For landscape architecture students beginning to experiment with computer generated imagery, the focus should be on integrating digital media in a comprehensive manner throughout various phases of the design process. Digital media exercises must be developed in such a manner that they support, express and enhance the design content of a studio project in conjunction with the chosen design process. In a beginning-level studio, digital media is best explored through easy-to-learn applications in a structured yet flexible studio environment.

One powerful way to integrate digital media with design inquiry in a comprehensive and reciprocal manner is the electronic overlay of information and poetic impressions. This method takes on particular relevance in dealing with the multiple issues that face landscape architects today.

L'intégration des média digitales dans les studios d'architecture du paysage: La superposition des média et du processus

Pour les étudiants en architecture des paysages qui commencent à expérimenter avec des images produites par l'ordinateur, l'emphase devrait se placer sur l'intégration des médias digitales d'une manière comprehensive au travers des différentes phases du processus de conception. Des exercices en médias digitales devraient être développés d'une manière qui soutient, exprime et améliore le contenu en design d'un projet studio en conjonction avec le processus de conception choisi. Lors d'un studio pour débutants, il est préférable que les médias digitales soient explorées grâce à des applications faciles à apprendre dans un environnement studio structuré mais flexible.

Une façon puissante d'intégrer les médias digitales avec des investigations sur le design, dans une manière compréhensive et réciproque, est la superposition électronique d’informations et impressions poétiques. Cette méthode est d’une pertinence bien particulière pour les nombreuses questions auxquelles doivent faire face de nos jours les architectes de paysages.
introduction
The implementation of computer applications in landscape architecture programs across the United States seems to focus primarily on the usefulness of CAD software as a drafting tool and GIS programs for advanced landscape analysis. There is, however, little discussion on the use of electronic media in a more comprehensive manner. Nor is there much debate on the usefulness of digital media for design inquiries particular to landscape architecture. In general, the integration of electronic media in landscape design seems to lag behind in comparison to similar efforts made in architecture studios. Many landscape instructors are not familiar with digital applications. Students who are well-versed in the use of computers take a lead in experimenting with electronic media, leaving other students and many of their instructors far behind. Consequently, a demand is growing for digital landscape design studios that teach those with less aptitude to use these advancing tools while providing opportunities for those already familiar with basic graphics applications to challenge themselves further.

A comprehensive approach to design studio teaches process and media in conjunction with introducing students to new programs and subjects. The project, method of inquiry (design process) and method of communication (media choices) must be related to one another. Any given project may have multiple valid design processes and a wide range of suitable media. However, it is necessary to change the selected method of inquiry and the communications tools with each studio, so that students may become familiar with the variety of options that are available. Students can eventually learn to construct their own design processes and to make appropriate media choices independently. The incorporation of various ways to use digital media must be built into this progression.

The examples and images in this article come from a third-year undergraduate landscape design studio taught in the winter of 1998 at the University of Oregon. For the majority of the students, this was their first experience with the incorporation of digital media into design. Students were given a relatively detailed design process to follow, both because the design problem was complex and because the students were not well acquainted with the idea that different design methods do indeed exist. It was also important that the digital component did not take away too much attention from the design problem itself. Therefore, only one easy-to-learn graphics and image editing program, Adobe PhotoShop, was required, with optional choices for page-layout, illustration, and simple 3D modeling left up to the students. In addition, students were encouraged to use the Internet to find imagery to be used in their graphic compositions. Modern Medium Inc. granted the studio a copy of PhotoMap™ which provided students with 4,500 digitized aerial photographs of Eugene Oregon, the town in which the design sites for the studio were located.

In the course of this studio, students were given a comprehensive understanding of how computers can be utilized in the various design phases of analysis, concept development and presentation. The studio included a number of required digital assignments: the creation of digital pattern maps, a poster summarizing design efforts up to mid-term and at least one photo montage that gave an illusion of a human-eye perspective to illustrate selected views of the final design. For the remaining exercises, students were free to choose what they felt would be appropriate media to convey their intentions. The project, Marking Place: Spatial Overlays, focused on concept and the expression of meaning through contextually responsive spatial composition. Students were first asked to generate images that communicated ideas before attempting to produce graphics and digital models for a developed spatial design.

studio problem description
In the Marking Place project, landscape was regarded as a repository of multiple influences. Students were asked to focus on the city of Eugene, Oregon, and examine the systems, networks, narratives, and relationships which inform its public spaces. Working in pairs they mapped the spatial patterns of five of these influences. They were then asked to combine the maps in order to select a design site where three or more patterns overlapped. For this site, each student had to develop three separate interventions intended to reveal the existence of individual influences through spatial
forms and structures. The final step was to integrate the three interventions into a single site design. This overlay of conceptual metaphor and spatial organization was to be consciously approached as a symbolic narrative. Students were asked to carefully consider the relationships between the influences they had expressed and how to make this evident in their design.

the role of computers in design phases
Each design process can be roughly divided into an analytic phase, a conceptual phase and a development phase in which conceptual ideas are depicted in such a way that they become imaginable in the reality of an existing space and time. Smaller sub-steps within this process may be specifically developed for a certain design problem as well as make the process more personalized for each individual designer.

