
AC 2011-1849: BENEFITS AND CHALLENGES OF GO!: AN INNOVATIVE ONLINE PUBLICATION TO ATTRACT TEENS TO TRANSPORTATION

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Benefits and Challenges of *Go!*: An Innovative Online Publication to Attract Teens to Transportation

Abstract

This paper discusses benefits and challenges of creating, supporting, and promoting a unique free online publication called *Go!* designed to attract middle and high school students to educational opportunities and careers in transportation.

In addition to workforce development, *Go!* also serves as a valuable resource for supporting and enhancing informal STEM (Science, Technology, Engineering and Mathematics) education. *Go!*'s value lies in its online presence and informative STEM articles that foster learning anywhere, anytime—a quality germane to informal learning. Such avenues also offer co-curricular and extra-curricular options with contextual opportunities to demonstrate higher levels of learning outcomes such as analysis, synthesis, and evaluation.

Preliminary findings indicate *Go!* has built up a loyal subscriber base (~860 subscribers) and is attracting a large number of visitors (~5000 visitors monthly) from over 100 countries. However, in order to make the web site truly effective and useful to teens, substantial funding is required to help transform the web site into a self-sustaining virtual community of users from schools, universities, federal, state, and local agencies, and parents.

Introduction

There is a pressing need to develop the transportation workforce to meet the needs and challenges of the future^{1,2,3}. For this, it is imperative to attract students at the middle and high school grade levels to STEM disciplines. This is a challenge based on a number of factors including competing opportunities, perceptions about the industry, and career opportunities⁴. Addressing this challenge also requires overcoming the communication gap between transportation practitioners and individuals in this age group (i.e., teenagers). This paper presents efforts to develop *Go!*, a free online magazine, to address this need, and a preliminary evaluation of its effectiveness. Also included are plans to build on these efforts to enhance the reach and impacts of the magazine.

Background: Declining transportation workforce

The transportation industry is multidisciplinary. Its workforce comes from a broad range of disciplines. These include, but are not limited to STEM disciplines, computer science, statistics, behavioral, natural, and social sciences, information systems, design and planning, logistics, management, policy, and legal studies⁵. However, key aspects of transportation systems planning, design, construction, operations, and maintenance are based on STEM fields. Practitioners from engineering disciplines, particularly Civil Engineering, play a critical role in this regard in ensuring a safe, efficient, and effective transportation infrastructure system.

It is estimated that 40-50 percent of those currently employed in transportation are slated to retire in the next 10 years^{1,2}. Additionally, due to slumping birth rates in the 1980s³, there is a smaller hiring pool to fill the void created by the retiring baby boomer generation. The growth rate of the labor force peaked during the 1970s at 2.6 percent, but subsequently has been decreasing every decade. The projected labor force growth rate for 2015 to 2020 is only 0.6 percent, falling to 0.2 percent between 2020 and 2025⁶. This decline in the labor force is expected to continue into the future⁷.

Concurrent with the decline in the labor force, the demand for skilled transportation workforce has increased dramatically since 1990. National efforts to address this challenge include the University Transportation Centers (UTC) program within the US Department of Transportation's (DOT) Research and Innovative Technologies Administration (RITA) and other work force development initiatives at the DOT. For example, a 2009 report from the UTC program at Georgia Tech notes the following:

With population, urbanization, and the need for infrastructure expansion and renewal projected to increase over the next several decades, the demand for transportation professionals could become more acute. If the needs of a growing society that is increasingly dependent on a functioning transportation system are to be met, steps must be taken to motivate students to choose transportation as a career.⁸

Meeting the needs, opportunities, and challenges of transportation systems of the future require an increase in the breadth and depth of STEM-related skills and expertise. This challenge is magnified by the fact that the field of transportation is competing with other STEM-intensive career paths for a limited number of new professionals. Further, there is a need to identify ways to reach future transportation professionals early, and increase female and minority representation, instead of simply competing for the limited pool of professionals available⁹. Reaching women and minorities has been a challenge¹⁰. The perceived invisibility of transportation⁴ makes attracting such populations among the teens difficult.

