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The ID-Online Asynchronous Learning Network: a 'Virtual Studio' for Interdisciplinary Design Collaboration

Jim Budd[1], Surya Vanka[2] and Andy Runton[1]

[1] *Georgia Institute of Technology*
[2] *Microsoft Corporation*

jbudd@idesign.arch.gatech.edu

Abstract

Starting in 1996, the authors, Surya Vanka and Jim Budd developed *ID-Online*, an Asynchronous Learning Network (ALN) for Industrial Design Education at the University of Illinois at Urbana-Champaign. The primary objective of *ID-Online* was to deliver enhanced design instruction via asynchronous access to design resources and enhance network-based communication between instructors and students. This paper provides an historical overview of the development of *ID-Online*. It discusses two years of development, use and evaluations. It then leads into the authors' recent initiatives to advance the concept of a developing design community in the digital realm. The paper concludes with reflections on the benefit, and pedagogical pros and cons, of the use of asynchronous learning technologies in design education.

Keywords: *asynchronous, design, collaboration, community, computer networks, conferencing, distance learning, interdisciplinary*

1. Industrial Design Education

The industrial design programmes at the University of Illinois and Georgia Institute of Technology (Georgia Tech) are among the oldest and most highly regarded in the United States. The core curriculum of each programme is made up of a progression of design studios supplemented by support courses. The support courses develop the student's technical, critical and problem-solving skills, while the studio courses provide the opportunity to apply the skills to projects that simulate 'real world' scenarios.

Studio projects at both schools focus on a systematic approach to design problem-solving (Figure 1) with a bias on visual support materials to support design thinking and decision-making (Figure 2). There is often a requirement to produce well-illustrated research documentation to depict problematic issues with existing products, or innovative features of competitive products. Similarly, presentation materials may take the form of pencil sketches, marker renderings, sketch models, computer models, technical drawings, prototypes and computer animation. Attention to details including form, colour and texture are all-important issues that must be considered. Although effective communication and thorough documentation are

Figure 1. The systematic approach to design problem-solving.

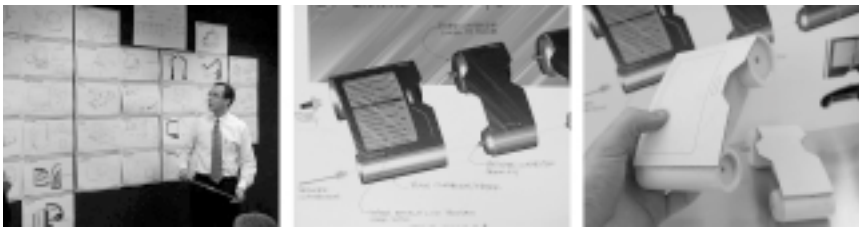

Figure 2. A range of visual support materials.

Figure 3. Computer labs are remote from design studios.

essential to informed decision-making, the reproduction and distribution of visual reference materials is an overhead that can be complex, cumbersome, and time consuming.

Like many design schools the University of Illinois and Georgia Tech still use traditional design tools and drafting tables in the main studio facilities. Because of costs and maintenance issues, computing equipment tends to be sequestered in isolated computer labs — often some distance from the studios (Figure 3). As a result students are constantly on the move from the studio to the computer lab. To compound this problem many students now have their own computers and prefer to work at home. These issues can create serious obstacles for scheduling and communication during collaborative ventures.

1.2 Changing times

Studio-based teaching is an effective and proven educational model that has produced generations of successful designers world-wide. Yet the traditional design studio merits re-examination as it may not be as well suited, in its current form, to the design problems and education of the late nineties. Today's world, typified by increased access to information and accelerated social and cultural change, is dramatically different from the world just a decade ago. To respond to these changes effective design education must train students to work in teams that include specialists from disciplines concerned with business, engineering, culture and the environment. Our experience with computer-based learning technologies led us to believe that new developments leading to the integration of telecommunications and computing could provide a key means to handle complex contemporary design problems (Figure 4).