Exercises within these phases can be structured to demonstrate how the computer can aid the design process at distinct levels, rather than focusing on one particular application of digital media. The following section shows how the Marking Place studio guided students through site analysis, concept development, spatial organization and design presentation. Each subsection consists of an introduction to and a description of relevant studio work created during a specific design phase, followed by thoughts on the design process and conclusions on the use of digital media.

analysis phase: creating hybrid maps
During the site analysis phase, landscape designers attempt to uncover as much as they can about a site in order to find contextual information on which to base design concepts. Unfortunately, students often regard this phase as an extraneous task which, as a result, seldom permeates their design ideas in any significant way. A typical approach to site analysis consists mainly of collecting data through mapping various physical aspects of the site and its immediate surroundings and taking photographs of present conditions. Although students are acquainted with conventional methods of site analysis which take into account various types of information and overlay them, this type of research is seldom consciously used in the studio. Evidence of its use is primarily found in studios that
students were also instructed to select a limited number of icons to mark points of discrete spatial manifestations where selected aspects of their chosen influence appeared. Most teams created icons by downloading images off the Internet and adapting them in PhotoShop, but one team constructed their own symbols using ClarisWorks, a basic graphics program. Restricting the use of colors and number of icons made it possible to superimpose the different pattern maps and create a hybrid map which showed relationships and juxtapositions of information. The merged maps were used to find sites where at least three of the researched influences came together. Students were then asked to choose one of these sites to create a design proposal.

**Contribution to the design process.** The merged maps effectively depict how the spatial manifestation of each influence weaves in and out of the other spatial patterns, creating a complex mosaic which can be endlessly expanded by incorporating additional spatial patterns of other influences. The assignment illustrates the idea that each site is related to other sites in complex manners which can be made apparent through a process of abstract digital mapping and overlay.

**Digital media application.** There are many potential applications for digital media in the site analysis phase. Superimposing transparent maps is only one possibility. Landscape analysis can also be augmented by linking spreadsheets, photos, videos and site maps and by combining CAD and GIS information. By employing any of these methods, diverse site and context aspects can be readily compared. This enables students to go beyond collecting information, and allows them to integrate site analysis into concept development in a relevant way.

**Conceptual phase: developing narratives**

The development of a concept is often difficult, especially for beginning design students. As Carl Steinitz (1995) points out, students are confused about what to base a concept on and how to judge if their concepts are good. Theoretically a concept is derived from work done in the analysis phase. However, a factual analysis is not the only source from which design ideas are derived. Stu-
Students often tap into their impressions and feelings about a site when developing concepts. During design reviews they often defend their work with phrases such as “...the site reminded me of...” and “...I feel this would be a perfect site for...” These statements come from an intuitive analysis of the site (and sometimes the design problem).

The Marking Place project was built around an intentional framework which choreographed students through a multi-leveled analysis engaging intuition, observation and the interpretation of facts from literature and maps. Students were required to construct three distinct narratives reflecting the three aspects that were identified as influencing their chosen site and then translate these narratives into three design interventions. For this assignment, students were given their choice of media based on what they felt was appropriate and would convey their intentions. Many of the most successful pieces were produced in a digital format.

Several students used collages to express their narratives. One student presented her opinions on creative expression in Eugene’s low-income multi-ethnic neighborhood through a set of emotionally-charged digital collages and paintings which emulated the textures and patterns of graffiti art. Another student expressed narratives on corporate influence, the impact of drugs, and pioneer history on the controversial commercial avenue leading to the university in a set of surreal representations. Both students scanned hand-made sketches and included them in their compositions.

Collage was not the only method employed. Using the 3D-CAD program Design Workshop™, one student made three simple digital sculptures that connected the impact of water, history, and corporate influence on the once-industrial Mill Race area. These sculptures were specific to the narratives running through the site, but not placed contextually within its current visual and functional properties. Yet another student took a more direct path through the design process to a decidedly spatial organization of ideas, rather than expressing the ideas metaphorically. The technique of digital photographic montage helped him to rapidly illustrate his initial ideas for the design interventions. Rather than going through the lengthy process of designing the...
structural components from scratch, fragments of existing places (Fisherman's Wharf in Seattle and the San Antonio Riverwalk) were pasted onto scanned images of the design site.