However, it is essential that steps are taken to meet the workforce needs of the future. Over the past two years RITA, in partnership with several UTCs, has organized about a dozen regional summits across the nation to identify strategies to address the transportation workforce needs and challenges. A general consensus of the Midwest Summit held in April, 2010 found that one of the most significant challenges the transportation industry faces is to steer middle and high school students into STEM-related areas³. *Go!* is a free online magazine (e-zine) specifically designed to address this need.

***Go!*: One approach to develop the transportation workforce**

Go! (www.go-explore-trans.org) was launched in 2007 as a communications tool to attract teens to transportation studies and careers. It was created in response to a lack of awareness among young adults about the field of transportation as a challenging career option. *Go!* was designed to be an online magazine as a response to the increased utilization of online resources by its intended target audience, namely teenagers. It was the first such online magazine (e-zine) in

transportation and remains the only such publication to date. In 2009, its Spanish edition, *¡Vamos!* was introduced (Figure 1).



Figure1. Original design of *Go!* and *¡Vamos!*

The e-zine’s layout and contents were designed and developed to appeal to the target audience. It presented short articles in the form of stories along with snippets of information on transportation. These were written / created by young people for young people with the mentorship of transportation professionals. The key contributors to the e-zine were undergraduate or graduate students with backgrounds in journalism, communications, and graphic design.

Summary of efforts to date

Since its inception in 2007, *Go!* has published 18 issues on a wide range of transportation-related themes like design and engineering, freight, safety, sustainability, transit, space, rail, and women in transportation. The e-zine consists of a mix of featured departments and articles. The departments spotlight educational institutions (universities, colleges, community colleges) with information about course work and research opportunities as well as potential scholarships. The featured articles address topical issues and items. They build on news items that have gained recent attention in the popular press.

The “student spotlight” section in *Go!* highlights where a student studies, her/his involvement with a transportation program, and background (e.g. how did s/he become interested in transportation). Other items published include information about upcoming events, puzzles, quizzes, brainteasers, and a mystery photo competition. The mystery photo competition is a popular feature and invites readers to guess a transportation related photo. The winner (drawn at random from all of the correct responses received by the deadline) is awarded a *Go!* t-shirt. An annual essay contest is yet another feature designed to attract teens to transportation. This

competition has drawn entries from across the US and from several countries around the world. The winner receives a prize and has his/her essay published in *Go!*.

Examples of articles published in *Go!* include the following:

1. “Shipping Harry Potter: How do they do that?” (http://go-explore-trans.org/2007/mar-apr/shipping_HP.cfm). This article addressed the logistics required to ensure that the books were available at book stores right at midnight on the date the book was released.
2. “Pretty good trip planning” (<http://go-explore-trans.org/2010/feb/index.cfm>). This article appears under the *Teen Point of View* column and presents a high school student’s experience developing a Google Transit Feed Specification (GTFS) for transit trip planning during a summer internship with a transit agency.
3. Another example is a “spotlight” on transportation and freight-related programs at the University of Wisconsin-Madison (<http://go-explore-trans.org/2007/nov-dec/index.cfm>).

In 2009 *Go!* received new funding from the Iowa Math and Science Education Partnership (IMSEP), which helped expand its scope to include teachers and minorities. It added the following new features:

- *Curriculum Connections* linked *Go!* feature articles with STEM concepts. To date, nine Curriculum Connection articles have been published. These include, among others, topics such as:
 - The physics of paint
 - Using Geometry in a transit route survey
 - Thermal conductivity
 - Solar cells
- *Original hands-on activities* encouraged readers to design their own projects and submit their designs for a chance to win a prize.
- *¡Vamos!*, the Spanish edition of *Go!* was created and five issues published from July 2009 to June 2010.

Redesign of Go!

Based on the changing landscape of technology use among young adults who are highly mobile and networked, *Go!* publishers found a need to redesign *Go!* in ways that better resonated with the youth. In turn, this would enhance *Go!*’s reach to address the pressing workforce development challenge in the field of transportation.

