All Together Now: A Collaborative Game To Increase Advocacy Among Disabled Individuals in Higher Education

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Abstract

A common problem for people with disabilities, particularly those who rely on mobility devices, is learning to navigate a new environment. This is especially troublesome for students who are attending a new university and need to figure out how to get from one place to another. All Together Now is a mobile multi-player cooperative game developed for two purposes. First, the game, developed by two computer scientists (one, co-author Engoron, a wheelchair user) and a disability studies scholar, is intended to give disabled students a fun way to learn their way around campus, learn how to report accessibility issues on that campus, and make friends with people who have similar disabilities. Second, the game can be used as a way of fostering awareness and advocacy among students without disabilities, by having them work in teams where one member is someone with a disability that causes them to rely on mobility devices. This paper describes the implementation of the game within a disability studies course and results of two pilot tests, with both disabled and non-disabled participants. Although All Together Now was developed as a prototype for our university, the interface allows for the creation of custom challenges so that it may be used on any campus.

Introduction

In 1990 the Americans With Disabilities Act (ADA) was signed into law in the United States (ADA 2016). This comprehensive piece of legislation prohibits discrimination of

those with a disability. In addition, the ADA requires employers to provide reasonable accommodations to employees with disabilities, and imposes accessibility requirements on public accommodations. These accessibility requirements are "necessary and appropriate modifications and adjustments not imposing a disproportionate or undue burden, where needed in a particular [instance]." Real life examples of these reasonable accommodations include automatic door openers, ramps that lead up to a door as an alternative to stairs, and having doorways wide enough to accommodate a wheelchair.

A common problem with the ADA however is that its rules are largely open to interpretation (Fleischer & Zames 2011, Hamilton 2000, Scotch 2001, USDOJ 2016). While the ADA requires all public facilities to be accessible to the disabled, the method by which that requirement is met is at the discretion of the public entity itself. As such, there is no law set into place that standardizes the positioning of accessibility accommodations. Due to this fact, when a person with mobility issues is adapting to a new environment, it is hard to learn all of the intricacies of accessibility that exist. While it may be one thing to read about accommodations on a page, in order to learn how to navigate a new environment as a disabled individual, interacting with actual built environment is another. Experience is key.

For a new student or visitor to an unfamiliar college campus, this can be especially distressing. It's difficult enough for anyone without disabilities trying to figure out for the first time where a specific room in a particular building is. Trying to find an accessible path to that building (without having to go over curbs or up or down stairs), the accessible entrance to that building (with a ramp and automatic door opener),

and an elevator to the appropriate floor (again, considering stairs and doorways with no automatic opener) can be especially daunting for a new student in a wheelchair.

In addition to common problems with the ADA, another issue that those with disabilities may face while adapting to a new environment is a misunderstanding of reasonable accommodations by those in charge of said accommodations. Those without disabilities may be under the perception that their facility is accessible and follows ADA requirements. However, this may not be the case. Take for example President William F. Messener of Holyoke Community College in Massachusetts (Ross, 2008). In 2008, after complaints that the school was inaccessible, Messener took to a wheelchair and began to navigate the campus. To his surprise, although the campus technically followed ADA regulations, it was much harder to navigate the campus than he had originally believed. Although this is a common problem among public institutions, little has been done to solve the problem, and little has been done to help disabled people learn how to advocate for themselves when faced with similar situations. Furthermore, when dealing with issues of advocacy, it is important to realize that one is never alone. Having a support group while adjusting to a new environment, as a disabled individual is an important way to increase advocacy for the disabled community.

With all of the issues mentioned above, the question now becomes what can be done to rectify the situation? How can one aid a disabled individual in adapting to a new environment while promoting self-advocacy, self-awareness, understanding, and community purpose? Our response was to create All Together Now, a social interactive game to help disabled people navigate new environments.

