

# **A Critical Examination of the Teaching Methodologies Pertaining to Distance Learning In Geographic Education: Andragogy in an Adult Online Certificate Program**

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## **Abstract**

Differences between student audiences are an important aspect not only of traditional learning in higher education, but also in the distance learning environment. Facilitators of distance learning coursework must be cognizant of the differences which adult students bring to the classroom and their varying expectations and reasons for learning. Taking these differences into account, the facilitator can better serve their remote adult and traditional students in the online setting.

Case in point is an adult online GIS certificate program at a traditional liberal arts-based institution, which accommodates adult learning modalities and provides for adult learners to have ownership in their learning while providing a practical reason to learn while implementing geospatial concepts into their current job.

Based on Malcolm Knowles theories of adult learning, adult online learners require certain aspects of andragogy which complement the content in an adult online experience. These include, but are not limited to: adults needing to know the reason for learning something; adult learners bringing life experiences to the classroom which are different from traditional undergraduate students;

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adults needing to be responsible for their decisions on education; adults being involved in the planning and evaluation of their instruction; adults being interested in learning subjects having immediate relevance to their work and/or personal lives; adult learning being problem-centered rather than content-oriented; and adult learners responding better to internal versus external motivators.

This paper offers a case study of an online adult-oriented GIS certificate program at a traditional liberal art-based college whereby Knowles' principles of andragogy are employed to offer adult students a rich online learning experience as a technical introduction to the geospatial technologies industry.

**Keywords:** Pedagogy, andragogy, distance learning, adult education, geographic education, GIS certificate program

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## Introduction

Over the past decade, the use of the Internet in teaching and learning at the university level has increased the array of educational practices available to instructors. Educators can currently offer quality instruction to remote students, reach underserved populations, respond to the diverse learning styles of different audiences, address the paces and modalities at which students learn, break down barriers of geography and cultural differences, and provide access to students of different languages and cultures (Joo, 1999) as well as serve those with physical challenges. Technological advancements have made this not only possible, but ubiquitous in higher education. Yet, despite all the positive advantages of distance education, there are issues at play that can affect online learning both in a positive or negative way. McLoughlin (1999) notes that technology is not neutral and that when various cultural differences and technologies interact, either harmony or tension can be the result.

A key issue at the center of distance education is the pedagogy and/or andragogy which one uses in their teaching. While most educators are acutely aware of what constitutes sound pedagogy, including the differences between distance learning teaching methods versus classroom teaching methods, few realize that there are indeed subtle, and some not so subtle, differences between the experiences which audiences bring into the course and that teaching methodologies must be particularly well suited for those various student audiences. A distinct difference in student audiences presents a challenge for those educators not well versed in the area of adult learning and what adult learners bring to the learning environment.

Andragogy is a term that was coined originally by Alexander Kapp (a German educator) in 1833, and was developed into a theory of adult education by the American educator Malcolm Knowles, beginning with his landmark publication in 1980 (Knowles, 1980) and solidified by his book in 2005 (Knowles, et al., 2005). Knowles asserted that andragogy (from Greek, meaning "man-leading") should be distinguished from the more commonly used pedagogy (from Greek, meaning "child-leading").

Andragogy consists of learning strategies focused specifically on adults. It is often interpreted as the process of engaging adult learners with the structure of learning experience, meaning that adult learners bring certain life experiences with them which younger students have not yet experienced. The term 'andragogy' has been used in different times and in different countries with various connotations. Currently, there exist primarily three (3) understandings of andragogy (Knowles, et al., 2005):

1. In many countries, there is a growing conception of 'andragogy' as the scholarly approach to the learning of adults. In this connotation, andragogy is the science of understanding (i.e., theory) and supporting (i.e., practice) the lifelong education of adults.

2. Especially in the U.S.A., 'andragogy', in the tradition of Malcolm Knowles, labels a specific theoretical and practical approach, based on a humanistic conception of self-directed and autonomous learners and teachers as facilitators of learning.