User testing was conducted on the old web site to identify concerns and problems. Feedback from users and the recognition that actively engaging the audience was more powerful in attracting them, led to a review of the e-zine’s design, layout, and contents. Subsequently, graduate students from communications and graphic design disciplines worked on comprehensive evaluations of content, visual design, layout, and navigation. The publishers realized, through reader feedback, that the original *Go!* functioned as a disseminating tool. It provided little room for users to interact and express themselves as active participants in addressing transportation problems.

A new website has since been developed, which directly addresses concerns and suggestions from users as well as problems and issues noted by the designers. The redesigned version of *Go!* was launched in December 2010 (www.go-explore-trans.org). The new site transformed *Go!* from a static production to a dynamic, interactive website. The current *Go!* sports a changed information architecture, user interfaces, and the contents are designed to be interactive to encourage readers/users to engage with it in different ways (Figure 2). For example, the *Historically Speaking* feature encourages readers to help fill out an interactive map on women, past and present, who have made a difference in the field of transportation. Readers enter relevant information directly into a text field, which goes through an approval process before getting published. This task thus involves the readers actively and collectively in generating knowledge on a common topic. Readers engage in research and writing activities that can be easily integrated into their school curriculum making it a useful resource for teachers and students alike.

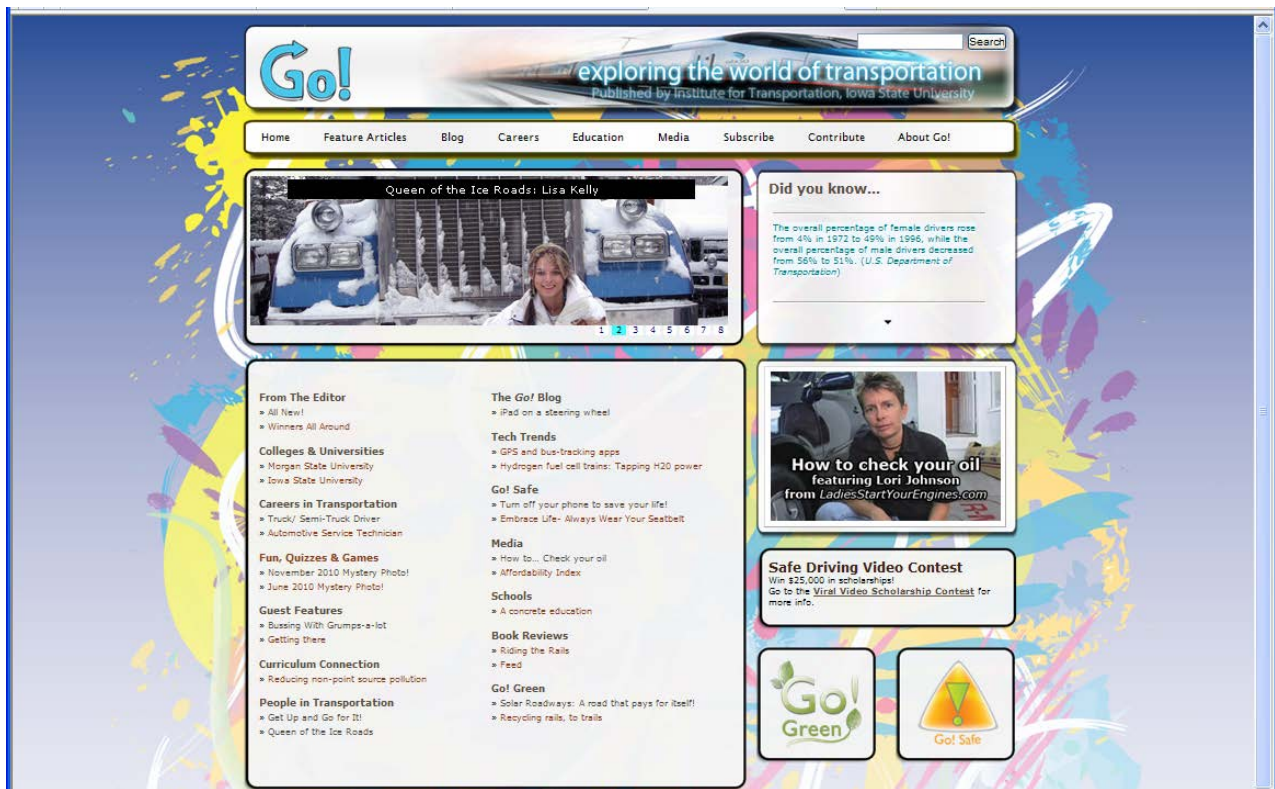


Figure 2. Homepage of the new *Go!* web site

The web site is also continually monitored for visitor traffic and steps are taken to optimize it for search engines and promote it on partner sites. It is expected that these changes will help *Go!* heighten its impact within its target audience and effectively increase teen and young adult's interest in transportation related careers.