Overview of All Together Now

All Together Now was developed at our university by two computer scientists (one, co-author Engoron, a wheelchair user) and a disability studies scholar with the following goals in mind:

- Help disabled people learn to navigate a new environment.
- Increase self-advocacy amongst disabled individuals in a specific locale.
- Increase understanding of accessibility issues for nondisabled individuals.
- Provide an easy way to report accessibility concerns.
- Promote community bonding amongst those with disabilities within a specific locale.

[Insert Figure 1 here]

Figure 1 shows the opening screen for the game. All Together Now is a collaborative game, where all players must work together to "win" the game: either everybody wins, or nobody wins. Collaborative games have been show to effectively increase both learning and players' sense of self-efficacy (Sung and Hwang 2013). By making the game collaborative, weaker players can get help from the stronger players, and a sense of camaraderie is developed as all become master of their environment.

Implementation of All Together Now

All Together Now is implemented as an iPad application using Filemaker as a foundation. Filemaker is a cross-platform database engine that uses a graphical user interface (GUI) to allow users to modify the database through layouts and forms, not only

by commands. Filemaker was chosen due to its comprehensive and easy to use GUI creation system that allows for the creation, storage, and analysis of various types of data. As this application is meant mainly as a tool for those with disabilities, we designed the User Interface with those individuals in mind. Text on the application is white on a dark gray background, allowing for legibility. Buttons were made big and bold to allow for a successful click even without exact precision. Furthermore, buttons were laid out in a way that requires users to make as few clicks as possible. Figure 2 shows the main menu for the app.

[Insert Figure 2 here]

As part of our application, we place restrictions on the amount that our players can view within the application. For instance, we only allow users to view the objective page for the objective that they are currently assigned. We do this in order to encourage users to explore their surroundings instead of automatically asking for help from teammates when receiving an objective. It is our hope that this also encourages users to write down comments about an objective as they are completing said objective, since the form will not be available after they complete it.

The Basics of The Game

The gameplay for All Together Now is similar to that of a scavenger hunt. Each player is given a different set of objectives to complete, all of which involve learning how to get around in the new environment. Everyone's final objective is to go to a designated meeting place, such as a dining hall on campus. When all the players get there, a

facilitator checks to ensure that the objectives were attained, and then rewards them all with a final prize, such as a beverage or snack of their choice.

Throughout the duration of the game, players can stay in contact with one other using FaceTime. Because of this, players who are having difficulty with a certain objective can ask for help from the others. Likewise, players who finish first can offer help to those still working on their objectives. This encourages the building of community between those with disabilities.

In addition, the game has a feature that allows players to report accessibility problems. This is to help increase advocacy, and also make the campus more accessible to all. Functionality of the game is described in greater detail below.

The Objectives

When playing All Together Now, a user is assigned an objective by the system. These objectives are designed to teach those with mobility impairments to navigate new environments through experience. Figure 3 shows the Objectives screen displaying one of the our university objectives. There is little direction given in these objectives in order to encourage exploration of a new locale. These objectives were designed to be challenging in the fact that they expose challenges that one with a disability will face daily when navigating campus.

[Insert Figure 3 here]

The objective given has a completion condition where users are told how to complete the objective. In our application, there are two ways to complete an objective. The first is to submit a picture of your surroundings that will be uploaded to a database

for the game admin to approve; the second is entering a string of text that will be located at the end of the objective. We provide these two ways to complete an objective in order to take into account those with disabilities that might not be able to take a picture while holding an iPad.

In addition to having pre-made objectives, our application also allows users to create their own objectives in order to challenge their friends and increase awareness of accessibility concerns across a specific locale.

In its current state, the application requires each user to complete two objectives before receiving his or her communal prize. This number is also increasable should more objectives be created.

Each objective also has a comment section that allows users of the game to comment on how they completed a specific objective. This comment section not only allows for further communal building but also promotes the sharing of knowledge in overcoming obstacles in navigation.

FaceTime Integration

An important part of our application is the functionality to use Apple's FaceTime in order to communicate with other players of the game. Each user is required to input an Apple ID at the start of the game to allow FaceTime to function. We allow users to FaceTime with other players at any point during the game. We include FaceTime integration to allow users to check on the status of other players in addition to allowing players to ask for advice in a more real-time setting than the comments.

