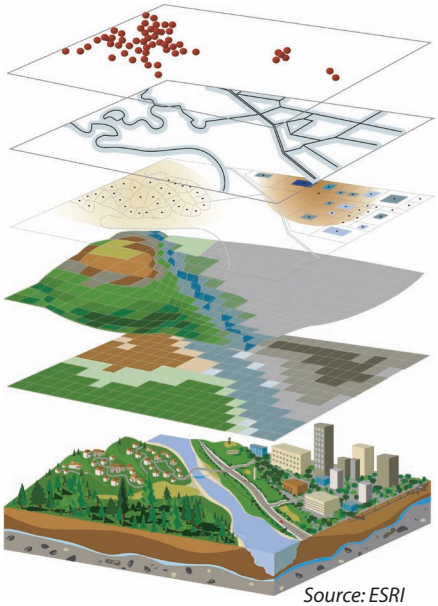


Source: ESRI

This article is one in a series exploring GIS implementation among Wisconsin's municipal, county, and regional planning agencies.

Current or forthcoming articles explore topics such as GIS use in public planning agencies, geospatial data, GIS-related planning applications, and the benefits and challenges of GIS use for Wisconsin public planning agencies.

G3872-02

GIS Training: A guide for Wisconsin public planning agencies

Z. Aslıgül Göçmen, Stephen J. Ventura, and Amy Seeboth

Geographic information systems (GIS) are extraordinary tools that can greatly empower planners. However, the promise of GIS can only be realized with sufficient training in the use and application of geospatial tools. According to a 521-respondent web-based survey among practitioners in Wisconsin public planning agencies conducted in 2007–08, issues related to training and a lack of understanding of technology were among the top three challenges to GIS use in planning, as identified by almost half of those sampled[1] (for more information about the study, see G3872-01: *GIS Use in Wisconsin's Public Planning Agencies*). Lack of training or trained staff was identified by one-third of the respondents as a top challenge.

To address these concerns, this publication explores the current training practices in Wisconsin and suggests strategies for further training based on the gaps in current practices as well as feedback from public planning agency practitioners.

Current GIS training in Wisconsin

There are various opportunities for practitioners to get GIS training or information by paying a professional fee throughout the State of Wisconsin.

- A leading resource for GIS training in Wisconsin is the **Land Information and Computer Graphics Facility (LICGF),** a University of Wisconsin–Madison center that primarily promotes land records modernization and the application of GIS for natural resource management. The regularly scheduled year-round workshops provided by LICGF range from introductory GIS to the more advanced application of CommunityViz, a planning support system. Registration for these multi-day training sessions ranges from $600 to $1,150. LICGF also provides periodic training, scheduled according to demand, on topics such as 3–D visualization, geospatial data access, and internet mapping.
- **R.A. Smith National** of Southeastern Wisconsin provides training (e.g., Introduction to ArcGIS, Introduction to ArcGIS Server) to local and regional governments at a cost of $950 to $1,470 per workshop.

[1] The topic "challenges to GIS use" will be analyzed in further detail in a future publication (G3872-05).

- The **University of Wisconsin System** offers other opportunities for practitioner training, including a 12-credit certificate program offered by UW–Milwaukee and a 20+ credit certificate program by UW–Madison designed as a one-year graduate program. Both programs aim to provide GIS theory and practical knowledge to their students.

There are also numerous opportunities for **free or low-cost** GIS training or information in the state.