2. ALN (Asynchronous Learning Networks)

The fundamental concept behind Asynchronous Learning is the ability to maintain ongoing communication without having to meet at the

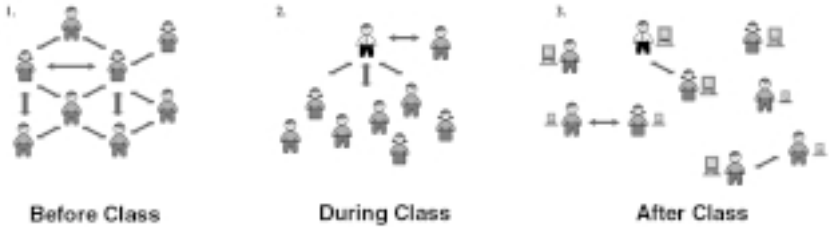

Figure 4. Communication needs during a design project.

same place at the same point in time, as opposed to the face-to-face synchronous environment of the traditional classroom. The basic building block of any ALN is a common conference space (Figure 5), like an email account that all participants have access to. Anyone can post a message or assignment; everyone can read it and anyone can respond — all within the same shared space. ALN is most commonly used for the linear delivery of instructional materials.

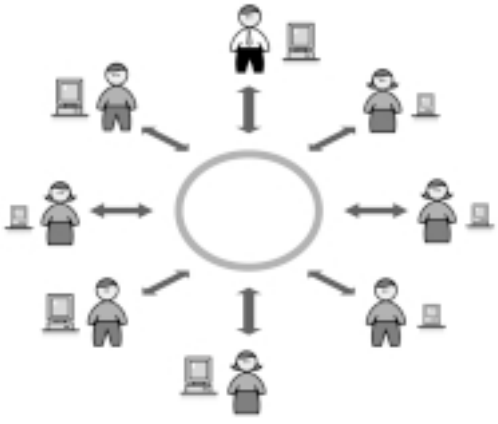

Figure 5. The common conference space.

Students often have independent logins for each class they take. The 'class conference' typically contains syllabus, schedule and assignments with some provision for submitting work. Instructors who are more familiar with the use of ALN will often initiate online discussion groups within the conferencing environment, while others administer tests and report grades using the ALN as well. From an administrative perspective these systems seem to work well. From the student perspective they seem to have little value beyond the academic requirements of the isolated class they relate to. Our strategy in building *ID-Online* was to break this mould by approaching the problem from a user's perspective. How could we 'add value' to an ALN and encourage students to become more active in building and supporting this new resource?

3. ID-Online

Early in 1996, Surya Vanka and Jim Budd began to develop *ID-Online*, an Asynchronous Learning Network for Industrial Design Education at the University of Illinois at Urbana-Champaign. The primary objective of *ID-Online* was to explore the potential to provide enhanced access to design-related resources and more timely communication between instructors and students. From the outset of the project we felt that an asynchronous learning network appeared to be a viable mechanism to support collaboration. We felt that:

- ALN could provide improved access to instructional materials;
- ALN could facilitate teamwork and interaction;
- ALN could provide an enhanced level of feedback to students; and
- ALN could provide a vehicle to showcase excellence.

3.1 Building the ID-Online ALN

One of the major problems in team-based projects is the frequent inability to synchronise work schedules to accommodate team meetings as teams become larger and more diverse. This situation is further exasperated when geographical displacement of key team members becomes an issue. Based on our initial investigations of emerging technologies we conjectured that an asynchronous learning environment might offer an appropriate means to address many of these concerns. In a pilot project led by Professor Vanka, design teams of Sophomore level ID students in a Materials and Process course used an intranet-based class conference to share

research and concepts sketches with their classmates and instructors, and collaboratively develop and discuss solutions. The results of the pilot project were extremely encouraging. An independent assessor from the Office of Instructional Resources at the University of Illinois shadowed the pilot project and reported that in comparison to previous non ALN-aided implementation, student involvement and performance in the course improved, even as the quantity of instructional material covered in the course increased. The experiment clearly demonstrated the potential that ALN methods had to address key instructional issues and deliver enhanced industrial design instruction more efficiently.

