As well as giving a huge choice of color and being very quick compared to traditional methods of drawing, digital tools enable old subjects to be treated in new ways, and allow both traditional and digital approaches to be used at once, merged together.

The children can use different software or hardware to gain experience of DMA, 2D and 3D; such exploration maintains interaction during the lesson between the student and instructor as well as between students. By the end of the project, the students should have tangible proof of their expanded skills, and the teacher can ask them to choose the tool that has been most effective for their creative work

IX. MOTIVATING CHILDREN BY GIVING FEEDBACK

Feedback is important for children's improvement, and therefore the teacher should provide feedback during the lesson. This will encourage pupils to improve their work and also to acquire research skills. In addition, the teacher should increase the children's motivation by writing words such as 'Thank you' or 'Well done', by giving good grades, or by sending them an email with comments about their artwork. At the end of the project, the teacher should create an exhibition of the children's work. Allowing the children to save their artwork to show to friends and family will give them encouragement and stimulate them to constantly improve during the sessions.

X. MAKING PUPILS' WORK DISTINCTIVE

For the final addition, the teacher can request that pupils add something to make their artwork more interactive, for example by adding sound effects or dialogue, or animating objects. The teacher could offer suggestions to stimulate them to think creatively and produce something different from what their peers are creating.

XI. ASSESSMENT OF CREATIVE WORK

According to a number of studies, assessment of creativity has proved to be difficult [1] and in many schools, teachers find it difficult to assess pupils' art work. It seems that teachers tend to make approximate assessments of pupils' creativity by using selected criteria. Particular technical skills can be evaluated easily, but it is more difficult to assess the effects of these skills on pupils' achievement. Much further discussion and information will be needed regarding the use, design and assessment of creative art using adventurous new approaches [1].

Research has described how the use of digital tools and software allows pupils aged between nine and eleven to create visual work. Once their ability to control the tools has been established, the approach allows children to demonstrate understanding of content and relationships between ideas more clearly than by written tests, and can be applied to a range of educational topics. However, this raises the question of whether creativity should be tested by examinations or simply developed by providing helpful feedback to pupils to assist further progress. Should the aim simply be to reward and celebrate good personal expression? It may be argued that some form of assessment is important for creating competitiveness between pupils, in order to make them work more effectively and creatively [18]. Therefore, the best and most successful pieces of digital art work should be exhibited in a school-time exhibition. This can build pupils' confidence and enable them to feel that they have achieved something important.

TABLE I
TEACHING METHODS IN THE ART CLASSROOM [10]

Activating pupils in digital art	Type of activation	Resulting in
Teacher asks pupils to explore ideas using different tools, such as by taking photos related to their topic or searching on the internet, etc., to save them, and then choose what is suitable for their work.	Responsibility	Pupils have a perception of their artwork and how they should think at this stage.
Teacher asks pupils to try to use all the tools offered to find out which ones are easy to use and which ones are useful to use.	Gain experience	Pupils know which tools are appropriate for their art work.
Teacher asks pupils for first sketch of artwork. Teacher can give feedback to keep them improving all the time, such as by thanking them during the lesson.	Stimulation	Pupils constantly develop and produce creative work.
Teacher lets the pupils know that he/she will make an exhibition at the end of the term.	Confidence	This can build pupils' confidence and sense of achievement.

XII. NEW MODEL FOR ENHANCING PUPILS' ARTISTIC CREATIVITY

This model is based on a literature review and various theories, and could be used to provide guidance to education providers in choosing appropriate digital tools and software for the art classroom.

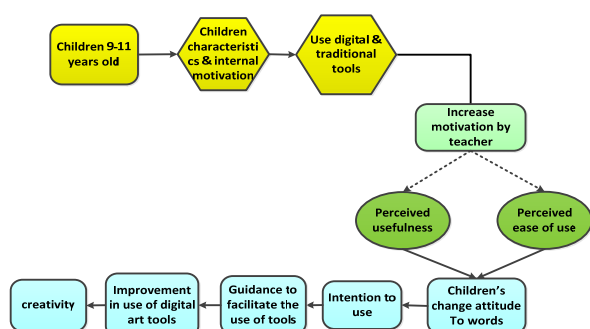


Fig. 4 Process of developing children's digital creativity

XIII.DISCUSSION

The model was used to test children's motivation before and after the provision of tools. This was designed to give clear results about the children's attitude and behavior, and also to demonstrate how the teacher's guidance facilitates the children's learning and leads to an increase in motivation. The technical art work was viewed and the creativity assessed by the teacher.

In order for children to build their artistic abilities, they need to go through several stages, starting with observation and ending with creativity in the classroom. The first phase in the research for this model was to consider the issue of self-esteem as an aspect of a child's personality within this age range. Self-esteem or self-confidence is a motivating factor, as the individual strives to achieve their goals in order to feel more confident. In this context, the children attempt to achieve their goals by improving their creative ability, and when they find their creative strengths, it can have an enormous impact on their self-esteem. According to Maslow's theory, all this can be gained through learning [19].

This motivation can facilitate the children's learning process, according to Bloom's Taxonomy, within the psychomotor domain. The taxonomy suggests that such learning starts with two aspects, observation and imitation, whereby a child observes what the teacher is doing and watches more attentively to gain further experience. After this, they start imitating and trying to copy what the teacher and others have done, in order to learn a new skill. This type of learning is described as follows: "The learner is observed and given direction and feedback on performance. The movements are not automatic or smooth [20]. The next stage is that the teacher should offer both digital and traditional tools, then observe the children's ability with both and assess which are the most suitable tools for them to use, using TAM theory [12]. This will further help to motivate the children to improve their artistic creativity.

XIV.METHODOLOGY

A researcher must adopt a useful method to achieve the objective of the research, in order to discover details and facts which are unclear and which have not been considered extensively in previous literature. The mixed method approach adopted by [13] was used to analyze the process of learning and creativity among students in upper-elementary grades.

XV.CONCLUSION

In certain circumstances, the use of digital technology allows pupils to do things more effectively, or to do things they could not do at all in other ways, because it offers speed, flexibility, range, capacity and interactivity [1]. It teaches students to make choices as to the suitability of tools to use, and these new tools have the potential to develop creativity within an educational context. Digital methods can be used in both traditional school environments and in new learning environments.

However, digital tools are not clever enough to control human beings. They cannot give ideas to the user or solve problems. The success of art work with digital tools depends on the pupils' technical and creative abilities, and how they are developed by the context (environment, equipment, and human interaction).

It is hoped that this work will achieve several aims: to give guidance to teachers in choosing digital equipment for art classes, and to improve pupils' opportunities to produce artwork by digital methods, thus enhancing their experience as well as their cognitive, technical and socially-interactive skills. It also aims to show how online and digital artistic methods (drawings, use of color, animation, and others) can be successful teaching methods for other subjects such as Geography, Math, and Science.

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