- **UW-Extension** specialists are good resources for GIS training and information. GIS training routinely offered through the UW-Extension includes Introduction to GIS and ArcGIS 9, Accessing Environmental Geospatial Data, and Land Suitability Analysis with ArcGIS. Training sessions offered by UW-Extension specialists are either offered cost-free or for a minimal fee.
- The **UW–Madison's GIS Certificate Program** and the **Robinson Map Library staff** offer cost-free introductory GIS workshops to the public twice a year. The purpose of these short workshops, which are open to the public, is to introduce GIS concepts and spur interest in geospatial technologies.
- **Wisconsin Department of Natural Resources (WiDNR)** provides occasional workshops and webcasts on several of the geospatial tools that the agency has created.
- **Wisconsin Land Information Association (WLIA)** also provides half-day or full-day workshops during the association's annual meeting. These workshops, which are open to members and non-members of the association for a registration fee ranging from $40 to $100, include instruction on software (e.g., advanced editing in ArcGIS), geospatial data (e.g., The National Hydrography Dataset), and professional applications (e.g., targeting working lands with GIS and Land Evaluation and Site Assessment [LESA]).
- A popular online resource is the virtual campus of **Environmental Systems Research Institute (ESRI),** which accommodates a large of number of courses. In February 2009, for example, ESRI listed 129 courses for their software ArcGIS. While some of these modules are offered free of charge, others have a fee of around $200. Some of the charges may be covered under the license agreement a given agency has with ESRI, so we suggest that interested individuals check with their technical support staff to learn about whether their agency qualifies.

In addition to training resources, there are many other sources of important GIS-related information. Among those are GIS-day events held in November, the State Cartographer's office, various state departments, and user group meetings.

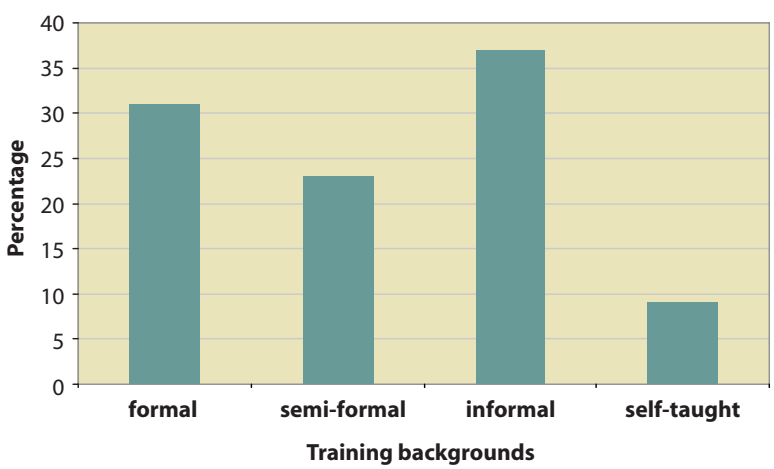
GIS-day events hosted by multiple institutions throughout Wisconsin (such as those offered by UW–Madison, UW–Milwaukee, and WI Department of Administration) provide invaluable GIS-related information relevant to a wide range of interests, from advanced users to beginners.

For more information on these programs, see **Training and other resources** at the end of this publication.

Training backgrounds among practitioners

The 2007 survey indicated that the majority of the respondents are familiar with GIS and actively use it for their jobs. On average, respondents had been using GIS for around 9 years and most have had informal GIS training, such as on-the-job training by a co-worker (figure 1). When taken together with the "self-taught" category, it appears that close to half of the practitioners learned GIS in environments other than higher education or workshops. There was a significant pattern in GIS training backgrounds when examined based on the size of the department or the type of organization the respondent practiced at.

Figure 1. Participant GIS training backgrounds



Note: The formal category refers to extended classroom training, semi-formal training refers to workshops and short training sessions, and informal training refers to on-the-job training via co-worker interactions.

To learn about backgrounds, perceptions, and preferences that practitioners may have about training-related issues, our survey asked a series of Likert-based opinion questions, with answers ranging from "strongly disagree" to "strongly agree." In this publication, we use the word "agree" to represent those who somewhat agree and strongly agree. Sixty percent agreed that "they were familiar with GIS tools and training such as those offered by WiDNR, U-W, and ESRI" and 34% agreed that "their GIS skills were very advanced." Nevertheless, around half of the respondents agreed with the statements that "it is difficult to follow advances in GIS" (45%), "using GIS is very complex" (45%), and "it takes a very long time to achieve proficiency in GIS" (55%).

Our findings showed that respondents follow several GIS-related publications and organizations (figure 2). Specifically, three-quarters of the respondents stated that they regularly read the ESRI publication Arc News. After Arc News, the WLIA newsletter was the publication that practitioners followed most.