Self-Advocacy and The Reporting of Accessibility Concerns

In order to increase self-advocacy among mobility device users and create a tool that allows for the reporting of accessibility concerns, All Together Now utilizes both pictures and FaceTime Audio Calls. As a user is completing a specific objective, should they notice an accessibility concern that needs to be addressed, they are able to take a picture of said concern, write down the location where the picture was taken, and detail the concern that must be addressed. These records are then uploaded to a database that every user of the game has access to. The ability to submit pictures allows for an increase self-advocacy among disabled individuals when completing objectives.

In addition to using pictures to document accessibility concerns as mentioned above, this application also contains methods to call emergency personnel should one encounter an issue while completing an objective. Currently, the application contains three emergency contact buttons. The first is a button to contact the game administrator concerning a problem with the application. The second is a button to contact the police department should one become stuck (e.g. in an elevator) while completing an objective. The third button is a button to contact a building manager in order to inform him or her of a broken automatic door, or other accessibility issues relating directly to the location of the objective a user is trying to complete. These buttons and picture submission forms create a tool for users to report inadequate accessibility accommodations. As a result,, it not only increases self-advocacy, but also creates a means to advocate.

All Together Now As A Teaching Tool

Besides using All Together Now as a tool for those with disabilities, we also designed All Together Now as a teaching tool to increase the advocacy and understanding of those without mobility deficiencies. We piloted All Together Now in a two-credit disability studies course for first-year students called "Rolling Through Life: Wheelchairs and Society." Two sections of the course were offered for students in the undergraduate colleges of Human Development and Information and Technology Studies. The topics in the course included: An introduction to disability studies and disability or "crip" culture and sexuality (Linton 1998, Kuppers and Marcus 2008, Brown 2002); Disability policy and history (Scotch 2001, Fleischer and Zames 2011); Viewings of the films "Darius Goes West" (2006) and "Murderball" (2005), both of which examine wheelchair accessibility and suitability in factual, human-centered contexts, and, finally, Navigating campus in a wheelchair (Martin, 2012).

In order for All Together Now to be used as a learning tool, we send out a disabled wheelchair user with a team of non-disabled individuals to complete their objectives. It is always important to include wheelchair users with nondisabled participants because research has shown that disability simulations, (e.g. where nondisabled people spend a period of time pretending to have a disability by using a wheelchair, using blindfolds or ear plugs, etc.) do communicate the intended messages to participants (Brown 2013, Burgstahler and Doe 2014, Flower et al. 2007, French 1992, Olson 2014). While simulations may result in some increased understanding of environmental barriers, it is also likely to increase a sense of pity for disabled people, based on distorted an inaccurate conclusions reached through the simulation experience. Thus, we made the decision to

ensure that people who were disabled wheelchair users accompany nondisabled players so that they would provide a perspective based on their actual life experiences and reactions to the barriers presented in the game. While completing his or her objectives, the disabled individual is meant to point out issues of accessibility as they progress towards their destination. In this guided tour, the non-disabled individuals become aware of accessibility concerns that they might not have been aware of previously which in turn leads to an increase in advocacy among non-disabled individuals concerning disability accommodations.

Pilot Testing

In the spring semester of 2015, we conducted two pilot tests of All Together Now at our university. The first was denoted the "expert" test and was completed by people who rely on mobility devices to get around. Participants for this study were recruited through Disability Services on campus, and were told that this was a research study. The goal of this study was to discern the usability of the game, and to gauge whether playing the game actually enhanced the players' connection to one another, self-advocacy, and ability to navigate our university. The second test was denoted the "student" test and was completed by those without mobility devices, working in teams that were led by someone with a mobility device. As mentioned above, participants in this study were students taking a seminar course on disability studies with a focus on mobility issues; although they were all required to play the game, they were not required to fill out a survey for the study. A key goal of this second study was to test the ability for the application to increase advocacy amongst "able-bodied" individuals. The expert testing group consisted

of six participants while the student testing group consisted of 15 participants. For the purposes of these tests, each participant was given two objectives to complete. The first objective sent them to a remote building on campus to find a specific room and overcome any mobility obstacles, while the second objective was to regroup in the designating meeting location to receive the communal prize. Only when each participant was at the meeting location would the prize be distributed.

