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Drawing Tablet and Ergonomic Factors for Art and Design Online Learning

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ABSTRACT
Universities have adopted Online Distance Learning (ODL) as a method of teaching and learning during the COVID-19 pandemic lockdown. Educators applied a variety of strategies to ensure students get to complete their learning activities including completing their assessments. Giving students direct or indirect drawing or sketching demonstrations during online learning is a significant challenge for lecturers in the faculty of art and design. During ODL, lecturers are required to perform live demonstrations in front of a camera, recording the activity and uploading them on an online medium such as Google Classroom, YouTube, instant messaging application and social media sites like TikTok. This pushes lecturers to abandon traditional pencil and paper in favor of digital drawing software like Adobe Photoshop or Sketchbook Pro. To utilize this software, one must utilize a drawing tablet monitor, created specifically to make sketching tasks easier. Sketching tablet displays are frequently used in design fields. To determine the usefulness of this device, a survey was given to lecturers and students at College of Creative Arts at Universiti Teknologi MARA (UiTM) Kedah. Based on 121 out of 150 respondents, the drawing tablet monitor is useful for delivering demonstrations during online teaching and learning activities. In addition, conclusion was made that ergonomics factors in the design of the drawing tablet monitor are essential to users since aspects of the design affect the human body. The ergonomic design of the drawing tablet monitor thereby enhances comfort, safety and productivity of users.

Keywords: *Drawing Tablet Monitor, Online Distance Learning, Art, Design, Ergonomic*

1 INTRODUCTION

A drawing tablet monitor or graphics tablet, pen tablet, or digitizer, is a computer input device that allows users to draw, sketch, paint, and manipulate digital images directly on the surface of the tablet using a stylus or digital pen. A drawing tablet monitor is a piece of technology that enables pen sketches on a computer. Since users can create pictures on their computer just like they would do with a pen or

pencil and paper, this is especially helpful for artists. By using a dedicated pen called stylus, which simulates the feel of a pen or pencil, and the tablet monitor as a drawing surface, actual sketching instruments are imitated. There is a display for live drawing that has a sizable space and a few buttons on the side. There are two different kinds of drawing tablets: with or without screen. Screened drawing tablets are more expensive and generally more professional than drawing tablets without a screen because they allow for direct sketching on the screen.

1.1 Drawing Tablet Monitor's Initial Users

There are two types of drawing tablet monitor or pen tablets: those with screens and those without. Drawing tablet monitors, pen display monitors, and creative pen displays are tablets with integrated external monitors that connect to the computer. It gives a natural feeling and supports the improvement of user creative ideas and sketches. The use of 2D or 3D software to sketch or draw directly on the screen makes it more user-friendly and responsive for digital artists, in addition to being beautiful. Graphic or pen tablets are more common and less expensive without screens. In essence, the user will utilize a particular stylus with these big pressure-sensitive trackpads. One of a pen tablet's key advantages over a mouse or trackpad is the level of control it provides. Using a graphics tablet makes working with organic or flowing lines much easier. Users may complete all activities just as they would if they were using a pen and paper, such as drawing precise contour lines for desired models, tracing clean circles, and more. If they had ever tried to sign their name with a touchpad or mouse instead of a pen, they would have seen the difference. The possibilities for allowing users to express their creativity using a graphics tablet or pen display are essentially limitless (Zabora et al, 2023). Here are some examples of the type of work that digital artists or designers typically create with this device.

1.1.1 Comics & Illustrations

Since tablets are compatible with many illustration and design software programmes, including Adobe Photoshop and Illustrator, comic book artists and illustrators are well recognised for using them to facilitate their work and processes.

1.1.2 Sketching & Drawing

Users can easily sketch or create digitally using a Pen Graphics tablet, just as they would with a pen and paper. Whether they are amateur painters or professionals working in studios, there are tablets that are suitable for everyone.

1.1.3 Graphic Design

Since graphic artists typically create everything from logos to marketing materials like brochures and posters, using a mouse to control everything can be taxing. For them, drawing tablet is the ideal way to expedite the task.

1.1.4 Fashion Design

Technology and fashion should come together to create something remarkable. On tablets, fashion designers may concentrate on different subtleties and add dimension to their designs, which may not be possible with a mouse.

1.1.5 Animations

Everybody likes to watch animated films, and many people fall in love with the cartoon characters. However, only an animator would know how much time and effort went into making the character. Animating can be a highly tedious and time-consuming job most of the time. From concept design to narrative planning to character creation, a tablet will help designers streamline

and accelerate every phase of the process. All tablets can run the best animation software applications, including Autodesk Maya, Houdini, Blender, ToonBoom, Adobe Character Animator, and others.