Contribution to the design process. Students used digital collage, painting, sculpture and montage as strategic techniques for the poetic representation of narrative expression. Layers of personal interpretation and intuition were added to the data derived from the analysis phase. These visionary graphic constructions have the potential to illuminate conceptual thinking at a profound level before ideas are consciously translated into site specific spatial forms. The quick generation of images expressing complex perceptions helps to sharpen the content of vaguely articulated concepts often present at this stage of design. Through evocative representation, ideas are made visually tangible and are then open to dialog with instructors and peers. Associative thoughts can be expressed graphically, especially in a collage, and such thoughts are further stimulated by the very process of creating a collage. The media is not restricted by considerations of scale, yet the formal properties between collaged elements remain important (Utsey 1987). Collage thus facilitates the teaching of formal graphic composition in conjunction with expressing thoughts. The approach also demonstrates to students how the same element can acquire different meanings through its formal relationship with other images.

Montage techniques provide for quick spatial evaluations as well as a conceptual comparison between the design site and the spaces from which the images are borrowed. Using various graphics applications, the montaged elements may be gradually transformed into site specific elements through alterations in scale, color, materials, etc. Express-
Integrating Digital Media in the Landscape Architecture Studio: Overlaying Media and Process

Overlaying design narratives through collage, montage and basic three-dimensional modeling strategies allows students to start thinking beyond the traditional vocabulary of landscape architecture (trees, shrubs, grass, benches, lights...) and beyond purely functional solutions to more meaningful design content. In this studio, initial conceptual interventions were later developed into designs which included elements such as glass pavement blocks revealing a river channel running beneath the surface and metal plates under porous paving that acted as rain drums, celebrating and giving voice to a critical aspect of Eugene’s identity.

Digital media application. Graphics applications such as Adobe Photoshop give students greater options for exploration than conventional collage techniques. Images can be re-scaled, repeated, stretched, made transparent, changed from color to monochrome, ad infinitum. Work in this format can be easily altered and re-structured, enabling students to make changes and continuously revise and recycle their ideas based upon studio critiques. Digital media permits several different versions of work to be saved. This not only facilitates a better evaluation of the proposed changes, it also helps students to be more confident in experimenting with new ideas. The described methods are key to a design process in which representation informs the designer as much as the designer informs the representation. As Louis Delaura (1997) notes, visual representation, in this respect, becomes process-oriented rather than artifact based.

spatial organization: seeing relationships

In this phase of the design process, ideas are embedded in the particularities and constraints of a design site. Sometimes the level of detail considered in this stage attempts to solve very practical reality-based issues dealing with construction and maintenance. In the Marking Place project, the designs were not developed into highly detailed plans. The ten-week winter term warranted a choice between conceptual design work and more technical considerations. Within the spatial organization phase of the studio, students combined their three interventions into meaningful compositions that were functionally and aesthetically responsive to their selected site context. They developed narratives that were reflective of how their three inter-
Contribution to the design process. Students established how their three interventions interacted in a narrative fashion. Once they brought their three interventions together in a spatial composition, they needed to decide if their initial concepts should be overlapped, juxtaposed, woven together, intersected, etc. In this manner the spatial organization phase was grounded in conceptual considerations.

The creation of one spatial narrative that links several initial design concepts based on strands of site specific information is a design process indicative of our postmodern era. Various philosophers and artists have pointed out how this is a period in which multiple truths occur simultaneously despite apparent discordance. We live in an age of ambiguous truths (see, for example, the writings of philosophers Jean Baudrillard, Michel Foucault and Jacques Derrida). Post structuralist designers take this ambiguity in a positive sense, celebrating the end of a time ruled by single valued determinism. Instead of combining various styles and symbols in apparent randomness such as some early postmodern designers have proposed, the Marking Place studio engaged a process where multiple concepts were related in a deliberate and meaningful manner.

Digital media application. The technique of digital photo-montages was much appreciated and enjoyed by the students. It permitted them a form of “instant gratification”—visual evidence of their ideas quickly generated, yet realistically portrayed. All the montages were successful in their representation of design intention. Some of the images appeared more realistic than others. The less realistic depictions gave a slightly more poetic representation of the imagined reality—an appropriate response for this particular studio.