3. On a broad spectrum, an unclear use of andragogy is found, with its meaning changing (even in the same publication) from 'adult education practice' or 'desirable adult values' or 'specific teaching methodologies,' to 'reflections' or 'academic discipline' and/or 'opposite to childish pedagogy', claiming to be 'something better' than just 'adult education'.

Knowles' theories (Knowles, 1980) can be stated with six (6) assumptions related to motivation of adult learning:

1. Adults need to know the reason for learning something (Need to Know);
2. Experience provides the basis for learning activities (Foundation);
3. Adults need to be responsible for their decisions on education; involvement in the planning and evaluation of their instruction (Self-conceptualization);

4. Adults are most interested in learning subjects having immediate relevance to their work and/or personal lives (Readiness);

5. Adult learning is problem-centered rather than content-oriented (Orientation);

6. Adults respond better to internal versus external motivators (Motivation).

In an effort to promote the andragogical teaching model, this paper seeks to compare and contrast adult teaching methodologies with conventional distance learning used in the traditional undergraduate pedagogy. While conventional distance learning teaching methodologies are normally guided by behaviorism and focused on course content, facilitators in an adult-dominated distance learning setting must go beyond the conventional online teaching model characterized by the use of Bloom's Taxonomy of Educational Objectives (Bloom, 1956) and embrace humanism and life experiences from which andragogy stems (Wang, 2011).

## **Background**

### **A Research Model for an Adult-Oriented Distance Learning Experience: Using Technology for Successful Adult Learning**

Knowles, Holton, and Swanson (1998) have done extensive research on adult learning theory and published on how to facilitate effective adult learning. While their research is not necessarily focused on distance learning, the principles behind sound andragogy remains unchanged; one of their conclusions is that we must alter the traditional faculty/student relationship. Knowles, Holton, and Swanson (1998) state that the role of the university faculty is to provide opportunities for students to become active learners. Faculty encourage and institute active learning by creating powerful learning environments and activities for students to gain knowledge, rather than trying to transfer faculty members' knowledge to students through lectures.

According to Knowles, Holton, and Swanson (1998), the most effective learning occurs when:

- the learner takes responsibility for her/his own learning;
- learners are cooperative, collaborative, and supportive in a "learning community";
- learners are accountable for their new learning; and
- classes are student centered, as opposed to content focused.

When learners are active in the learning process, they

- develop critical thinking skills;
- develop a social support system by way of active learning communities, for learning;
- are able to tap into their most effective learning modalities; and
- develop life-long learning skills.

The faculty member's role in facilitating learning is to:

- provide carefully constructed learning activities to motivate students to learn;
- provide an environment for students to meet course learning outcomes within a given time frame;
  - provide an opportunity for students to discuss and integrate content knowledge into "real life" situations and implement them into problem-solving activities for a practical purpose;
  - provide an environment for students to go beyond course objectives if they so desire;
  - assist learners when necessary in how to locate information;
  - assist learners to work collaboratively to learn from each other most effectively while overseeing discussions gone astray or off topic;
  - provide opportunities for students to demonstrate their learning and mastery of course objectives by way of active projects and learning platforms.

One can argue that higher education has given priority to the integration of technology into the curriculum. As this has occurred, institutions are faced with the many issues that surround making the lessons succeed technologically, not to mention the necessity for making technology something that adult learners can navigate successfully. Faculty members must devote substantial amounts of their time learning how to employ the technology, be trained in the methodologies surrounding the distance learning experience using that technology, and ensuring that adequate institutional support is present to make the technology work. On occasion, the instructional design of such curricula is set aside while technology issues are addressed, which delays the process and does little to address adult learning issues. Nonetheless, faculty members need to focus on learning theory in the design of instructional technology so that they can provide lessons that are not

only technology-effective, but that are meaningful from the adult learner's standpoint (Fidishun, 2000).