The next step was to design and build an Asynchronous Learning Network (ALN) to support our objectives. The result, *ID-Online*, is comprised of two complementary components — an intranet-based conferencing environment and a World Wide Web site (Figure 6). The conference supports the interactive exchange of information (Figure 7) while the website provides a wealth of visual reference material (Figure 8). We built an initial series of instructional, tutorial and gallery modules for the ALN during the summer of 1996. The first 'real world' trials of the ALN began in the Fall of 1996. Professor Vanka led a team-based project

Figure 6. ID-Online consists of a conferencing environment and a WWW site.

Figure 7. The conferencing system.

Figure 8. The World Wide Web site.

for ID students which linked a series of Junior level courses within the Industrial Design Program. At the same time Professor Budd co-hosted an interdisciplinary collaborative studio which partnered Senior Industrial Design students and Senior Architecture students from different Colleges at the University. Both projects demonstrated the viability of a dedicated ALN to support ID education under diverse conditions and were received well by participants.

3.2 What did we learn from ID-Online?

En route we discovered many of the strengths and weaknesses of Asynchronous Learning Networks (ALN). The key benefit is the 'anytime-anyplace' access to knowledge resources be they people or information. Since any participant can post a message to the forum, it serves as an enormous perpetual bulletin board

for sharing knowledge. Since the technology encourages and facilitates responses, the bulletin board becomes more of a discussion space where knowledge is not simply acquired but also created through dialogue. Clearly, the danger in such a persistent and incessant flow of messages is confusion, noise and babble. This is where a well structured ALN that has a strategic and well thought through definition of shared and common spaces plays a vital role. Forums that are clearly defined, such as course-centric, project-centric, or discussion-centric, allow exchanges to be constrained and meaningful. Unlike a traditional bulletin board or a verbal discussion, ALN software such as *FirstClass*, allow tracking of messages. For instance, it is possible to track the life of a message from its creation, through its life 'history' including the time and identity of each person who has read or responded to the posting (Figure 9). For instructors or team members who must be aware that it has been received by all intended recipients, such tracking tools have enormous utility. The file transfer capabilities of the ALN software is another outstanding feature. The system is fast, reliable and easy to use. It does not have the file size restrictions and delivery delays common to email systems. This makes the conferencing software an attractive mechanism for circulating the visual reference materials which are such an important aspect of communication in the design process. Other features such as threaded discussions, synchronous chat (Figure 10) and the ability to send 'image messages' — small embedded images (Figure 11) are also useful capabilities of the conferencing software. Underlying all theses specific features, the Mac/PC cross-platform implementation of the ALN software facilitates broad-based access for our users from the academic, business and home environment. The complementary website of visual reference materials also allows students to access multi-media instruction materials (text, images, animations) anytime and anywhere they have access to a networked computer.

Conceptually, we held a vision of *ID-Online* as one seamlessly integrated resource. In reality the system was comprised of an intranet server hosted by the Sloan Center for Asynchronous Learning and an internet server hosted by the School of Art & Design. To access the website it was necessary to log in via a browser and to access the intranet site it was necessary to log in via client/server software over an entirely separate network. Within the University environment it was possible to open a window on each network on your desktop and use the two components of the ALN in tandem. From home or a remote site this was not possible. In other words, the major limitations of the *ID-Online* ALN were technical in nature.

Figure 9. An example of message tracking in FirstClass.

Figure 10. Synchronous chat windows.

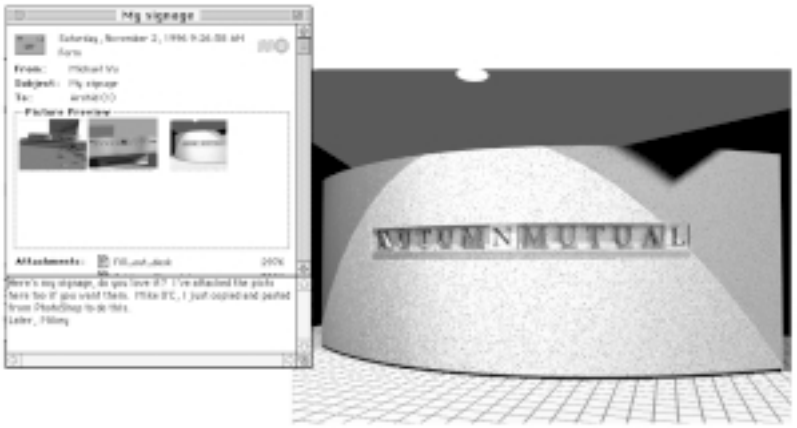

Figure 11. Image messages.