The 3D model produced in Bryce was equally successful in the presentation of design content as well as in providing persuasive illusions of human-eye perspectives. The created model was not completely accurate. The buildings in the model lacked details and were shaded in one color. Human scale figures were bit-mapped on flat surfaces and their flatness was apparent in the created imagery. However, the creation of such less-than-perfect digi-
tal models may be more appropriate for a design studio than the generation of time-consuming photorealistic imagery. Photorealistic illustrations are useful in presenting finished designs to lay persons (such as clients). Similar to so-called “artist renderings,” such detailed imagery does not need to be created by an architect. In current architectural practice the production of photorealistic presentation documents is often left to specially-trained digital illustrators.

The time-consuming production and more complex software applications required to generate such presentations can certainly be introduced within the course of an architectural education, but in the studio environment, the teaching of design must take center stage. The creation of compelling graphics that illustrate design intent is befitting for a studio which focuses on conceptual considerations.

**conclusions**

The *Marking Place* project effectively showed that digital media can be integrated in a design studio in a comprehensive manner even when using a limited set of software tools. Key to this effect was that media and process were linked as integral parts of each other. Superimposing factual data drawn on transparent maps transformed the collected facts into information which set students up to think about landscapes as a network of interrelated and juxtaposed systems. Diverse ideas could be easily expressed in the form of digital montages and collages which included the integration of hand-made sketches.

For the final presentation, montage proved to be a powerful media strategy for quickly generating a persuasive illusion of the built design. Unfortunately, many students did not use collage and montage techniques for exploring their spatial design work. This approach would have been particularly apt because spatial organizations were based on themes such as overlay, weaving and juxtaposition. Nonetheless, digital media played a role in the spatial explorations of some. These students started with rough analog sketches and developed their designs in much greater detail once they drew their plans in digital format.

**introducing electronic media**

Conclusions concerning the use of digital media in landscape architecture studios are only valid for this moment in time. Both the students and the technology continue to change and evolve in ways not yet imagined. Children now learn to use computers in pre-school. As a result, explaining basic software techniques will certainly take up less time in future design education. As for technological developments, the distinction between video, image editing, 3D animation, CAD, GIS and even Virtual Reality may disappear. In the future, design will perhaps take place in holarographic studios where it will be possible to zoom out to examine mapped data overlaid upon the actual design site and then zoom back in to try out ideas at a one-to-one scale. Spatial concepts and details might be developed through processes which incorporate a form of manual intuitive sculpting of the virtually inhabited space.

Although a wonderful (and perhaps not-so-distant) fantasy, in 1998 educators must work with tools that are still in their adolescent stage of development and with students who are not quite yet...
immersed in the digital information age. Because the technology keeps on advancing and changing, students cannot rely on any one set of tools learned in a particular studio setting or digital media class. Students need to understand that utilizing computers to their fullest potential means that they continually need to teach themselves new tools and techniques, as well as expand their fluency with programs they already know. This process of becoming self-reliant is part of all learning but seems to take on a particular urgency in the use of computers (Cheng 1997). Setting up opportunities to self-teach digital media warrants a careful programming of digital studios and a thoughtful choice of design projects. Digital studios need to be constructed sequentially. Students should be introduced to digital media through the use of a selective set of software that shows them how computer imagery can aid various phases in design. In advanced studios, the studio subject itself should challenge students in their selection of all media, including electronic media.

In the third-year undergraduate landscape architecture studio used as a case study in this article, students had been introduced to Photoshop in a digital media class taken the year before. Despite their previous experience with the program, the integration of digital mapping and collage into the design process slowed down some students in developing their design ideas. At the same time, some novice computer users became enthusiastic about incorporating digital imagery into their design work and voluntarily expanded their application of these tools. These same students might have been overwhelmed had they been required to use more complex tools. In addition, giving students the ability to choose between digital or analog media at various intervals in the project kept frustrations in check. It was, however, equally important to require a number of exclusively digital assignments which revealed to students the power of electronic media and forced some to confront their biases against this new medium. Simple software tools along with a structured yet flexible studio approach can serve to demonstrate the multifaceted ways in which computers can be utilized to aid design.

design subjects for future landscape studios

Digital media can be used for any landscape design inquiry. Nonetheless, a number of design questions may particularly benefit from analysis and design explorations that incorporate electronic media. Potential implementation of digital media specific to landscape architecture is the visualization of change. Landscapes live, grow and change with the seasons. Under new ecological management practices, landscapes are now even allowed to burn, to move through profound cycles of birth, death and rebirth.