As noted previously, Malcolm Knowles' theory of andragogy outlines effective methodologies for adult learning. When this theory is integrated into the design of technology-based learning environments, it is possible to create lessons that not only serve the needs of students to use the latest technology, but also focus on their learning as an adult for their intended purposes. Andragogy includes ideas such as an adult's readiness to learn, the role of the learner's experiences, the faculty member as a facilitator of learning, an adult's orientation to learning, and the learner's self-concept, which are all critical considerations to the adult learner.

In order to effectively facilitate the use of andragogy while teaching with technology, especially in a distance learning setting, one must employ technology to its fullest. Arguments for the use of technology many times include statements about its flexibility and the ability of the learner to move through lessons at anytime, anywhere, and at their own pace. These arguments also include logical explanations of how a learner may adapt the lessons or material to cover what they need to learn and eliminate the material that is not appropriate or that they have already learned. To adapt to the needs of adult students, these definitions of technology-based learning must be utilized to make its design interactive, learner-centered, and to facilitate self-direction in learners. In short, adult learners tend to desire input on what they are learning, how they are learning it, and the implementation of what they have learned for their own intended purposes, such as what they are doing in their job.

Educators who are using adult education concepts in the development of their lessons must also become facilitators of learning. They must structure student input into their design and create technology-based lessons which can easily be adapted to make the presentation of topics relevant to those they teach.

If these guidelines are followed, the instruction that is developed will be not only technologically workable, but also effective from an adult learner's perspective. Figure 1 provides a suggested model from the perspectives of adult students, facilitators, and the critical element of institutional support with a well-developed technological infrastructure.



**Figure 1.** Proposed Model for Learning Success in a Student-Centered Adult Distance Learning Environment

## Methods

### ***An Implementation Method for the Model: Learning Success in a Student-Centered Adult Distance Learning Environment***

While it comes as no surprise that the elements of a successful learning experience for adult learners in a distance setting are grounded in active learning and solid facilitation by the educator, the experiences that adult learners bring to the virtual classroom are also a strong consideration in the andragogical process. Although some faculty may feel that simple button pushing is considered to be under the realm of active pedagogy, Schultz (2011) illustrated that, in addition to mouse clicks, active engagement with data and hypothesis testing promotes a richer learning experience for geographic information science and technology (GIS&T) students. Online facilitators, and in particular, GIS&T instructors, should be encouraged to experiment with active pedagogy for the betterment of their students' learning and

advocate that their students think about how it is that they best learn about course material, including, as Schultz (2011) noted, spatial concepts.

Fink (2003) presents a model for developing significant learning experiences in which course development is approached in a “backwards” framework. That is, learning outcomes are created first, followed by the process of how learning outcomes are achieved over a given time frame using various modes of active learning. Utilizing Fink’s methods, the implementation model concerns the following “best practice” activities and guidelines which occur in the course development process:

- Stating clear expectations to students, especially in terms of the syllabus and learning outcomes;
- Incorporating of multiple forms of feedback into the course and with various modes of communication;
- Providing regular communication to individual learners and the group to encourage learning communities and build the framework for a positive learning environment;
- Providing learner flexibility and control to reinforce a completely accessible curriculum;
- Incorporating motivational strategies to encourage students and teaching students “how to learn”;
- Offering a variety of forms of learner support including technical support and locating valid information (e.g., information literacy);
- Maintaining the focus of content within units and providing a reason to learn about the content;
- Providing consistency among courses such that learning can flow in a designed sequence;
- Considering limitations of adult learners and also the prior experiences which adults bring; and
- Respecting learner roles and life priorities.

Once the course development process has included the aforementioned considerations, it is then time to transform the specific learning outcomes, content material, and timeline onto an active learning experience using technological tools.



The difference between a traditional undergraduate learning experience and an adult learning experience has to do with two aspects of the audience differences:

- The life experiences which adults bring to the classroom as a result of various past experiences and job-related experiences, some of which may be related to the use of technology; and
- The notion that adult students would like to participate in the course design and have some ownership in what is being learned in the course in order to immediately implement their learning into their current job.

