

Evolving Graphics in Landscape Architecture: Professional Demands on Educational Institutions

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Abstract

Advances in graphic technologies over the past several decades have allowed landscape architects, architects and engineers to combine accuracy with visualization for project development and communication across professional lines. However, the inclusion of these technologies have impacted the curriculum of design programs in a variety of ways, both positively and negatively. This paper will explore the evolution of graphics in landscape architecture design programs and the profession, present recent studies that examine what graphic technologies are being used in the profession with survey responses reflecting the perception of technology and conclude with a discussion on the implications of these changes on educational institutions.

Keywords: Computer Graphics, Landscape Architecture, Graphic Technologies, Curriculum, Technology Trends, Design Education

1. Evolution of Graphics in Landscape Architecture

Most design fields begin the process for design through verbal communication and have expressed design ideas to others through traditional methods of drafting and rendering on paper, typically known as hand graphics. Various forms of graphics from loose conceptual diagrams to formal illustrative plans to highly technical constructive documents are developed with pencils, pens, markers and pastels on various types of paper are communicated to others through a design process. Standards of hand graphics have been in place for decades, however, an influx of advanced computer programs have continued to influence and often replace traditional graphics throughout the design process in Landscape Architecture.

Although Computer Aided Drawing (CAD) programs have been around since the 1960's, computer applications were not adopted into Landscape Architecture until the 1980's (Tai, 2003). Most Landscape Architecture firms reported using word processing and spreadsheet programs for business management until the mid-90's when CAD (Computer Aided Drawing) became an industry standard for construction details (Palmer, James. 1998. The 1996 status report on computers in landscape architecture. *Computing* 11(1):2-5.). With the advent of AutoCAD by Autodesk and better computer graphics cards, few professions realized the impact that graphic programs would have in a little over a decade (Bishop and Lange, 2005).

Although preliminary indications associate CAD with just construction documents, AutoCAD also offered other benefits such as easy corrections, precise drafting and graphic standards which could be easily transferred to colleagues and across design professions. With the opportunity to increase productivity, CAD started to replace other traditional methods of graphics throughout the design process.

The history of graphics for design professions have since been enticed by the capabilities of computer graphics, but, in the words of Kirby Lockard (2000), not without many seductive pitfalls. The speed of project production in the profession via computer graphics in the late 90's increased and the hiring of computer capable employees was intoxicating. At this time, academia was also realizing the need for curricular adjustments to meet basic professional needs in regards to computer graphics (Tai, 2003).

The pedagogical side of graphics had little time to absorb the educational implications and curricular time restraints in merging multi-medium graphics. Where classes may have only been using and/or teaching hand graphics skills, courses now had to include computer applications. In many cases, four or more programs are being taught in conjunction with hand graphics, and in some design schools, computer graphics have superseded hand graphics in educational value.

2. Adoption of Computer Graphics

“Once upon a time, people in the design profession used very crude tools called pencils and pens to create plans. It was a very painstaking process, but the results, if done well, were stunning. Along came AutoCAD and everything changed...” Nick Petty, UGA Graduate Student. 2006

Starting an educational career in the late 90’s as a professor of both hand and computer graphics for landscape architecture, it was important for me to develop a practical course sequence which met professional demands. However, not much research had been done to determine what that might be. As a result, I started a series of early surveys in 2004, 2006, 2007, 2009 and 2012 which began to track what technologies were being used and how. It was the beginning of a transitional period that saw over a dozen graphic applications taught with three leading technology applications emerging as essential to curriculum inclusion in order to meet/exceed hiring qualifications: AutoCAD by Autodesk, Photoshop by Adobe and SketchUp by Trimble (Calabria & Buitrago, 2008).

2.1 AutoCAD

Originally used by architects in the 1960’s, CAD programs began to replace hand graphic development for construction details and other standardized documents in landscape architecture, eventually replacing hand-drafted base maps, planting plans, and other constructive documents typical to the profession. Formally released in 1982, AutoCAD became the most widely used CAD software in just over 4 years. It was an exciting tool which allowed quick changes and clean products. Students who learned it in school were highly marketable as it was adopted into office production. Even so, there were limitations in the original versions which had a cumbersome 3D platform and lacked in a variety of areas including design visualization, rendering and illustrative symbols.

2.2 Adobe Photoshop

In early to mid-1990’s, Adobe Photoshop was being used primarily for image display of photos, hence the name, but it soon began to emerge as a landscape architecture standard for artistic rendering and digital imagery manipulation, allowing for a modicum of visualization. With the advancement of scanners and file extension, designers could easily import hand-drawn or AutoCAD-drafted products for rendering a variety of materials with what seemed like endless colors, filters, and creative brush strokes. Digital imagery could generate quick photos of redesigned spaces, not only for design decision making but for communicating design ideas to clients.

