

## Curriculum-Based Virtual Field Trips: Career Development Opportunities for Students with Disabilities

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### Abstract

Many changes are taking place in our country. Technology continues to impact on the workplace, demographics are changing the face of our neighborhoods, communities, and work environments. Globalization is placing greater demands on the economy and on workers. Educators and employers must face the challenge of how to prepare learners for new roles that they will play in this ever emerging workplace.

In this context, consideration must be given to how the U.S. education and training system can evolve to better meet the needs of the 21<sup>st</sup> century workforce. Challenges from the private and public sectors will include improving educational outcomes at the primary and secondary levels and developing current and effective opportunities for career development.

When paralleling workforce preparation curricula, field trips are valuable learning experiences in the career exploration process and can provide unexpected benefits where examples talked about in the classroom can be related to real-world situations. For individuals with disabilities, field trips can create challenges for students and educators, including medical issues, accessibility issues, behavior management issues, and processing issues.

Virtual field trips (VFTs) are one example of a time-worthy career exploration tool that has been enhanced by technology. New technologies in the next 10 years will offer tremendous potential to revolutionize the way education and training are delivered in order to improve efficiency and effectiveness in learning. The locations that a classroom teacher can use with professionally developed VFTs are limited to those presently

posted on the Web, and these may or may not correspond to the specific instructional needs of a workforce preparation curriculum or to the special needs of specific learners.

Teacher-created VFTs offer a number of advantages to workforce educators and students. The general steps for creating a customized curriculum-based virtual field trip are outlined in this article.

### Preparation for the Global Workforce

American society is based on work. A job is the price of admission to the American way of life and a means of realizing the American Dream. The work that one does affects almost every dimension of life: personal sense of accomplishment, type of home, and neighborhood in which one lives, standard of living, and educational opportunities provided to one's family. Those who are seeking employment and not able to obtain and keep a job eventually tend to drop out of family and community life. Even worse, those not able to function in the American economy may become involved in substance abuse, crime, and violence (Carnevale & Porro, 1994).

In the next 10 to 15 years, work in the United States will be shaped by demographic trends, technological advances, and economic globalization. Correspondingly, one challenge facing educators and employers will be how to prepare learners for their changing roles in the workplace and how to ensure that the economy uses the full capacity and potential of our youth (Charner, 1996).

In today's economy, skills matter; there is a strong connection between what one learns and

what one earns. To support a family and succeed, workers at all skill levels need opportunities to learn throughout their careers. Lifelong learning is no longer a luxury; it is a way of life in a global economy (Mt. Auburn Associates, 2004).

In preparing students to meet the challenges of the 21<sup>st</sup> century workforce, future curricula and associated activities must be developed around universal themes such as adaptability and change, diversity, increasing technology, and lifelong learning. Technology dominates the development of the 21<sup>st</sup>-century school. Educators and transition specialists must have an understanding of real-world requirements so that they can better teach all students, including those with disabilities. Instead of talking about which subjects they are taking, students will be talking about outcomes, job experiences, projects, or community applications in which they will be working (Zenger & Zenger, 1999).

### Individuals With Disabilities and Employment

For any group in the United States, one in five has a disability, and the unemployment rate for people with disabilities is the highest for any group of Americans. People with disabilities represent an often-untapped group of educated, highly skilled, talented, and qualified workers. Although many people with disabilities are employed, the unemployment rate for people with disabilities is unacceptably high. A National Health Interview Survey found that 79% of adults without disabilities were working at the time they were interviewed and that only

37% of those with disabilities were employed (U.S. Department of Labor, 2005a).

Employers face workforce challenges daily, and the forecast of labor market shortages is not improving. A 2003 survey conducted by the Center for Workforce Preparation, a non-profit affiliate of the U.S. Chamber of Commerce, revealed that workforce development and a shortage of workers at all skill levels are the major issues facing business and industry. Moreover, a recent Aspen Institute report projected a critical shortage of workers over the next 20 years, particularly in jobs requiring specific training. These reports confirm what business and industry already know; there are too few sources of qualified workers to meet projected needs. People with disabilities represent the single largest minority group of qualified workers seeking employment in today's market (U.S. Department of Education, 2005b).