3.3 A new studio concept

Early in 1997 we extended participation in the ALN to the entire ID Program including all students and faculty. One of our primary objectives was to test our premise that the ALN would encourage more interaction at all levels throughout the ID Program. In addition to the standard instructional Class Conferences and Team Conferences which function at an independent course level, we began to create a series of cross-course technical discussion groups and support forums which were available to all students and faculty at the program level. Perhaps the most beneficial addition is a series of 'social threads' for our new 'virtual community'. By adding a Notice Board, a forum for the Student IDSA Chapter (Industrial Design Society of America) and a Job Posting conference the ALN suddenly became the most effective and valuable source of information within the ID Program — everyone would routinely check their Personal Conference Desktop for the latest news (Figure 12). The ALN was no longer solely an instructional resource — it was beginning to play an important role in promoting and strengthening both academic collaboration and social interaction at all levels within the ID Program.

The next major step was to capitalise on the potential to access the ALN from anywhere, anytime. The *FirstClass* client software, which could be distributed at no cost, allowed us to create direct electronic links with ID Program alumni. Our former students, now successful in private practice, could serve as studio critics from the comfort of their own offices. At the same time the *ID-Online* website was beginning to serve as a productive communications tool for the ID Program by showcasing the student work posted to the ALN (Figure 13).

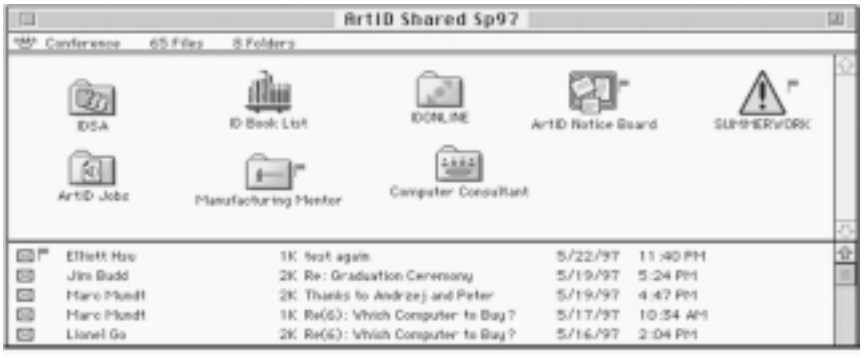

Figure 12. The Notice Board.

Figure 13. Showcasing student work.

4. idesign — Building on the Concept of Community

In the Fall of 1998, Jim Budd and Andy Runton began work on *idesign*, a new ALN at Georgia Tech. One of the most fascinating results from our experiments with ALN at UIUC was the 'new studio concept' — the idea that it was possible to use the conferencing environment to create a sense of community. By adding features which mimic the resources of a neighbourhood community there seemed to be sufficient substance to attract system users to 'frequent' the conference which in turn fostered an increased level of communication and interaction. *Idesign*, like its predecessor, *ID-Online*, is a collection of knowledge-based resources. However, *idesign* is built on the mental model of a community from the ground up, creating a neighbourhood that is familiar and friendly, a reliable source of information and a place to chit-chat with your friends and colleagues. The *idesign* interface has also been custom built to reflect the notion of community (Figure 14). Icons are simplified representations of buildings, people and objects, creating a personalised community complete with familiar places and familiar faces (Figure 15). *Idesign* is a user-friendly environment, that can easily be explored and navigated by a novice but holds an advanced set of features and benefits for experienced users. *Idesign* is based on a new generation of conferencing tools combining the functionality of an intranet server and an internet server in one integrated package. The *FirstClass* Collaborative Classroom software allows users to access our new design community from anywhere, using the internet for direct access. Because of its integration of internet/intranet functions, the new server software also allows personal home pages and internet hyperlinks directly from our intranet conference — direct links to design-related sites, tutorials (Figure 16), and software resources, as well as direct links to digital databases like the Materials