Those aspects of the adult classroom are vastly different than the additional undergraduate classroom where students normally do not bring years of life experiences or a desire to have input on course learning to the classroom.

### ***Case Study of an Adult-Oriented Online Geospatial Program***

In 2005, the Elmhurst College GIS Certificate Program was designed with the intent to serve the Chicago, Illinois metropolitan area working professionals in the geospatial community with a means of having for-college-credit coursework on their official academic transcripts. The thought was that numerous local geospatial professionals were seeking professional certification from the GIS Certification Institute (GISCI) for the purpose of obtaining a professional GIS designation (GISP). Market research indicated that there was a sizeable population of these professionals working in the metropolitan area of Chicago who did not have college coursework in the area of geographic information systems (GIS) because courses did not exist when they attended college years, and sometimes decades, earlier.

While the coursework was initially offered in a hybrid format, since professionals lived locally, with courses meeting weekly in the evening, the need to expand the student audience was soon realized. However, this meant that the teaching methods needed to be altered since classroom time was no longer an option for all students, especially those in remote areas who could not attend the face-to-face meetings. Additionally, course management systems (CMS) were becoming more common and provided a platform for presenting remote students with access to the coursework on an “around-the-clock” basis.

The Elmhurst College GIS Certificate Program, centered in Elmhurst, Illinois, U.S.A., offers five online geospatial-oriented courses, including Fundamentals of GIS, Remote Sensing Techniques, Programming with ArcObjects, Implementing Geodatabases, and a GIS Capstone course. These courses can be used to satisfy the curriculum requirements for a GIS Certificate, and applied towards future college coursework since the courses carry undergraduate college credit. Since these

courses are offered in an online instructional format, the course design process was crucial to take into account the student audience and their needs for a successful learning experience.

The course design using an andragogical model was developed in 2005 and implemented in the Fall 2006 semester. Because of technological developments and software changes, numerous changes have been made incrementally to the program itself and program offerings, but the andragogical slant to the teaching has remained throughout the modifications.

Taking into account Knowles research on andragogy and adult student populations (Knowles, et al., 2005; Knowles, 1980; Knowles, 1984; and Knowles, et al., 1998), as well as Schultz's (2011) research for metacognition and active learning in GIS&T classrooms, a successful adult-oriented learning environment in the area of geospatial technologies and GIS has resulted.

From a curricular sense, the program consists of a total of five courses for those new to GIS and geospatial technologies. Students who have demonstrated sufficient experience with GIS software and the implementation of spatial thinking concepts, may have the first course, Fundamentals of GIS, waived by the program coordinator upon application to the program. All students are required to take four additional courses noted described above. It is recommended, although not required, that two courses be taken concurrently in both the Fall and Spring Terms to facilitate the completion of the program in a nine month timeframe.

The current curriculum of the program is based on student feedback, review of teaching and course evaluations, and testing course effectiveness with regards to delivering content and grading online submission of assignments and tests, and faculty-student interaction and student-student collaborative learning. Key elements of the courses, specifically designed with adults in mind, and using the andragogical teaching methodologies of Knowles, include:

- Weekly modular structure to accommodate adult student life priorities;
- Stating clear expectations to adult students to allow for planning and scheduling of life priorities;
- The flexibility to learn other appropriate technologies in the courses based on student input, thus accommodating student ownership in the leaning aspect of the course;