For both pilot tests, we gave participants a survey that gathered both quantitative and qualitative information regarding their experience playing the game, in relation to the five goals mentioned above. A consent form was attached to the survey. Participants in the student test were also required to maintain a journal as part of a seminar course, where they provided additional information about their experience playing the game.

Results from the expert test were as follows:

- 4 out of 6 people enjoyed using the application
- 6 out of 6 people believe the activities were engaging
- 5 out of 6 people felt connected to their team while using the application
- 5 out of 6 people believed their self-advocacy was increased as a result of using the application.
- 5 out of 6 people believed they learned to navigate our university campus as a result of this application.

When asked about their biggest difficulty navigating campus, participants noted that lack of handicapped ramps, lack of handicapped parking, and unpaved roads were the biggest issues, which increased their awareness of accessibility issues around campus.

In terms of the student test, for the 7 people that filled out the survey:

- 7 out of 7 people enjoyed using the application
- 7 out of 7 people believed the activities were engaging
- 7 out of 7 people felt connected to their team while using the application
- 7 out of 7 people believed the application helped them learn about the functions of mobility devices
- 7 out of 7 people believed that this application had increased their awareness of advocacy for mobility concerns.

When asked about ways that campus could be improved for the mobility of those with disabilities, 7 out of 7 people mentioned fixing cracks in pavement as well as an increase in the number of handicapped doors around campus.

Results

As the results above show, this application most likely achieves the five goals it originally set out to achieve. The results of the survey may be called into question, however, beyond quantitative and qualitative surveys, it is difficult to measure the effectiveness of this application without noting differences in advocacy over a long span of time.

In addition to the results mentioned above, these testing conditions also helped to diagnose a major issue with the application. Given that the application communicates with Filemaker Sever, a constant connection to the Internet is necessary to keep the application open. When moving outside however, the Wi-Fi connection connecting the iPads to the Internet was dropped which effectively logged all users out of the application. Given the single-use mentality of the application mentioned above, as a user

is logged out of the application, it is impossible to return to the same conditions when logging back in. Objectives are reassigned, and all pictures taken are deleted. A simple solution to this problem would be to either use iPads connected to cellphone networks or to create a version compatible with iPhones as well to use cellphone networks.

One expert also mentioned that he or she believed that the application was impractical for use in the outside world given the sheer amount of mobility issues. Our university is a confined space that is determined to be as handicapped-accessible as possible. As a result, when moving to a larger area, objectives will be harder to define and harder to complete. A solution for this problem still must be worked out.

Conclusion

All Together Now was created as a social application to build community, increase advocacy and experience in navigation among disabled individuals. We piloted the application within a disability studies class that offered a review of disability culture, history and policy with a specific focus on the experiences of wheelchair users. According to survey results collected from both testing situations, we have achieved our goals. The game brought to life some of the barriers and issues experienced by wheelchair users that the students had been learning about in class and were able to discuss these in detail with the wheelchair users who participated in the game. While some technological concerns, such as the availability and speed of Wi-Fi, must still be addressed, this project proves that an interactive social game akin to a scavenger hunt can be used to increase awareness and advocacy among the disabled community and its allies. While testing in larger areas may prove to be an issue, this tool can be used as an

instrument for college campuses during disability orientation to help said disabled students learn how to navigate their specific campus with their own mobility devices. This multifaceted game is always undergoing changes and updates, but at its core retains the desire to help those with disabilities better navigate a world that is often lacking the proper accommodations.

Future Work

Having shown that All Together Now can be used successfully on one campus, we would like to extend its use to other campuses. This would involve working with those other campuses to create their custom emergency information. It would also require others from that campus to create appropriate objectives. This ability to create new objectives is already implemented.