2.3 SketchUp

In early to mid-2000, a rapid adoption of SketchUp for 3D modeling was an easy fix to the visualization and production package of a project, appropriately described as “3D for Everyone”. Free and relatively easy to learn, SketchUp already had been used by architects and furniture designers, and although it was a bit difficult to get smooth curved edges, landscape architects found a quick way to use SketchUp to generate short walk through animations, develop wire framing of architectural features for perspectives, and model the built environment for design visualization and decision making.

Although ubiquitous in a variety of design related professions, these technological advances in design communication have some negative consequences which are inherently rooted in the way Landscape Architecture needs to use them.

3. Recent Studies Examining What is Being Used in the Profession and Reflections on the Impact of Digital Communication

A more recent survey in 2014 by Graduate Student Rodney Benton and practitioner, Daniel Tal was conducted through ASLA, The American Society of Landscape Architects. This survey asked a variety of firms about their graphic production and technology use. The results indicate an interesting connection the profession of Landscape Architecture has with the history and adoption of graphic technology.

“New technology over the past 20 years has truly revolutionized my office, but at the same time there are days when I feel that the small incremental advances in software are eating up an increased amount of time necessary to adapt to the new changes, which seem to rarely result in an increase in productivity that makes the time and effort worthwhile.” Survey response.

3.1 Survey Results

3.1.1 Firm Size and Demographics

The survey was sent out via surveymonkey to 3,880 ASLA registered offices. 729 offices replied. Over half of the offices, 55%, had a firm size between 2-49 employees. Sole proprietors made up 27% with the remaining offices having 50 or more employees.

Office demographics identified the professional composition of each responding firm. Firms that are mixed with Landscape Architects as well as Planners, Architects and/or Civil Engineers typically have a wider variety of technology in the office due to this larger mix of professionals. A vast majority, over 400 of the 729 offices had Landscape Architects only. Approximately 225 offices employed multiple disciplines and the remaining offices had a mix of hired planners, architects and engineers with landscape architects.

3.1.2 Hardware

In a time where Macintosh products have dominated technological advances in processing and touch screen technology with sleek designs and colorful displays, the survey clearly indicates that 75% of firms still use PC based computer hardware with another 15% using both PC and MAC computers. Part of this relates to the software typical to the landscape architecture industry and the historical significance of applications like AutoCAD which only ran on PCs in the past. Anticipating an increase in MAC usage, Autodesk wisely adopted a MAC friendly version, but it is still short of the full PC capabilities.

3.1.3 Graphic Style

Don't get rid of that pencil sharpener yet.

“Most of the sketch up and cad renderings I've seen is crap. Can't touch rendering by hand. Learn to draw or get out of the business.” Survey response

Use of hand and computer graphics have oscillated over time. With each new application there is always some speculation that hand graphics will be replaced and become outdated or unused. For educators, it's a constant struggle to balance curricular time and skill development. For professionals, it's a matter of what works the fastest and communicates the best. Surveys like this allow hand graphic professionals a chance to utilize and value this timeless artistic form of communication. Surprisingly, over 600 firms stated they used hand graphics in the office, primarily for conceptual design and basic presentation of ideas. While computer applications have certainly taken a firm hold on project development products, there is still an appreciation and usefulness for quick sketching, design thinking and preliminary communication.

“I think too much focus has become of the digital rendering and modeling programs, and does not replace the ability to draw. Additionally, I have found that there is a connection between students who only know 3D programs vs. those who can also draw by hand. Those who can draw seem to have a better understanding of spatial form and the artistic ability to show detail. While invaluable, 3d modeling is only one tool.” Survey response

3.1.4 Software

Here is where things start to get interesting. A larger list of applications was included in the original survey but a quick snapshot of the most widely used applications showed that MS Office has a variety of valuable uses making it the most practical application for the work environment. In regards to drawing, AutoCAD still remains a leader in drafting with Civil 3D on the rise. Photoshop is as widely used as AutoCAD and SketchUp in a close 3rd place. “We have found that no single software on the market is truly suitable to the landscape architecture/urban design work that we do. It takes multiple programs to achieve our desired goals, but luckily many of the software have become more comparable and interchangeable with their internal and external data. Hopefully that trend will continue “. Survey response.

3.2 Technology Issues

Survey results suggested a general frustration with the cost of upgrades, having the time and resources to learn new technologies and other technical issues such as hardware needs and managing large file sizes.