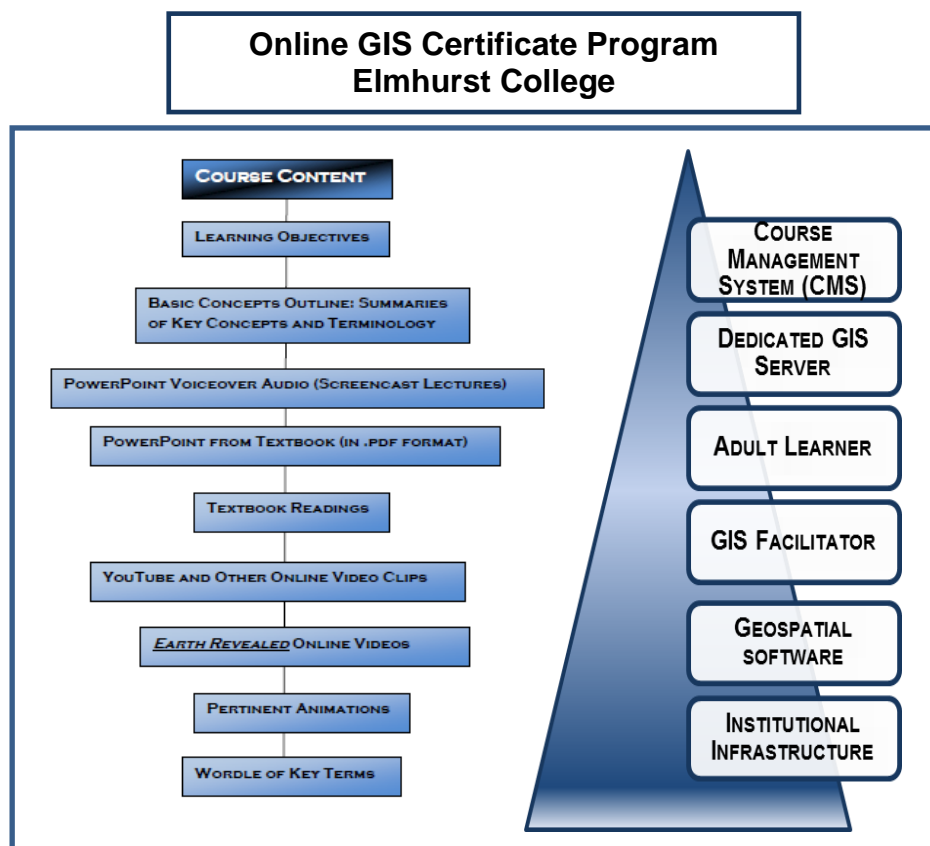
- Incorporating of multiple forms of feedback into the course and with various modes of communication to keep adult students engaged;
- Providing regular communication to individual learners and the group to encourage learning communities and build the framework for a positive learning environment, especially important for adult learners;
- Providing learner flexibility and control to reinforce a completely accessible curriculum while accommodating adult student life priorities;
- Offering a variety of forms of learner support including technical support and locating valid information (e.g., information literacy) on an “around-the-clock” basis;
- Providing a practical reason to learn about the content and immediately apply to one’s work environment;
- Considering limitations of adult learners and also the prior experiences which adults bring; and
- Respecting learner roles and life priorities.

## **Results and Discussion**

The Online GIS Certificate Program at Elmhurst College consists of six entities: the course management system (CMS), the dedicated GIS Server, the adult learner, the GIS facilitator, geospatial software, and the institutional infrastructure to accommodate learners (Figure 2). The courses are presented with the following components to accommodate adults and facilitate learning of geospatial concepts:

- personal learning styles inventory issued at start of program;
- personal technology competency proficiency exam issued at the start of the program to determine future technical skills needed;
- a weekly background learning component, consisting chiefly of screencasts and voiceovers of PowerPoint lectures;
- weekly active learning exercises in the form of immediate feedback, low stakes, concept quizzes and skills tests;
- ongoing discussion boards to facilitate learning communities and exchange ideas and provide feedback;
- weekly YouTube® video clips and geospatial skills clips;

- weekly online content reading of subject matter;
- weekly animations illustrating key concepts;
- weekly virtual office hours and “Professor’s Office” discussion board;
- monthly online exams with immediate feedback and ability to download exam with feedback for future study.