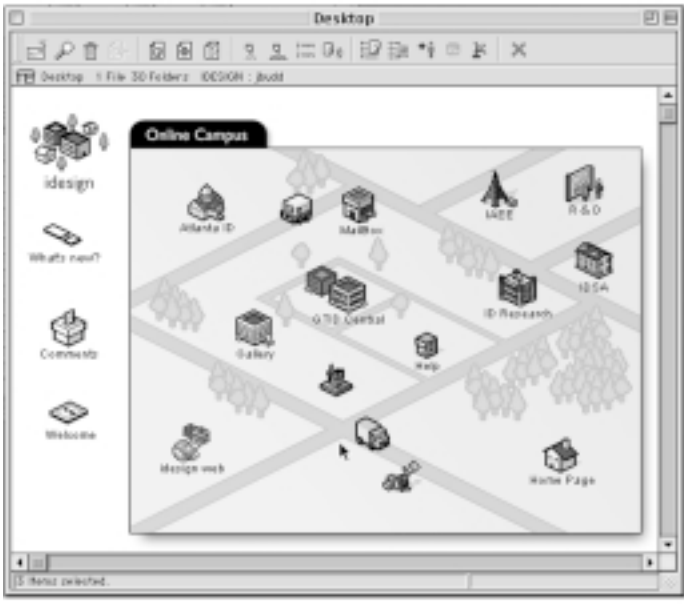

Figure 14. The idesign interface.

Figure 15. Idesign and the personalised community.

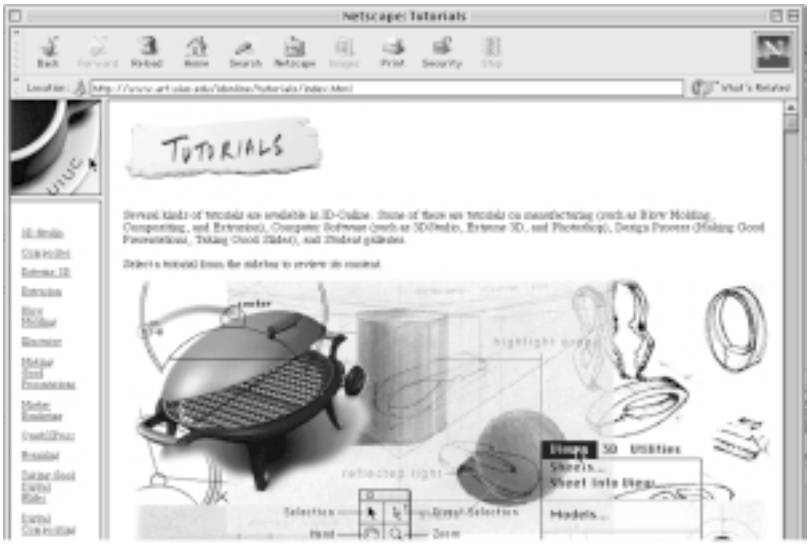

Figure 16. Internet links accessible through idesign.

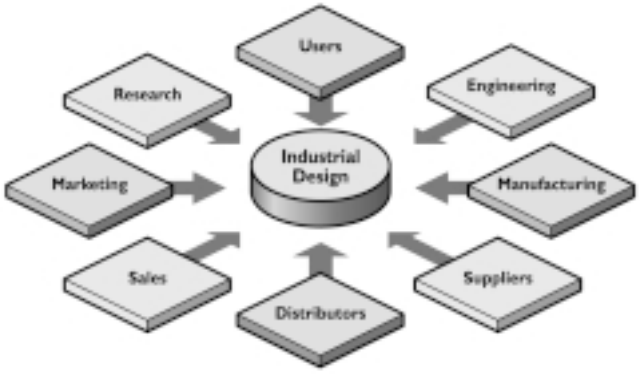

Figure 17. An increase in interaction exchanges.

Library at the University of Illinois or the Design History Website at Georgia Tech. The previously separate internet and intranet connections are now powerfully interwoven. *Idesign* is accessible anywhere you can access the internet — at school, at home or on the road.