The pilot tests have also illuminated several ways that All Together Now might be improved. Primary among these is creating a cellphone version of the game, so that cell services (which are much more reliable than wireless internet) can be used for maintaining constant connection to the server. At the same time, we are planning to modify the app so that the game can be continued even if connection is lost for awhile. A secondary improvement will involve creating a system of side-objectives, to go along with the main objectives, to increase engagement and encourage exploring.

Finally, Disability Support Services suggested that a similar type of game would be very useful for blind students. This will involve a complete re-working of the interface, but will greatly expand the audience for this game.

References

ADA (2016). US Department of Justice, Information and Technical Assistance on the Americans with Disabilities Act. Retrieved October 31, 2016 from: https://www.ada.gov/ada_intro.htm.

Brown, L. (2013). A Critique of Disability/Impairment Simulations. Retrieved October 31, 2016 from: https://autistichoya.files.wordpress.com/2013/02/a-critique-of-disability-impairment-simulations.pdf

Brown, S. (2002). Steven Brown (2002) What is Disability Culture? *22(2). Disability Studies Quarterly*. Retrieved October 31, 2016 from: http://dsq-sds.org/article/view/343/433

Burgstahler, S., & Doe, T. (2014). Disability-related simulations: If, when, and how to use them in professional development. *Review of Disability Studies: An International Journal*, *1*(2). Retrieved October 31, 2016 from: http://www.rds.hawaii.edu/ojs/index.php/journal/article/view/385/1183.

Darius Goes West (2006). Retrieved October 31, 2016 from: http://www.dariusgoeswest.org/

Fleischer, DZ and Zames, F. (2011). The Disability Rights Movement: From Charity to Confrontation. Philadelphia: Temple University Press.

Flower, A., Burns, M.K., & Bottsford-Miller, N.A. (2007, March/April). Meta-analysis of disability simulation research. *Remedial and Special Education, 28(2)*, 72-79.

French, S. (1992). Simulation exercises in disability awareness training: A critique. *Disability, Handicap & Society, 7(3),* 257-266.

Hamilton , L.H. (2000), Backlash against the ADA: Interdisciplinary Perspectives and Implications for Social Justice Strategies, *21 Berkeley J. Emp. & Lab. L. 1* . Retrieved October 31, 2016 from: http://scholarship.law.berkeley.edu/bjell/vol21/iss1/1

Kuppers, P. and Marcus N. (2008). Cripple Poetics: A Love Story. Ypsilanti Michigan: Homofactus Press.

Linton, S. (1998). Claiming Disability. New York: NYU Press.

Martin, R. (2012). Campus as Obstacle Course. *New York Times, October 30, 2012*. Retrieved October 31, 2016 from: http://www.nytimes.com/2012/11/04/education/edlife/a-wheelchair-tour-of-morningside-college-in-sioux-city-iowa.html?pagewanted=all

Murderball (2005). Retrieved October 31, 2016 from: http://www.murderballmovie.com/about.html

Olson, T. (2014). Retrieved October 31, 2016 "How Disability Simulations Promote Damaging Stereotypes. Braille Monitor. 57(1). from: https://nfb.org/images/nfb/publications/bm/bm14/bm1401/bm140107.htm

Ross, K. (2008). College President Tries Wheels, *The Republican*, (Thursday, March 27, 2008). Retrieved October 31, 2016 from:

http://www.masslive.com/chicopeeholyoke/republican/index.ssf?/base/news-13/120660243598000.xml&coll=1.

Scotch, R. (2001). From Good Will To Civil Rights: Transforming Federal Disability Policy. Philadelphia: Temple University Press.

Sung, H. Y., & Hwang, G. J. (2013). A collaborative game-based learning approach to improving students' learning performance in science courses. *Computers & Education, 63*, 43-51. doi:10.1016/j.compedu.2012.11.019

USDOJ (2016). U.S. Department of Justice, Civil Rights Division, The ADA and City Governments – Common Problems, Disability Rights Section. Retrieved October 31, 2016 from: http://www.ada.gov/comprob.htm.