Results to date

Since its launch in 2007, *Go!* has shown promise, gained new subscribers (~860 by fall of 2010) and caught the attention of federal organizations such as RITA and other units within US DOT. Its online medium of publication, along with its content and authoring styles (young adults writing educational articles in their own jargon) helped engage the target audience.

Figure 3 presents a demographic snapshot of users based on a 2010 survey.

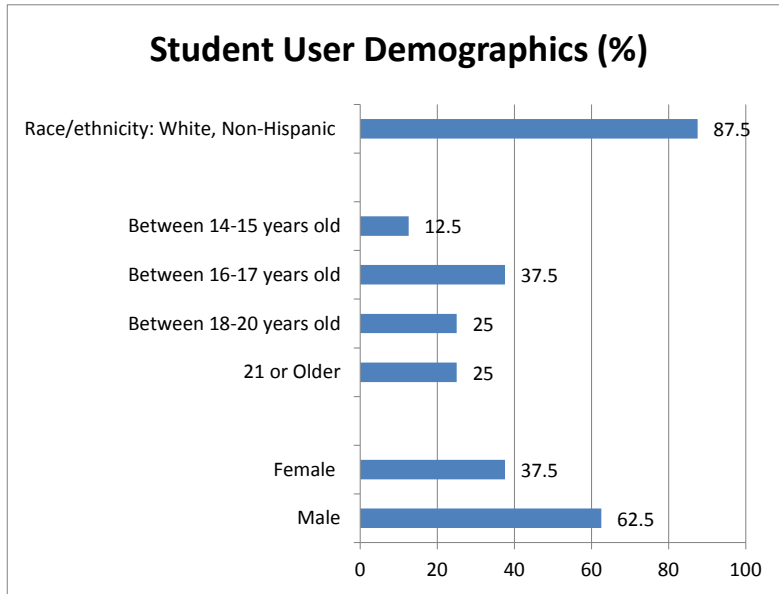


Figure 3. Go! user demographics

Key indicators of success in the most recent calendar year (2010) include an average of about 5,000 unique visitors monthly (with as many as about 8,000 visitors for some issues). Typical issues in 2010 had over 12,000 page views. The e-zine has attracted visitors from 173 different countries, with the largest numbers from the US (67 percent), Canada, UK, and Mexico.

Annual survey of adults and students conducted in 2009 indicated the following:

- 44% of the students and 74.3% of the adults found *Go!* very interesting.
- A majority of the adults surveyed (~52%) found the content interesting to teens, while a smaller percentage (33%) of students felt the same.
- 77.8% of the students indicated that they had learned something new.
- 33.3% of the students would consider pursuing a career in transportation.

Secondary informal user testing has been performed on the new interface and website and the design tweaked. Traffic data from a month after the launch of the new site (i.e. in early January 2011) indicate a substantial increase in web site traffic from the previous months.

- There have been 1,552 more web visitors

- There have been about 17 percent more unique visitors (first time visitors) than the previous month
- Surveys on the quality of the new articles (length and interest level) indicate that the readers found the articles to be interesting and of appropriate length.