Twenty-four respondents mentioned that they regularly read publications aside from those mentioned in the survey. Six of these respondents mentioned other ESRI publications (including Arc User).

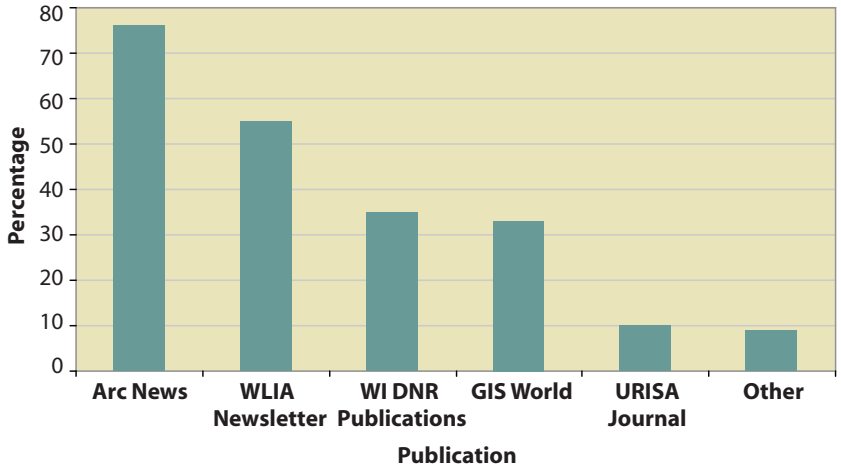
Practitioner views on training and advancement

The study found that a significant proportion of respondents were at least somewhat satisfied with the GIS training they receive through their organization. Forty-two percent of the respondents agreed that their organization provides all the GIS training that they and their co-workers need. A higher proportion of practitioners from county governments (49%) appeared to receive the training they need, compared to those from municipalities (34%) and regional planning commissions (39%).

The survey also gauged the frequency of three different instructional and delivery methods offered by the respondents' departments or organizations: training/workshops, newsletters/other written information, and user group meetings (figure 3). Our findings show that each one of the delivery and instruction methods was generally not frequent. The most frequent activity or method was found to be user group meetings, indicated by 14% of the respondents. Training/workshops were indicated by only 7% of the respondents to be a regular offering of the respondents' departments or organizations. Only a few participants mentioned other instructional methods that their departments or organizations used, such as seminars, one-on-one instruction, and e-mail updates.

Also of note, 44% of the respondents agreed that their departments did not have funds allocated to sufficiently invest in GIS. While this question did not specify funds allocated for GIS training, respondents may have considered budgetary limitations for obtaining training when evaluating this statement.