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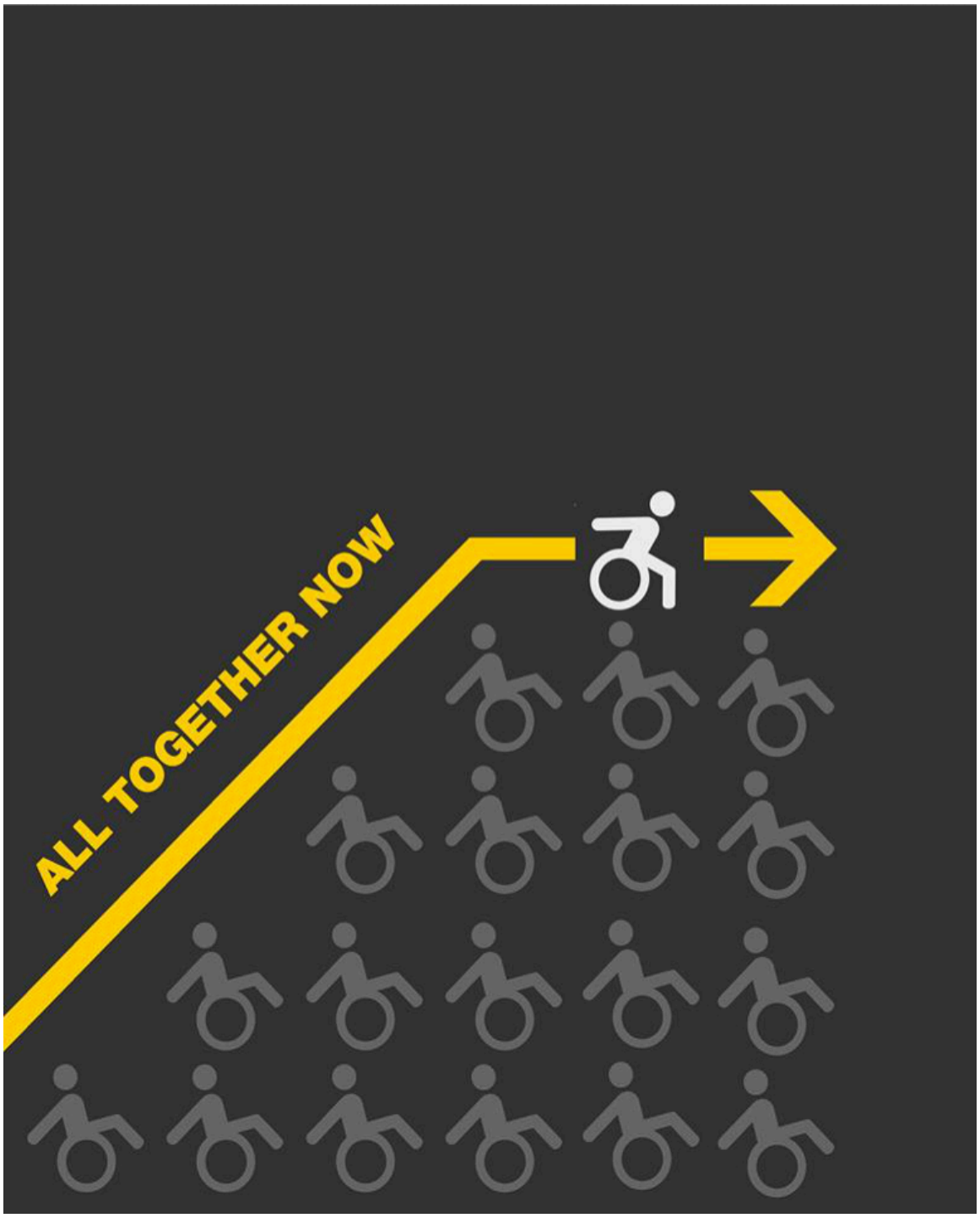