Landscape architects have only limited control over their implemented designs, especially in situations where nature takes over as the prime form giver to the land. Landscape designers can at best create a framework within which the natural processes take place. Digital media is particularly apt to communicate an evolving landscape. The designed framework can be built once and then variables added in different layers that predict the possible effects of seasonal changes, growth stages and management regimes. Software could be developed that aids these predictions (Sipes 1994). Once landscape architects start generating images that illustrate various growth and management stages in their designs, they might also see these stages as opportunities for conscious design intervention. The element of time should and can become incorporated in landscape design in direct relation to considerations of spatial composition.

The expression of movement through space is another area for which digital media is particularly well suited. Gerard Smulevich (1993) and Ole Bouman (1997) have discussed the importance of inhabitation of space in architecture and the possibilities for this inhabitation to become not only part of a design process but also to create a new design idiom. According to these authors, the inhabitation of virtual design models during the design process can lead to a greater emphasis on sensory perception in architecture. Various landscape architecture critics have noted that the profession can expand its influence by moving into areas of infrastructure design such as the design of freeways, roads and parking lots (Beardsley 1998). These landscapes are uniquely perceived through inhabitation. A freeway is best experienced when
Integrating Digital Media in the Landscape Architecture Studio: Overlaying Media and Process

driving on it. 3D CAD animations or Quicktime videos would contribute enormously to the conscious design of these infrastructure landscapes.

In consideration of a multitude of interests, the profession looks at landscape as habitat for humans, animals and plants. Ecological functions, hydrology, economic influences, scenic values, historic narratives, human safety issues and social interaction are among the topics that can inform landscape architects in their decision making process. Knowledge on each of these subjects advances continuously and more and more data is available for landscape architects to take into account. The design inquiry used in the Marking Place project hints towards a method in which these multiple considerations can be incorporated into a spatially rich and meaningful design. Digital media can be used as a tool for visual thinking through the quick generation of multiple concepts and by providing formats that illustrate relationships between diverse considerations.

The studio assignments demonstrated how seemingly unrelated site aspects can be mapped digitally and compared by a method of digital overlay. The process of layering information and ideas, which was introduced in the Marking Place project, can be expanded upon almost indefinitely in more advanced studios. The growing complexity of issues in landscape architecture warrants further exploration and maturing of this approach. Digitally generated hybrid maps and collage techniques can play a pivotal role in progressing this method. These are strategies which allow media, design process and design subjects to inform each other in a comprehensive and reciprocal manner.

endnotes

1 There are some exceptions, Madis Pihlak from the University of Maryland is at the forefront of integrating digital media in landscape design and has recently worked with Virtual Environments in a landscape studio. Madis in cooperation with John Mcintosh and Stephen Ervin also teaches a short introduction course on digital design studios at Harvard University. Here the focus is on designing directly in a 3D digital environment. Tim Johnson and Tom Yane have implemented some 3D modeling in their studios at Pennsylvania State University.

2 The studio presented in this article demonstrated that digitally collaged imagery can be poetic and sensory compelling. Nonetheless, it is often remarked that working in digital media removes a tactile intuitive way of working from the design process. This was probably one of the reasons why most students in the Marking Place studio adhered to working in sketches and hand made models while developing their interventions and spatial design proposals. However, especially in collage, analog and digital media can be easily combined by importing scanned images of hand made products. Conversely, digitally generated images can be used in manually made collages or sculptures. Compelling ways to combine analog and digital media have been proposed by Daniel M. Herbert (1995) and by Gerard Smulevich (1997).

3 For examples of landscape studios that employed a similar method albeit in analog media see the work and writings by Jyrki Sinkkilä (1993) from the Helsinki University of Technology and Kathryn Moore (1993) from the University of Central England in Birmingham.

4 In design, this contemporary aspect of landscape can be expressed by a deliberate placement of elements and spatial patterns that do not build upon each other but are simply placed adjacent to or on top of each other. Two design entries for the 1982 design competition for Parc de la Villette in France show these approaches. In the winning design by Bernard Tschumi, layers of designed patterns are placed on top of each other, whereas in the second prize winning design by Rem Koolhaas, selected aspects of the design program are located in strips next to each other. In both cases, no attempts are apparent to make the separate layers or strips into a consciously integrated whole; there has been no effort to make the sum of the parts into anything greater. In a paradoxical manner, unrelated spatial influences could be transformed into a larger design idea by turning the “unrelatedness” into the concept.
David Jacques, a landscape historian, has attempted to create a schema summarizing the designers “millennium mind-set” in comparison with the “modernist mind-set.” The schema has been published in Landscape Transformed, 1996.

Natural growth patterns can be simulated by using procedural CAD modeling based on systems such as fractals. Software already exists that generates tree species at various ages. Landscape ecologists use complex mathematical equations to predict certain landscape management effects. Software could be developed that links ecological mathematical equations to procedural CAD modeling.

references