Figure 2. GIS-related publication readership



Note: URISA is the Urban and Regional Information Systems Association

Figure 3. **How frequently agencies offer various GIS training resources**

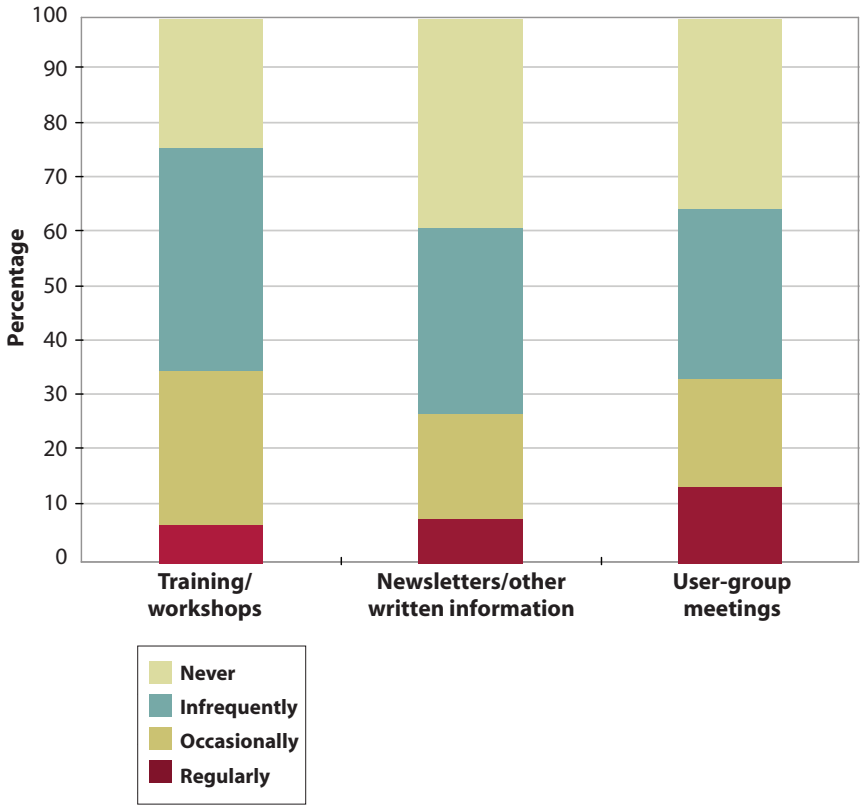
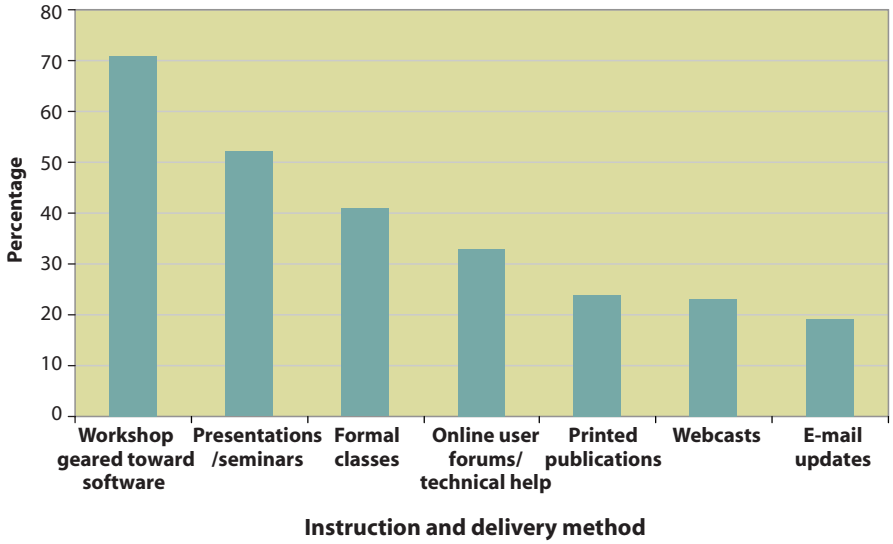


Figure 4. **Preferred methods of GIS training and information**



Strategies for further training

When asked about preferred methods for GIS-related training and information, our survey found "workshops geared toward software" to be the most desirable, with 71% of the respondents preferring this method (figure 4). Following software-specific workshops, preference was stated for "presentations and seminars.""E-mail updates" was the least preferred method of delivery (19%).

When asked about whether they would like to see more GIS education offered through their organization, 65% of participants said they would, while 6% stated that they would not. Over three-quarters of the respondents indicated that they were somewhat or very likely to attend regional day-long GIS training events and almost three-quarters of the respondents suggested that they were willing to travel up to 2 hours for these events. At the same time, around 70% of the respondents identified cost as a significant barrier to attending GIS training sessions.

The above review of training and information resources for GIS in Wisconsin suggests that there are various GIS training opportunities for practitioners, especially in the form of software-specific workshops; however, many of these workshops have high registration costs. While a sizeable proportion of the practitioners surveyed in our study suggested that they received the training they needed, a larger proportion suggested that they had difficulty with becoming proficient or following advances in GIS, suggesting that there was a significant need for further training.