5. Summary and Conclusions

We found that it takes significant time and effort up front to develop pedagogically sound ALN supported courses, but there is a long-term payback on this investment that makes it worthwhile. While ALN methods are usable in most courses, they are most effective in those courses that require collaboration, information sharing or require exchanges of multi-media materials. In particular, we found that the ALN facilitated team-work, particularly the cross-disciplinary team-work involving other departments on campus. Our experience was that the ALN we developed proved an invaluable aid in achieving our goal to train students to work in cross-disciplinary teams and engage in contemporary design challenges, by expanding the conception of the design studio beyond its traditional insularity. We found that ALN methods do not displace traditional teaching, but do expand and enhance instructional delivery formats quite rapidly. Even within the initial two years that asynchronous methods were employed in the industrial design program, they became a key means by which instruction was delivered working hand-in-hand with traditional instructional methods. The expanded instructional space and increased access to online information allowed instructors to enhance the offerings in information and skill intensive courses such as materials, manufacturing and computer-aided design. The increased access to people, both instructors and students, resulted in stronger project-based studio courses. The availability of common online resources and an environment where all students and instructors could interact resulted in stronger communication and clearly articulated purpose within the program. Interestingly, the use of ALN produced some benefits that were not originally anticipated: solutions to the studio projects began to show a marked increase in sophistication. Because of the highly interactive exchanges with professors and colleagues, students were managing complex design issues more effectively (Figure 17) and their solutions reflected a much higher level of resolution than seen in the past. It became clear that the increased level of interaction

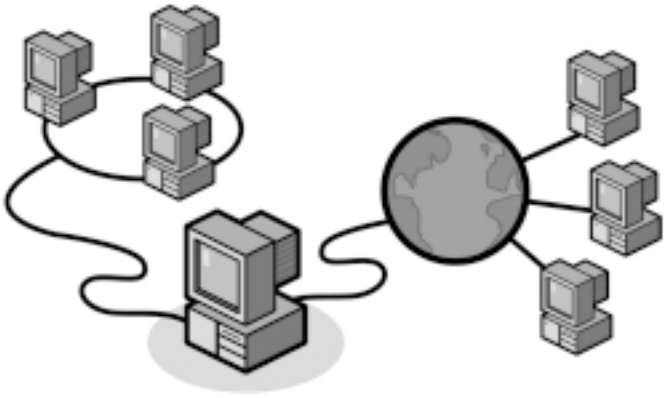

Figure 18. Integration of intranet and Internet servers.

fostered by the ALN appeared to be stimulating a very productive critical dialogue among a community of students and faculty.

Our more recent experience with *idesign* indicates many of the technical limitations we encountered with *ID-Online* have in fact been resolved. The integrated intranet/internet server (Figure 18) opens the door to much more broadly based access to the ALN resources. The addition of features, like built-in image viewers, further optimise the functionality of the system for applications in Industrial Design. Our efforts now are focusing on the potential to extend our digital design community to key technical resources, alumni, industrial partners, other schools and other related disciplines.

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Jim Budd is an Associate Professor in the Industrial Design Program at the Georgia Institute of Technology in Atlanta, Georgia. Jim has been working with computers in industrial design practice since the mid 1980s. In 1996 he worked on the design and implementation of *ID-Online*, an asynchronous learning network (ALN) to support design collaboration while teaching at the University of Illinois in Urbana-Champaign and he more recently worked on the development of the *idesign* ALN while teaching at Georgia Tech in Atlanta.

Surya Vanka is Design Lead in the Interaction Design Group at Microsoft Corporation in Seattle, Washington. Previously he was Associate Professor of Industrial Design and Fellow at the Center for Advanced Study at the University of Illinois at Urbana-Champaign. He is the author of two books and numerous publications on design.

Andy Runton is a Graduate Research Assistant in the Industrial Design Program at Georgia Institute of Technology in Atlanta, Georgia. Andy is a freelance illustrator and graphic designer. He is currently working toward a Master's Degree in Industrial Design at Georgia Tech. His efforts to humanise technology are embodied in the images and icons of *idesign*. For his master's thesis, he is translating the language of character design which will enable industrial designers to more easily create 'products with personality'.