**Figure 2.** Elmhurst College Online GIS Certificate Program entities and andragogy used for active learning

**GIS Server/Geospatial Software:** Before the start of the semester, usually two to three weeks prior to the first week of classes, the instructor contacts the students registered for the course(s) and instructs them on the use of the dedicated GIS Server. Since the dedicated GIS Server is run through a Windows Terminal Server (WTS) setting in a remote desktop environment, students can log on remotely (from anywhere with an Internet connection) and not have to install any software on their computers. Additionally, the server does all of the heavy lifting so students' computers need not be as robust in terms of memory or speed. The crucial aspect is the Internet connection, which must be stable. Students can also individually request software directly from the College who will provide them with one-year fully functional licensing such that students can install the software if they desire.

**Facilitator's Responsibilities:** Instructors essentially serve as facilitators for adult students and do less teaching and provide more guidance than a traditional undergraduate classroom. Content learning materials (including the course syllabi, screencasts, laboratory exercises, concept quizzes, online readings and tutorials, and all weekly learning modules) are all freely accessible to the adult student. Once the class begins, the facilitator focuses exclusively on communication with the students, technical support and guidance, and assessment with associated feedback. Since the adult learner that takes a course is frequently working while taking the course, all modules are available from a window of time beginning on Sundays at 12:00 Noon until the subsequent Saturday at 6:00 PM. For students gainfully employed, the vast majority of the work is completed during evening hours or on weekends, and the online adult learner needs immediate access to course materials during periods when the instructor is not online.

**Adult Learner's Responsibilities:** Students must recognize course expectations and the necessity to begin work early during the weekly module. For an online adult student to be successful, they must be aware of weekly due dates in the learning modules and submit assigned work on time (i.e., before deadlines). They must also be freely participatory in terms of discussion boards and tutorials. Communication is the key to a successful learning experience for both facilitator and adult student.

## Conclusions and Summary

Differences between student audiences are important aspects not only of traditional learning in higher education, but also in the distance learning environment. Facilitators of distance learning coursework must be cognizant of the experiences which adult students bring to the classroom and their varying expectations and

reasons for learning. Taking these differences into account, the facilitator can better serve their remote adult and traditional students in the online setting.

This paper has demonstrated by way of a case study at a small, liberal arts-based college that an adult online GIS certificate program can accommodate adult learning modalities and provide for adult learners to have ownership in their learning while providing a practical reason to learn and implementing geospatial concepts into their current job.

Based on Knowles' theories of adult learning, adult online learners require certain aspects of andragogy which complement the content in an adult online experience. These include, but are not limited to: adults needing to know the reason for learning something; adult learners bringing life experiences to the classroom which are different from traditional undergraduate students; adults needing to be responsible for their decisions on education; adults being involved in the planning and evaluation of their instruction; adults being interested in learning subjects having immediate relevance to their work and/or personal lives; adult learning being problem-centered rather than content-oriented; and adult learners responding better to internal versus external motivators.

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### **Biographical Statement**

**Dr. Richard B. Schultz** holds a Ph.D. in environmental geochemistry from the University of Cincinnati (1991), an M.S. in geology from the Wichita State University (1988) and a B.S. in geology from Illinois State University (1985). He is in his eighth year as full-time faculty member, currently as an Associate Professor at Elmhurst College in suburban Chicago, Illinois, U.S.A., and serves as the Coordinator of the Elmhurst College Online GIS Certificate Program. Dr. Schultz is the sole or senior author of more than sixty publications, book chapters, and

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He currently serves on the Illinois GIS Association (ILGISA) Board of Directors and chairs the ILGISA Education Committee. Dr. Schultz was the recipient of the International Distinguished Teaching Award for Colleges and Universities for 2008 from the National Council for Geographic Education and has been inducted into "Who's Who in America's Teachers". He was the inaugural recipient of ILGISA's Richard Hilton Distinguished Collaboration Award in 2010 and is currently the Vice President for Products and Publications for the National Council for Geographic Education (NCGE). He serves on the Editorial Board for several international journals, including *The Journal of Geography* and *RIGEO*. E-mail: richs@elmhurst.edu

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