1.1.6 Product Design

An essential step in introducing any new product to the market is the design stage. Even the smallest wall clocks and the greatest automobiles are designed with great care and attention to detail. Throughout the whole creative process of product creation, from the original 2D concept to the final 3D model, a tablet will become a go-to tool.

1.1.7 Photo Editing

With time, photography has evolved beyond simply taking attractive photos. The picture also includes additional features like photo processing, manipulation, color correction, retouching, compositing, etc. And in this case, a tablet can be useful.

The use of drawing tablet monitor with screens is more geared towards making things simpler for lecturers and students. The absence of a screen typically results in a more affordable and portable option. Due to the relatively high cost and impracticality of transporting it anyplace, fewer institutions purchase the version that can operate directly on the screen surface for educational purposes in the computer lab. The demand for devices for online learning has surged as COVID-19 spread over the world and the Malaysian government implemented the Movement Control Order (MCO) around April 2020. Shoppe Regional Managing Director Ian Ho claims, *"Besides the push factor such as great deals during major shopping festivals, we also noted that the demand for PC and gadget for e-learning grew dramatically this round of Movement Control Order (MCO)," (Nurhanani Azman, 2021).* This includes utilizing monitor tablets for educational purposes, particularly in the field of art and design, and it promotes students and lecturers to purchase monitor tablets as a necessary piece of equipment. Prior to the COVID-19 pandemic, the cost of a well-known screen monitor tablet brand like WACOM could range from USD1000 to USD3000 per unit. However, due to the high demand, monitor tablets from less well-known brands with nearly identical specifications, like HUION and XP, can now be purchased for less than USD200. Because of this, using monitor screens is now essential, especially for individuals working in the fields of art and design and online learning. What is clear is that digital generated art can offer new ways for artists and consumers to expose, discover and engage and interact with fine art. This kind of technology has the potential to increase interaction and bring high levels of human awareness to digital drawing tools (Hurst et al, 2023).

1.2 Drawing Tablet Monitor as Facilitator in Art and Design Online Learning

Drawing and sketching are done in front of students while they watch their lecturers do actual demonstrations in art and design workshops. However, as the COVID-19 epidemic caused a significant shift in the educational environment from physical classrooms to online learning, various difficulties have surfaced due to insufficient infrastructure as well as a lack of preparation for online learning. Any functional implementation has always been hampered by a lack of adequate infrastructure. According to Dubey & Pandey (2020), the success of digital learning would be viable if the infrastructure at the institutions and learners' end should be adequate. To help university lecturers with their online teaching and learning, starting with art and design courses, this article introduces Drawing Tablet Monitor as a useful tool. Due to the nature of the course syllabus, art and design courses are originally chosen as they have the most potential users (Omorkulov et al., 2021). The usage of digital tools like drawing tablet monitor as part of the art curriculum can provide inspiring and inclusive opportunities for learners and lecturers. It also encourages collaborative making of art not only in the education environment but also at home. This has significantly increased creativity and making ways to express ideas without boundaries (Edwards et al. 2021)

1.3 Ergonomic and Its Factors in Choice of Drawing Tablet Monitor

Choosing the ideal drawing tablet monitor depends on several factors. It may include a user's specific need, preferences, budget, and intended use. Ultimately, the best drawing tablet may depend on balancing all these factors and considering the ergonomics of the tablet design.

Ergonomics is the scientific discipline concerned with the understanding of interactions between human fit and overall product or system design. Ergonomics aims at designing and arranging things people use so that the interaction between people and products is efficient and safe. This includes aspects of the design of the product, workspaces, and tasks to fit the capabilities and limitations of the human body, thereby enhancing comfort, safety and productivity (Kessebohmer Ergonomics of America, 2024)

In terms of choosing and using drawing tablets for education purposes, the ergonomic factors of a preferred drawing tablet are crucial for ensuring that the tablet, environments, and systems are optimized for human use, comfort, efficiency and safety or long-term health. Ergonomic drawing tablet design is crucial to ensure comfort, precision, and long-term usability for users who rely on these devices for digital art creation. Kessebohmer Ergonomics of America (2024) highlighted the key ergonomic considerations in drawing tablet that includes:

1. **Surface Texture**

   The drawing surface texture should provide appropriate friction for the stylus while minimizing resistance and ensuring smooth strokes. The surface texture should be comfortable for prolonged use without causing pain to the user's hand or wrist.

2. **Size and shape**

   Drawing tablets ranging from compact to large models, should balance portability of workspace. The shape of the tablet should allow for a natural hand position and comfortable reach across active areas.

3. **Tilt and pressure sensitivity**

   This element allows for natural and precise control over line thickness and shading, reducing the need for repetitive hand movements while using the stylus.

4. **Display Integration**

   Tablets design needs to consider size and resolution of screen, adjustability of viewing angles, and anti-glare properties. The display should be positioned at a comfortable viewing distance and angle to promote good posture.