## The Necessity of Career Exploration

In a society obsessed with K-12 educational performance, the well-being of millions of students is compromised by a lack of bridges to the world of work around them (John J. Heldrich Center for Workforce Development, 2004). In today's complex global workforce, students with disabilities are in need of career development experiences more than ever before. Many experts agree that all students need a different mix of academic work and career preparation and a stronger integration of career and academic standards.

Career development and preparation for success beyond high school must be adopted early in the students' educational experience (Hughes & Karp, 2004). School-based career development should serve

as the foundation for a process of lifelong learning available to students with disabilities seeking a place in today's knowledge-based economy. The focus should be on providing all individuals with opportunities for self-fulfillment and economic security through learning. Career development and exploration can take place throughout life in a number of educational and training settings (John J. Heldrich Center for Workforce Development, 2004).

Individual interests are strongly influenced by what people have experienced in life. The reality for many people with disabilities is that their life experiences have been very limited. As a result teachers will need to include real opportunities for individuals with disabilities to explore the world of work and develop preferences and interests. Effective career exploration gathers information not only on specific interests and skills, but also on the personal characteristics and other attributes that the job seeker has to offer and the work environments and culture that will be the best and most supportive fit. Like anyone else, people with disabilities may express an interest in a field, but have a limited understanding about what it entails. Additionally, they may have a finite view of the types of jobs that are available (National Center on Workforce and Disability/Adult, n.d.).

The process of career exploration should help students with disabilities to:

- learn about different jobs and careers;
- identify their personal interests, skills, and abilities;
- understand what employers expect of them as employees
- learn about the importance of pertinent job skills;
- gain an awareness of the academic, technical, and personal skills required by certain jobs;

- realize that different jobs are characterized by different work cultures and environments;
- increase their understanding about career opportunities available to them (Klem & Tuthill, 2003).

Many students with disabilities face additional challenges that can impede both their academic and career development. These barriers incorporate both personal and environmental dimensions and add increased stress to students' career selection and decision-making processes. Personal barriers may include low self-esteem, reduced efficacy for career decision-making tasks, and a relative lack of work experience compared to peers without disabilities. Environmental barriers may include both perceived and actual job discrimination, inadequate social support, and a lack of workplace accommodations.

## Field Trips as a Tool for Career Exploration for Students With Disabilities

Field trips are valuable learning experiences in the career exploration process and can assist students with disabilities in gaining a better understanding of concepts learned in the classroom. When paralleling workforce preparation curricula, field trips can be used as introductory activities to expose all students to aspects of upcoming units of work. Field trips can provide unexpected benefits in cases where examples talked about in the classroom can be related to real world situations. They can also be effective as developmental or culminating activities to consolidate what has been learned.

However, field trips, although effective in providing career exploration experiences, can create limitations for both educators and students. These

limitations include a lack of transportation, supervisory arrangements, cost, and district guidelines regarding time away from school and access to field trip sites, especially for those students who reside in rural areas.

For individuals with disabilities, field trips can create additional challenges both for students with disabilities and for educators. These challenges include the following: (a) medical issues (e.g., students with health impairments, students who require medication); (b) accessibility issues for students with physical disabilities; and (c) behavior management issues.

### Virtual Field Trips for Students with Disabilities

Virtual field trips (VFTs), which are computer-based simulations of an actual field trip, allow the student to vicariously experience the environment of the intended location. VFTs are one example of a time-worthy career exploration tool that has been enhanced by technology. New technologies in the next 10 years will offer tremendous potential to revolutionize the way education and training is delivered in order to improve efficiency and effectiveness in learning. Learning programs will become increasingly sophisticated over time with advances in hardware and software, including artificial intelligence, voice recognition, and natural language comprehension. These programs will also benefit from improvements in intelligent tutoring systems that allow self-paced, interactive, self-improving knowledge (Károly & Panis, 2004).