Figure 1. Opening screen for All Together Now

Figure 2. Main menu for All Together Now

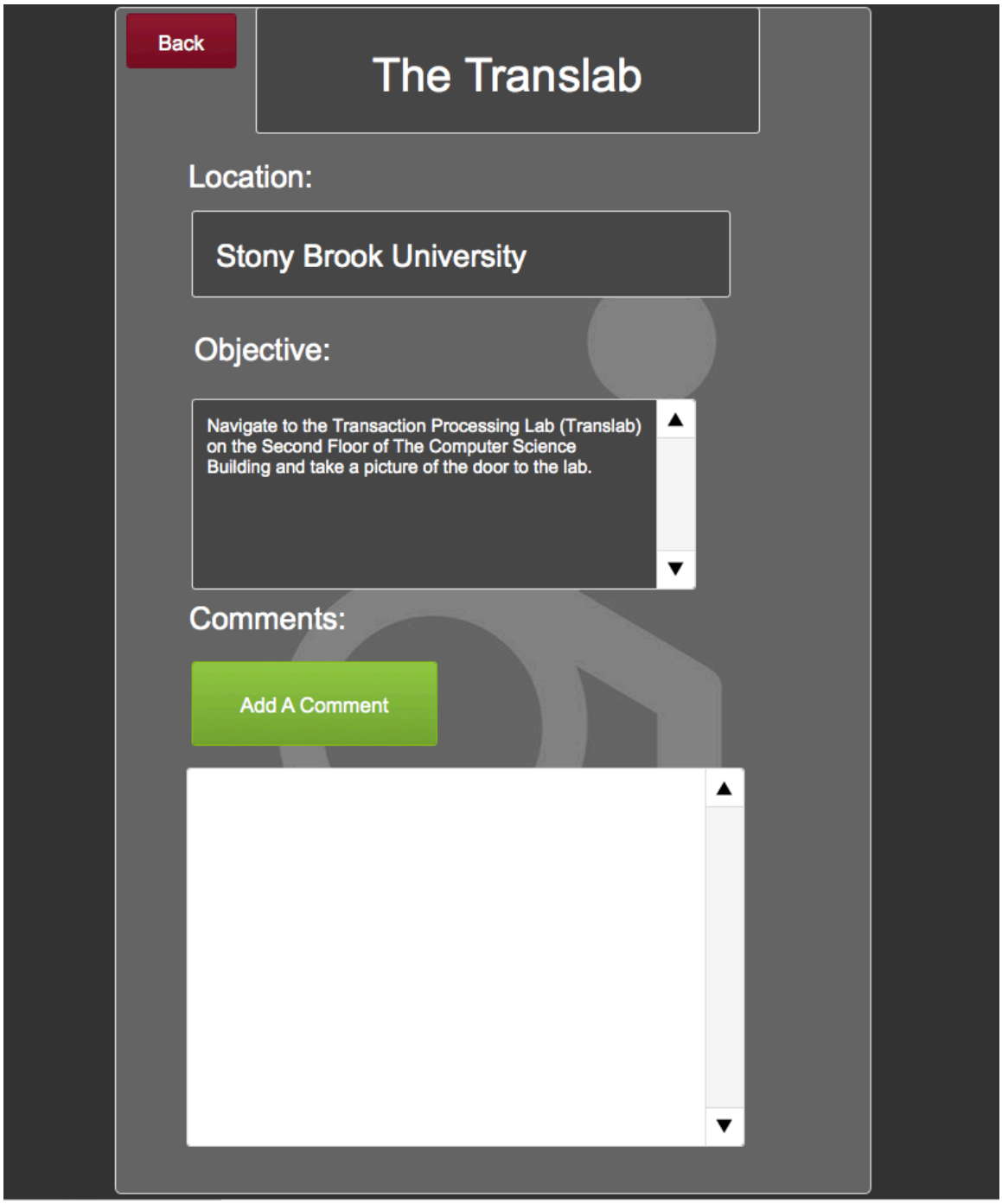

Figure 3. Example of an objective given to a player