5. **Software Integration**

   Ergonomic design extends to user interface elements, shortcut customization, and intuitive navigation. Efficient workflow and minimized cognitive load during creative tasks should be considered.

6. **Anthropometry and biomechanics**

   This aspect considers variability in human body size, shape, and capabilities. Anthropometrics ensure the comfort of a wide range of users. Meanwhile, biomechanical guides the design of interfaces and controls to minimize strain and fatigue during use.

2 METHODOLOGY

Universiti Teknologi MARA (UiTM) Kedah's College of Creative Arts lecturers and students in Graphic Design and Industrial Design have been polled. The survey respondents had the chance to use a few drawing tablet monitors from various brands, including Huion, Wacom, and XP-Pen. After receiving a chance to use the equipment first-hand, they were encouraged to respond to a brief survey about the use of drawing tablet monitors in their Art & Design classrooms.

The respondents who consented to test out the drawing tablet monitors were provided with a survey with a five-Likert rating system.

1. I can put up a drawing tablet monitor before my online lessons is one of the things on the list.
2. During my online classes, I can successfully use the drawing tablet display.
3. I can afford the drawing tablet monitors.
4. In my upcoming online classes, I intend to employ sketching tablet monitors.

Ergonomic Survey questions (HSSE World Free Ergonomic Checklist for General Industry, 2022)

1. Ideal Posture
- The tablet allows placement of the body at an open angle of 90° or more with the head erect and arms relaxed at the side
- The tablet requires an ideal height, angle, and distance to allow the user to maintain an ideal posture
- The tablet permits free movement
- The tablet reduces neck and shoulder strain

2. Sitting Position
- The tablet allows the distance required to effectively see tasks
- The tablet maximum angle is effective to see tasks without bending the neck
- The minimum distance required to effectively use the tablet is ideal

3. Tablet monitors and display screen
- The tablet screen is large enough to display a sizable amount of information
- The tablet shows clear and stable images that do not flicker or waver
- The tablet allows brightness and contract control
- The tablet allows arm movement in all directions, giving added benefits of freeing up the workspace

4. Work surface
- The tablet aligns the top of the display no higher than the user’s eye level
- The tablet allows adjustments for viewing distance
- The tablet positions the screen to reduce glare
- The tablet can be tilted back 10 to 20 degrees to allow eyes to look slightly downward when viewing the middle of the screen

5. Surface Texture and stylus
- The surface texture is non-slippery
- The stylus texture is non-slippery
- The surface texture does not have sharp edges, undercuts, deep ribs, or finger grooves.
- The stylus is thermally insulated so as not to get hot or cold
- The stylus grip is ideal
- The shape of the tablet allows for a natural hand position and comfortable reach across active areas

- The surface texture provides ideal friction for the stylus while minimizing resistance and ensuring smooth strokes.
- The surface texture is comfortable for prolonged use without causing pain to the hand or wrist.

The respondents were asked to provide their input for analysis after using the drawing tablet monitors.

3 RESULTS

3.1 Cost

Despite having a wide range of brands and specification options, the drawing tablet monitor is quite expensive to purchase and maintain. According to the respondents, the price range for screens drawing tablets, which starts at USD159.99 (Amazon.com, 2022), is expensive.

3.2 First Time User / Unfamiliarity / Operating Difficulties

As it was their first time using the devices, some respondents acknowledged having some software and compatibility issues with the drawing tablet monitors. Despite the challenges, most of them had the optimistic belief that it was only a little problem that would go away as they get accustomed to the gadgets.

3.3 Importances of ergonomic factors

All respondents highly emphasize the importance of having a tablet with ergonomic design. This is because ergonomic design is crucial for ensuring that the tablet, environments, and systems are optimized for human use, comfort, efficiency and safety or long-term health.

The drawing tablet monitor was deemed a necessary gadget that should be installed in institutions, notably in the computer labs. Most respondents concurred that using a drawing tablet monitor for online demonstrations is useful. In addition, taking ergonomics factors into account when selecting the ideal tablet is important to respondents.

CONCLUSIONS

Drawing tablet monitor offers a great deal of promise to be an excellent facilitator of online art and design study. Some norms have returned to normality as the world enters the post-pandemic period. However, a hybrid learning environment is presently in existence at some local colleges in Malaysia, allowing for both traditional classroom instruction and online learning, which have gained popularity since the COVID-19 pandemic. No matter what condition or environment we are in, such technology should be embraced and ergonomic factors in choosing a tool for learning is crucial as these factors give impact to comfortability, efficiency and long-term health of learners and lecturers.

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All authors played equal roles.

CONFLICT OF INTEREST

There is no conflict of interest.

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