Creativity is required more than ever on the part of educators. To capture the attention of students who are continually stimulated by television, DVDs, and popular music, educators need to present a variety of

stimulating learning experiences. VFTs are one answer, a new tool that educators can use to engage their students in learning (Kawka & Burgess, 2001).

A VFT is an exploration through the Web, typically an organized set of links with a particular theme. Some trips simply consist of a list of links on one Web page, while other trips use some type of navigator (or buttons) to move through the tour. In its best implementation, the trip is a guided and annotated tour of pages on the Web that have been selected by educators and arranged in a "thread" that students can follow from page to page or site to site (Foley, 2001). VFTs provide both the instructor and the learner the opportunity to explore aspects of an actual trip without leaving the classroom. They should include all elements of a well-designed field trip and provide the students with experiences that are beyond those that could be obtained from a pamphlet about or a photo display of the location (Clark, Hosticka, Shriver & Bedell, 2002).

Elements of field trips that are not necessary with VFTs include the following:

1. Site clearance and approval.
2. Safety (both travel to and from as well as on-site).
3. Parent/guardian permission forms.
4. Adult volunteers.
5. Weather-related travel issues
6. Time frames (departure, travel time, return).
7. Liability and insurance issues.
8. Costs (e.g., admission fees).
9. Eating arrangements.
10. Scheduling conflicts at school.

VFTs allow instructors to take students with disabilities inside businesses and industries without concerns about previously mentioned elements. The VFT experience can include still images, animation, graphics, video clips, and audio clips, which take the viewer into the workplace in a way not usually

possible in a real-time visit. The student can hear an explanation of the work being done and see the action as well. Short text descriptions can also be included. The VFT can be a multisensory experience that appeals to a wide range of learning styles.

The educator must choose the most effective means for delivering information to the students with disabilities. Providing access to various forms of technology at the right time can significantly improve the rate and amount of learning a student accomplishes (Kawka & Burgess, 2001). There is an almost limitless variety of ways that the VFT might be used by educators delivering a workforce preparation curriculum to students with disabilities. Examples include the following:

1. Using the video clips to illustrate real-world applications of core academic skills (math, science, etc.).
2. Using information to help in the career decision-making process.
3. Using job-site interviews to identify specific job responsibilities (job development and redesign).
4. Providing opportunities for repeated visitations to the site for continued study.
5. Allowing the student or instructor to focus on one specific aspect of the trip at a time (task linking).
6. Providing for the presentation of a wider variety of experiences than may be possible during one trip.
7. Illustrating time-sensitive issues that could not be viewed on a single actual field trip.
8. Providing curriculum integration examples from the multiple aspects of the field trip (Clark et al., 2002).

## The Value of Customized Curriculum-Based VFTs

There are two types of VFTs: those developed by professionals and those developed by educators. VFTs that are available on the Internet, for example, are often thorough and impressive, utilizing technological resources far beyond those available to individual educators. However, they may have some drawbacks for students with disabilities. For example, the narratives of professional VFTs may be written to address the general interests of a large and diverse audience. Thus, the reading level, graphics, and animations may be inappropriate and ineffective for some students with disabilities. Internet-based VFTs cannot replace customized curriculum-based VFTs, developed by educators, because the latter can be connected directly to the curriculum being delivered and can be tailored to address the interests and learning needs of students with disabilities. In addition, Web sites are notorious for changing addresses or even vanishing. This unpredictability necessitates continual monitoring of these professionally developed VFTs. Also, these trips probably do not cover local industries or environmental sites (Tuthill & Klemm, 2002).

Teacher-created VFTs offer the following advantages for students with disabilities:

1. **Increased Learner-Centeredness:** This means that students can control the pace of the presentation and complete it at a pace convenient for them.
2. **Use of Multiple Modes of Learning:** VFTs can be designed so that a variety of stimuli (audio, video, text) can be used to appeal to the different learning modes of students with disabilities.
3. **Teaching Flexibility and Efficiency:** Teachers can spend

more class time covering concepts while students access the VFT on their own time.