Cost appeared to be a considerable barrier in attaining training for the majority of practitioners. While our survey did not inquire about the training budgets, we believe that cost-free or cost-reduced training would allow more practitioners access to the training they need. We suggest that centrally located training would help offset some of the costs and provide better access to a large number of professionals (see Bellovary, 2006). In particular, WLIA or ESRI events and publications appear to be potentially beneficial sources of GIS-related instruction and delivery due to the high level of membership of these organizations and the readership their publications enjoy.[2]

We conclude that software-specific workshops should continue to be the major education effort especially because such workshops appear to be the most desired type of training among practitioners. However, limiting efforts to just providing software-based training may overshadow ideas that could be presented in seminars, presentations, printed material, or webcasts. These ideas could include the utility of GIS for analytical, modeling, and visualization purposes, which might be geared-towards a particular issue or a particular location.

Our observations suggest that the analytical functions of GIS essential to planning-related professionals are not adequately covered in training throughout the state. Indeed, other evidence from the survey suggests that respondents are not familiar enough with the analytical capabilities of GIS.[3] Therefore, we believe that training for planners should include a greater emphasis on the analytical functions of GIS. We also believe that planners and GIS professionals would also benefit from web-based GIS training, especially because of recent advances in the technology. LICGF and R.A. Smith National are current resources that offer web-based GIS training.

Implications for Extension educators

As few Extension educators are experts in GIS, expecting them to provide training on particular functions of GIS or on specific software would not be reasonable in most cases. However, they can still help by identifying the training and information needs of practitioners in their jurisdictions, organizing training events for practitioners, and introducing practitioners to creative new uses of GIS and the various GIS-related resources available in our state. Extension educators could also help increase awareness of current instructional efforts that are taking place in their region and online.

We also suggest that Extension educators focus on more than one type of delivery and instruction. A collaborative study between UW-Extension's Environmental Resources Center and WiDNR that examined preferences of Extension educators for training in web-based GIS tools for themselves and for their audiences suggested that a combination of workshops, printed materials, and internet resources would be the most effective educational approach for both groups (Watermolen et al. 2009).

Our study also echoes the idea that using multiple instruction methods can increase capacity among practitioners (see figure 4). For example, an Extension educator's primary method of delivery could be "presentations and seminars," a method preferred by over half of our survey respondents, supported with "webcasts" and "printed publications." These are the three instruction methods included in the survey— presentations, webcasts, and publications—that could be accomplished by an Extension educator who has a good understanding of GIS and GIS-related sources but not necessarily technical expertise in specific GIS software.

Study highlights

When considering ways to best serve the GIS training needs of Wisconsin public planning practitioners, the following points should be kept in mind:

- There are various opportunities for practitioners to get GIS training or information for free, at a low cost, or by paying a professional fee throughout the State of Wisconsin.
- The strong majority of respondents feel that they would like to see more GIS training offered through their organization and even more feel that cost is a significant barrier to attending outside training sessions.
- GIS training could benefit from additional focus on the analytical functions of GIS.
- Extension educators can play a vital role by identifying training needs in their district, introducing practitioners to various training options, and providing information and training via different delivery methods and instruction.

[2] One hundred and one of the survey respondents indicated that they had a membership with one or more GIS-related professional organizations. WLIA was the most common membership among our respondents; 88 people, or 17% of our respondents, belonged to this organization. Following WLIA, 22 participants held membership in various ESRI-based organizations such as the statewide user group.

[3] This is perhaps because most GIS experts do not know enough about planning and most planners do not know enough about GIS software.

Training and other resources

Land Information and Computer Graphics Facility (LICGF): www.lic.wisc.edu/training/CrsDesc/Index.html

R.A. Smith National: www.rasmithnational.com/services/gis/gis_training.htm

The Arthur H. Robinson Map Library: //www.geography.wisc.edu/maplib/about.html

UW–Extension: for further information, contact Aslı Göçmen at gocmen@wisc.edu

UW–Madison GIS Certificate Program: www.geography.wisc.edu/GISCertificate/index.htm

UW–Milwaukee GIS Certificate Program: www.uwm.edu/Dept/GIS/edu_degrees.html

Wisconsin Land Information Association (WLIA): www.wlia.org/wilandinfo/events/default.asp

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Watermolen, D. J., E. Andrews, and S. Wade. "Extension Educators Can Use Internet GIS and Related Technologies." *Journal of Extension* 47, no. 5 (October 26, 2009), www.joe.org/joe/2009october/a2.php

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