The following synthesis provides snap-shots at various times from user surveys:

A survey of visits in the summer of 2010 yielded the following results:

- 93% visitors (29,981 of 31,111) to English web site; 7% to Spanish web site
- About 39% of the visitors came from an organic Google search
- 601 visits were made using mobile devices (1.77% of the site total visits)
 - 282 from an iPhone
 - 111 from an Android device

Proportions of students and adults that found the site interesting were as follows:

Students (Male = 62.5%; female = 37.5%):

Very interesting	44.5%
Sort of interesting	33.3%
Boring	22.2%

Adults (Male = 45.7%; female = 54.3%):

Very interesting	74.3%
Sort of interesting	25.7%

The following are some of the suggestions from users for improving *Go!*

- *We don't like stuff that drags on I mean if there's a lot of info then cool, but if not don't say the same thing over and over*
- *More interactive activities. More contests.*
- *Possibly more interactive. Something they can click on and do.*
- *even more interactive, but don't cut the in-depthness of the articles*
- *games & puzzles*
- *Include more stories about video games, ipods and text messaging - seriously what else do people that age care about???*
- *Can't think of a thing...it's extremely interesting already!*
- *This 40 year old Dad thinks what you are doing is fine.*
- *Articles can be a little boring. Spice up topics with suggestions and maybe new ideas that teens can try. Maybe new technology or items that can help them.*
- *They should keep thier (sic) audience in mind when taking and publishing pictures.*
- *Seems like a difficult age to reach with reading materials.*
- *This is a tough nut to crack -- maybe the best thing would be to use other Web2.0 tools to push it out there. hash tags in twitter, etc...*
- *More interactive stuff or activities that get them involved like the mystery photo*

Reflections on the benefits and challenges

As a pioneer in the area of transportation outreach to K-12, *Go!* has experienced successes along with growing pains. Its success lies in the following:

- *Go!*'s online presence provides teachers, students, and transportation professionals 24/7 access to transportation information and STEM articles.
- *Go!* uses standard web technology making it easy to access by school personnel who use networks that can be highly restrictive for reasons of security.
- *Go!*'s informal nature and non-technical approach to an otherwise technical field makes it attractive to young readers who are still novice learners and who are just beginning to explore careers and occupations.
- *Go!* developers from non-STEM backgrounds are exposed to new concepts as they engage in developing STEM articles for a teen audience.
- A by-product of this initiative is the evolving model of interdisciplinary learning in higher education by engaging non-STEM college students in researching and writing articles on STEM topics. *Go!* publishers realize the importance of such a model and intend to study its impact on student learning and professional development.

However, along with successes, *Go!* publishers have experienced expected and unexpected challenges.

- *Go!* started as an experiment with minimum funding. In order to grow and become viable, it requires substantial investment, which has been a challenge, especially in the current financially-strapped economy.
- Without adequate funding and resources, it has been difficult to accurately gauge *Go!* reader's habits and perceptions. Since *Go!* is a free resource (it does not require a secure login) and can be accessed by anyone from anywhere, identifying and tracking readers becomes a challenge. To capture important user information, readers need to be surveyed more frequently on their browsing habits, their evolving perceptions of transportation, information related to user demographic and interests. Such surveys take time to fill out and have the potential of driving away readers and resulting in poor response rate. In spite of these challenges, publishers have started tracking their readers more systematically since the newly designed web site went live.
- Creating original hands-on STEM projects requires substantial time and effort.
- Making *Curriculum Connections* interesting to teens and useful for educators, as well as "packaging" its STEM content appropriately requires a development team with interdisciplinary expertise, which becomes a daunting task on a limited budget.
- Given the numerous demands on teachers, engaging them in developing curricular material for an informal and extra-curricular initiative like *Go!* without adequate compensation becomes challenging.

An update

Despite the aforementioned challenges, the *Go!* team has recently experienced success in the following:

- *Go!* has initiated contact with a middle school in the state and has negotiated a working relationship that includes working together with the math and science teachers to develop transportation-related curricular material and help them implement it in the classrooms.
- *Go!* has established a tentative relationship with the university's Spanish program to provide translation help for its Spanish edition *¡Vamos!*. Senior student interns in this program have

begun to provide translation services as part of their internship requirement. The translated articles are reviewed for accuracy by native Spanish speakers from the community.