4. **Geographic Independence:** Students can visit sites without leaving the classroom environment. This can be especially helpful in rural locations.
5. **Temporal Independence:** Students can access a virtual tour any time they feel it is convenient and spend as much, or as little, time as they want there.
6. **Ease of Use:** Web browsing is familiar to most students today, and it is likely that little training will be necessary for students to use this technology.
7. **Safety and Practicality:** Actual field trip sites may be unsafe, require great difficulty in travel and physical exertion, and may be inaccessible in bad weather. The field trip site may be an industrial plant or health care facility which cannot accommodate a large group of students. VFTs offer a safe and practical way to visit sites that may not otherwise be possible to visit.
8. **Control of Content, Language, and Features:** Teacher-created virtual field trips have the advantage of containing customized lessons designed to closely fit the curriculum, match the reading level of the students, and focus on local work-based sites that help learners better identify and relate to concepts. In addition, learning is enhanced when events are closer to students' own sociocultural perceptions formed through local culture. With this in mind, teachers can incorporate the communication style of the local culture into VFTs in order to appeal to local needs. For example, teachers working with students who have sensory disabilities can design an instructional VFT which incorporates design features allowing students access as required by the Americans with Disabilities Act and the concept of universal design.
9. **Additional Information:** If the VFT is on the World Wide Web or is made with an application that allows webbing, additional information can easily be included via a hyperlink. This avoids cluttering the screen with non-essential material.
10. **Simple Improvements and Alterations are Easy:** If there are revisions to be made, the instructor can immediately and easily make these changes.
11. **Reusability:** Once a VFT is developed, it can be upgraded, improved, and reused from year to year (Tuthill & Klemm, 2002, pp. 461-462).
12. **Elimination of Actual Field Trip Challenges and/or Barriers:** Accessibility, safety, and comprehension concerns may be present for learners who are visually impaired, hearing impaired, learning disabled, mobility impaired, health impaired, and cognitively impaired. These considerations can be addressed when teacher-developed, curriculum-relevant VFTs are employed, especially if students are involved in the process.

For a step-by-step process for creating a curriculum-based virtual field trip see Table 1.

## Evaluating the Virtual Field Trip

When evaluating the effectiveness of a customized curriculum-based VFT one should consider both the appropriateness and the effectiveness of the technology used in the presentation of the content. Students frequently experience learning situations indirectly through technology by the use of pictures, simulations, graph-

Exhibit 1.

Step-By-Step Process for Creating a Curriculum-Based Virtual Field Trip

The general steps for creating a customized curriculum-based virtual field trip are as follows:

1. Examine the objectives of the Career and Technology program and choose a VFT topic that includes experiences that fit the objectives and enhance learning. Technologically delivered or enhanced instruction must first and foremost be appropriate to the desired learning outcomes and be naturally woven into the overall pattern of the learning material (Cox & Su, 2004). The purpose of the field trip may meet multiple objectives.
2. Create a concept map of the experiences to be included in the field trip. A concept map provides an overview of all the elements to be included in the VFT and acts as an organizing framework to build upon in construction of the final product. The concept map should not be considered the final blueprint for the field trip; rather, it should be seen as an overview and a starting point from which the product evolves.

Figure 1.

Career Exploration Vignettes from a Radiology VFT for Health Science Technology Education.

Career Information

**Flouroscopy**

**Fluoroscopy** is often the most effective way to view the esophagus, stomach, and upper or lower gastrointestinal tract. A contrast material called **barium** is used to coat the inside of the esophagus, stomach, colon, or rectum to produce a sharp, well-defined image of the anatomy in interest.



Randy

Fluoroscopy.. I know this one. It's a new mouthwash with fluoride.



Rita

Wrong again, x-ray breath. Fluarescopy captures a moving image of an organ while it's functioning.