“We are constantly evaluating and upgrading our technology but make changes only after much deliberation. Clients are always looking at the bottom line and we have to balance being technologically savvy with being financially competitive”. Survey response

Each of the top three software received different complaints but they do have one thing in common: none of them were developed FOR Landscape Architects.

“It would be nice to see design software more geared towards what landscape architects need, but I’ve been saying that for over ten years now.” Survey response

Many survey respondents expressed a general displeasure with Autodesk, expressing Autodesk’s disregard for our professional needs and more recently about how expensive it has gotten with too many upgrades. Complaints about Photoshop included having to purchase the full Creative Suite/Cloud package which included other applications that weren’t used. SketchUp is well known for generating enormous file sizes and bogging down computers. Several firms have outsourcing resources, primarily in the US, but also abroad for advanced graphic production services. These services range from \$500-\$5,000 annually and are often required for sending/receiving files with multi-disciplinary offices or for client and presentation needs.

There were also many comments from survey respondents who are in the process of making those in house technology changes with Revit, Rhino and Vectorworks. Although Revit is more widely used, most comments really supported the adoption of Vectorworks. Unfortunately, the responses and results seem so random, it’s difficult to identify an up and coming leader which could meet the graphic needs of LA’s in one stylish package and that works across platforms with other professions.

“I am unhappy with the current selection of software offered to LA professionals. It would seem we are too small a group to demand purpose-built CAD software. The only thing I’ve seen out there that even comes close is Vectorworks, but that has compatibility issues with the Autodesk products. It seems to me that LA’s always have to work with software that is designed for other disciplines.” Survey response

There were a few brief mentions of applications that were designed for LA’s such as Land FX or Dynascapes, but for some reason they didn’t make the more widely used list.

4. The Impact of New Technologies in Education

In a 2012 study conducted by Jie Yan and Bo Yang at Utah State University, results clearly showed that while there are many positive results from new technologies, there are larger milestones for adopting them which revolve around time it takes to learn new technologies and the high price of purchasing and updating applications (Yan, 2012). While the cost of change is evident in survey results of firms, the cost of change is also evident in education. Having started teaching computer graphics during these two decades or more of transition, I have calculated over a dozen different applications/technologies our program adopted as “the next best thing”.

Not only in hardware specifications and sometimes licensing, but faculty must know it for practical applications prior to teaching it. In many instances, these technologies need to be applied year after year in subsequent classes and other faculty (who wouldn’t typically teach technology) need to be familiar with it in their studio courses for project development, many who don’t have the time or resources to focus on graphic development.

“There has always been a big gap between what students are learning in LA programs and what is being used in small LA firms. Cause? Cost and the steep learning curve for principals and other employees.” Survey response

The proliferation of technologically savvy professionals has risen and with that, many designers are starting to question the impact that computers have made in design, graphic literacy and representation. Much of this resulting in ambiguity in design communication pedagogy and a lack of identified trends in skill sets between education and the profession. Yan’s 2012 survey demonstrates some of the differences in perceptions between practitioners and educators on which applications should be taught and which applications are being used.

For instance ArcGIS has been showing up in surveys for several decades but it has stayed relatively minimally used in the profession. However, Yan's survey showed that while 38% of 341 practitioners use it, 91% of the 24 educators in the survey taught it. Likewise, applications like Rhinoceros 3D is used only 13% in the profession but 61% of those educators were using it. With a time crunched curriculum, how and what we decide to teach has implications of what we are leaving out or replacing.

“...history reminds us that one of the ways we get in trouble in teaching design communications is when we let what we are teaching get too separated from what is actually being done in design practice.” Kirby Lockard, 2000

5. Conclusion

The Landscape Architecture profession might be undertaking some graphic change in the coming years. Unfortunately, there currently doesn't seem to be a unified approach which would give LA's a voice in the development of a profession specific application and potentially influence other disciplines to work across our platform. Ultimately, the survey results are a reflection of how our profession historically and systematically adopted what worked as technology advanced and hasn't really been able to progress much beyond the initial adoption. Some of the best news may be that so many professionals are still using hand graphics and that, in conjunction with design skills, are the core elements of most Landscape Architecture programs throughout the curriculum.

“I honestly think there is TOO much emphasis on technology and not enough on pure and simple problem solving through hand drawn design. I don't think students are being properly taught that technology is a tool...not the end all in design. The over emphasis on tools is creating a group of young professionals that are all about pretty pictures and not enough about practical design...which has always been, still is and will always be...where the core of landscape architecture operates”.
Survey response

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