- *Go!* publishers are exploring ways to partner with departments at the university to leverage resident STEM and educational expertise and also work with other university transportation centers that share a common goal of developing the transportation workforce.
- *Go!* is actively seeking additional sources of funding.

Future activities

The recent transformation of *Go!* will assist in enhancing its impact within its target audience and effectively increase teen and young adult's interest in transportation related careers. By the time of the ASEE conference, an updated evaluation of the modified *Go!* web site will be conducted with end users. At the conference, preliminary findings from this evaluation will be presented. These findings would be beneficial to improving *Go!* and other efforts with similar goals.

The initial success achieved by *Go!* clearly points to its potential to attract teens to educational and career opportunities in transportation. The vision now is to expand its reach and impacts. These include building up the dynamic, interactive website and to have a more visible presence in the social media outlets popular with teens. Additional efforts are needed to improve *¡Vamos!*, the Spanish version of *Go!* by transforming it from a translation of *Go!* to a standalone companion to *Go!*

Efforts to date have been supported by seed investments from a few organizations. Enhancing the reach and impacts of *Go!* and *¡Vamos!* will require investment of resources and developing new partnerships with professional organizations and employers in the transportation industry.

Future Goals

- Expand *Go!*'s reach and scope to make it an effective tool for transportation engineering workforce development nationally.
- Involve higher number of middle and high school students, guidance counselors, and teachers in its design, development, and deployment.
- Introduce *Go!* to parents by networking with schools, pre-college programs at universities, and youth outreach programs outside of the formal school and/or college environment(s).
- Make effective use of resources by building new collaborations with interested universities, particularly those with UTCs.
- Partner with federal, state, and local agencies to promote transportation awareness among teens
- Improve tracking of *Go!*'s effectiveness

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References

- ¹ Transportation Research Board (TRB) (2003). The workforce challenge: Recruiting, training and retaining qualified workers for transportation and transit agencies. *TRB Special Report 275*.
- ² Federal Highway Administration, (2008). *Strategic leadership succession plan*. United States Department of Transportation. Retrieved January 7, 2011, from <http://www.fhwa.dot.gov/opd/#work>.
- ³ Nambisan, S., S. Hallmark. (2010). *Preparing tomorrow's transportation workforce: A midwest summit*. Institute for Transportation, Iowa State University, Ames, Iowa.
- ⁴ Rodrigue, J.P., Comtois, C., & Slack, B. (Eds.). (2009). *The geography of transport systems*. (2nd edition). London & New York: Routledge.
- ⁵ Sinha, K.C. (2007). Are transportation studies a scientific endeavor? Keynote address at the 7th Conference of the East Asian Society of Transportation Studies (EASTS), September 24-27. Dalian, People's Republic of China.
- ⁶ Toossi, Mitra (2002). A century of change: The U.S. labor force, 1950–2050. *Monthly Labor Review*, U.S. Bureau of Labor Statistics. May 2002, pp 15-28. Retrieved January 7, 2011, from <http://www.bls.gov/opub/mlr/2002/05/art2full.pdf>.
- ⁷ Toossi, Mitra (2006). A new look at long-term labor force projections to 2050. *Monthly Labor Review*, U.S. Bureau of Labor Statistics. November 2006, Vol. 129, No. 11, pp 19-39. Retrieved January 7, 2011, from <http://www.bls.gov/opub/mlr/2006/11/art3full.pdf>.
- ⁸ Georgia Tech. (2009). *Transportation engineers of the future*. Unpublished report submitted to US DOT University Transportation Centers program office. Retrieved January 7, 2011, from http://utc.dot.gov/publications/points_of_pride/2009/html/workforce_development.html.
- ⁹ Toole, J. & Martin, C. (March 2004). Developing tomorrow's transportation workforce. *ITE Journal*. Institute of Transportation Engineers. Washington DC.
- ¹⁰ Agrawal, A.W. & Dill, J. (2008). To be a transportation engineer or not? How Civil Engineering students choose a specialization. *Transportation Research Record 2046*. Transportation Research Board of the National Academies.