 "To get a really good idea of what **fluorescopy** is, check out this great website: <http://www.colorado.edu/physics/2000/xray/index.html> "

 "Hey, I'm just kidding about the mouthwash thing. Actually, my friend Penny at Children's Medical Center told me all about fluoroscopy. "

Career Choices

**Skip to the Good Stuff**

<a href="#"><u>Radiologic Technologist</u></a>	<a href="#"><u>Nuclear Medicine</u></a>
<a href="#"><u>General Radiologist</u></a>	<a href="#"><u>Ultrasound</u></a>
<a href="#"><u>Radiological Nurse</u></a>	<a href="#"><u>Magnetic Resonance Imaging</u></a>
<a href="#"><u>Diagnostic Radiology</u></a>	<a href="#"><u>Flouroscopy</u></a>

Exhibit 1, Figure 1, continued.

**Licensure Data**

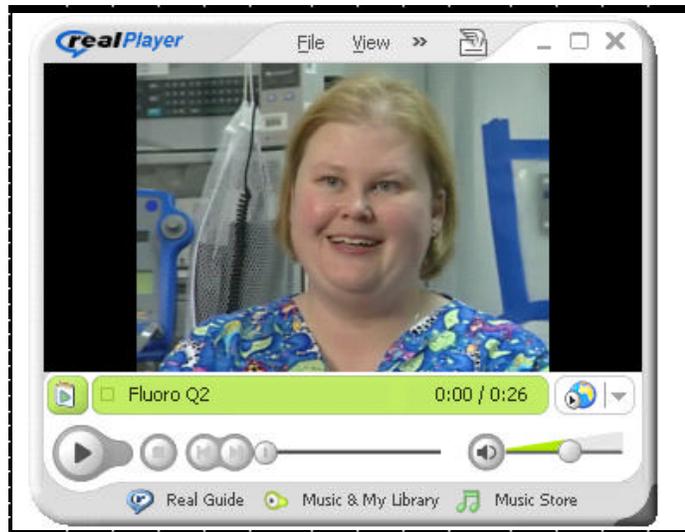
Radiology Career Fields by Minimum Entrance Requirements and Preferred Degree		
Career Field	Minimum Requirements	Preferred Degree
Radiologist	Medical Doctor	Doctorate of Medicine
Nurse	Registered Nurse	Bachelors Degree in Nursing
Radiologic Technologist	*ARRT certified in Radiography	Associates Degree in Radiologic Science
CT Technologist	*ARRT certified in Computed Tomography	Associates Degree in Radiologic Science
MRI Technologist	*ARRT certified in Magnetic Resonance Imaging	Associates Degree in Radiologic Science or Magnetic Resonance Imaging
Nuclear Medicine Technologist	*ARRT certified in Nuclear Medicine	Associates Degree in Nuclear Medicine
Sonographer (Ultrasound)	**ARDMS certified	Associates Degree in Sonography
Fluoroscopic Technologist	*ARRT certified in Radiography	Associates Degree in Radiologic Science

**Glossary**

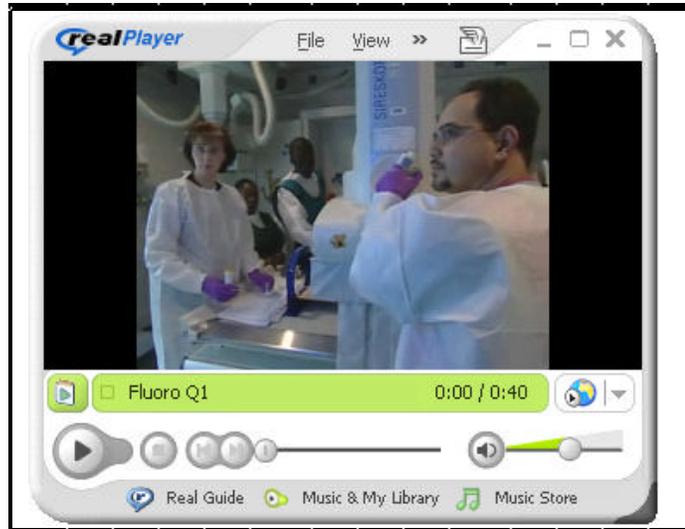
**ionizing radiation**

Radiation of sufficient energy to dissociate atoms or molecules into electrically charged atoms or radicals in the irradiated material.

**Job Shadow Interview**



**Worksite Tour**



### Exhibit 1, continued.

*The general steps for creating a customized curriculum-based virtual field trip, continued:*

3. Select the appropriate technology to be used based on the content and the curricular objectives of the trip. The technology includes organizing the program and tools for collecting and presenting data. The equipment and software used will depend on the complexity of the trip. Customized curriculum-based VTFs can vary in their complexity, based upon the experience of the developer with the technology available.
4. Collect and organize materials to be included in the VTF based on the curriculum objectives to be accomplished and the concept map. Examples of desired materials might be pictures, both digital and photographs; video clips; text; databases and graphs; and sound.
5. Schedule site visitations. Make contact with a resource person at the VTF site and explain the goals and purpose of the proposed VFT. If possible, take a video production crew to the site. (If the school district has a media technology program or department, this is an excellent resource.) Meet with all the people involved to briefly outline what is going to happen. Stress that the video shots are to be as natural as possible with "real" people going through the actual steps or procedures that are involved in the job being documented. Following the shoot, interview the people involved and ask them to describe in detail what they were doing and why. Ask about licensure, education, training, and the physical demands of the job. Draft a simple release form following department/organization policies. Request signed release forms from individuals included in the video clips.
6. If necessary, convert all materials to a digital format. When converting materials to a digital format, the question of computer platform (Windows vs. Mac OS) must be considered. The decisions made about the format of the individual parts (pictures and text) must be considered to ensure that they are appropriate for the platform being used.
7. Assemble all elements in the organizing program based on the concept map. Here, another decision regarding the format of the virtual field trip must be made. Will it be one stand-alone program presentation or a series of segments that can be accessed separately? How will the virtual field trip best meet the needs of the teacher and students? These decisions, along with the developer's knowledge of presentation programs, will determine whether Macromedia Director, Hyperstudio, Power Point, or any of the other available authoring programs meet the needs of the designed virtual field trip. The choice of the authoring programs used is often the developer's personal choice based on familiarity and skill with this program.
8. Review the finished product to be sure it meets the objectives for which it was intended. There will always be questions about how the VFT could be better. What can be added to improve the outcomes? What are the differing needs of the learners using it? How can each learner group add to the information presented? (Clark et al., 2002).

ics, and interactive experiences that allow the learner to follow their interests and to revisit locations in the program as their interests grow. Technology should not be seen as a replacement for experiences but as an enhancement of these experiences. Technology can be used to enhance the senses, build interest and excitement, or to review and analyze experiences (Clark et al., 2002).

### Summary

Employers face workforce challenges daily, and the forecast of labor market shortages is not improving (U.S. Department of Education, 2005b). Due to the changing nature of the workforce, impacted by demographic trends, technological advances and economic globalization, educators must meet the challenge of preparing the next generation for this new workforce. In order to accom-

plish this, educators and transition specialists must have an understanding of real-world requirements so that they can better prepare students for their role in the new global economy.

Universal themes must be infused into future curricula, including increasing technology, diversity, adaptability and change, and lifelong learning. Career development and preparation for success in the global workforce must be adopted early

in students' educational experiences (Hughes & Karp, 2004).

Field trips have always been a valuable learning experience in the career exploration process. They can assist students with disabilities in gaining a better understanding of real-life work demands. Virtual field trips (VFTs) are one example of a successful career exploration tool that has been enhanced by technology. A VFT is an exploration through the Web, typically an organized set of links with a particular theme, providing both the instructor and the learner with the opportunity to explore aspects of an actual work environment without leaving the classroom.

Customized curriculum-based VFTs, those developed by educators in coordination with business and industry sites, can provide valuable, up-to-date career exploration information for students. Steps to designing and developing VFTs to parallel career and technology curricula are provided in this article.

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