



(A Mobile Application that Encourages  
Adolescent and Teen Girls to Exercise)

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## I) Project Description

Chick Clique is a pervasive mobile application that is focused towards helping adolescents and teens to develop healthy exercise and eating habits. It is designed for a group of up to four friends. These groups of friends are to engage in friendly competition, in which the groups walking statistics are tracked. This competition encourages the girls to stay physical fit by exploiting the girls social desire to continue to stay connected with their peers. Girls in a clique collect, share, and compare personal fitness information within their clique. This impacts their activity level and overall health awareness. Each girl in a clique, must enter their clique list into the Chick Clique application using the *setup* and *edit clique* menus. Text messages are sent to everyone in a clique at specific times throughout the day to notify all clique members of the clique's performance. The text messages also indicate where each clique member is in terms of achieving their individual step goal for the day. The Chick Clique application is designed to give positive feedback to the girls when they reach their individual step goals.

## II) Motivation for Chick Clique

A lack of physical activity and poor dietary habits has tripled the prevalence of overweight adolescents and teens in the United States. Sadly, because of current adolescent and teen obesity trends some researchers believe that the current generation of children may not outlive their parents. This project targets young girls, because they tend to become less active during their adolescents and twice as likely to use unsafe dieting practices.

## III) The Goal of Chick Clique

The goal of this application is to test the effectiveness of using pervasive technology to generate change in the thinking and health practice behaviors of adolescent and teen girls. Chick Clique focuses on motivating girls to change their fitness and health practices by using pervasive technology to encourage them to monitor their behavior.

## IV) User Studies Conducted

### 1. Paper Prototype

A paper prototype was developed in order to test the usability of the Chick Clique application interface. The teenage girls that were interviewed found the interface easy to use and liked the ideal of putting the application on a cell phone. However, a few of the girls were afraid that the concept of competition for Chick Clique might lead to excessive exercise. During this user study pedometers were used by the girls to track how many steps they had taken during the day. A lot of the girls were highly interested in having the tracking of their step counts automated so that the Click Clique application,

instead of a pedometer, would keep track of their step count. This was due to their hectic lifestyles and related forgetfulness.

## 2. Personal Digital Assistant Prototype

A working prototype of Click Clique was implemented on a personal digital assistant (PDA) using the critique of the previous paper prototype user study. The software for Click Clique was written in Visual Basic .NET and storage limitations and interface design (e.g. size of display) were considered as preparation for later implementation of the application on a cell phone. This prototype included clique list entry, personal program set up, group and individual progress reports, and food tips tools. A weekend pilot study in which the developers of the application tested the application on themselves was conducted. The developers found the application easy to use. They said it made them competitive and walk more. A user study for the prototype was also conducted on two groups of girls who used pedometers to monitor their step counts and entered their step counts into the PDAs. One group consisted of four high school girls and the other consisted of three middle school girls. Each girl was given a PDA prototype and pedometer that they used for four days. The automatic text messaging of step updates was simulated by the girls using text or instant message at specified times each day. For two days the girls used just the pedometer and reported their step counts by phone.

Pre-study and post-study interviews and questionnaires were conducted, which yielded interesting results. The pre-study questionnaire found that four of the seven participants were actively engaged in some type of daily physical or exercising activity. One of the participants owned a pedometer and none owned PDAs. All the girls rated Chick Clique very easy to use and displayed no fear of using the PDAs, despite the fact that they had never used one before. The post-study questionnaire revealed that group performance was the most powerful motivating method of causing the girls to engage in healthy exercise and eating behaviors.

The high school girls tended to carry out more steps using just Chick Clique and the middle schools carried out more steps using just the pedometer. This implied that teenage or older girls might benefit more from this type of pervasive technology. The mixed results may be due to the fact that the middle school girls were on vacation from school when using the PDA prototype, but had resumed their regular sport team practices when they used the pedometer alone.

Chick Cliques also raised the girls' awareness of the relationship between food, exercise, and health. Many girls said they loved the food tips tool implemented in Chick Clique. They felt that the PDA prototype of Chick Clique made them more healthy and made them more comfortable with talking to each other about fitness and health issues.

## V) Upcoming User Studies

### 1. Nokia Cellular Phone Implementation

The Security for Ubiquitous Research Group at Indiana University plans to conduct a user study of a full implementation of Chick Clique on Nokia cell phones in the Fall. Copies of the text messages the girls' send to each other through Chick Clique will be stored in a back-end database to be used for daily observational purposes. Participants will visit an online web diary for Chick Clique to view charts and graphs of their step progress on a daily basis. This web diary will also give the participants the opportunity to comment on how each text message they received on the current day made them feel. They will also be asked survey questions and will be given the opportunity to enter any other additional comments.

My contribution to this project was writing the parseEmail.pl perl script for copying and forwarding text messages of Chick Clique participants, creating the MySQL database to store the copies in, and creating the Chick Clique Web Diary.

## VI) Technologies Used

### 1. Pervasive technology

A form of technology used to alter people's behavior and thinking patterns in non-commercial domains such as fitness and healthcare.

### 2. Nokia 6602 cellular phone

The type of cellular phone used for the Chick Clique Application.

### 3. Eclipse

Eclipse is an open source platform-independent software framework for delivering what the project calls "rich-client applications" (as opposed to "thin clients", this means the clients perform heavy-duty work on the host running the application). ...

### 4. EclipseMe

An Eclipse plug-in to help develop J2ME MIDlets. J2ME MIDlets are mobile applications written in Java 2 Micro Edition.

### 5. Carbide.j

A Nokia Developers tool used for packaging, signing, and deploying J2ME MIDlets.

6. J2ME Polish

An advanced build tool and GUI for J2ME applications.

7. Apache Ant

Apache Ant is a Java based build tool that aides in compiling and packaging the classes of a J2ME MIDlet Suite project.

8. Java2 Micro Edition Wireless Toolkit

Java 2, Micro Edition Toolkit is a group of specifications and Technologies that pertain to Java on small devices. The J2ME moniker covers a wide range of devices, from pagers and mobile telephones through set-top boxes and car navigation systems. The J2ME world is divided into configurations and profiles, specifications that describes a Java environment for a specific class of device.[9]

9. HTML

Hypertext Markup Language is the authoring software language used on the Internet's World Wide Web. HTML is used for creating World Wide Web pages.

10. Perl

Practical Extraction and Reporting Language is an open source server side programming language extensively used for web scripts and to process data passed via the Common Gateway Interface from HTML forms etc. Perl scripts are not embedded within HTML pages and do not download to the web browser but reside on the server. They execute by being triggered from commands within HTML pages or other scripts and may produce HTML output that does download to the web browser.

11. PHP

PHP: Hypertext Preprocessor is an open source [server side](#) programming language extensively used for web scripts and to process data passed via the [Common Gateway Interface](#) from HTML forms etc. PHP can be written as scripts that reside on the server and may produce HTML output that downloads to the web browser.

Alternatively, PHP can be embedded within HTML pages that are then saved with a .php file extension. The PHP sections of the page are then parsed by the PHP engine on the server and the PHP code stripped out before the page is downloaded to the web browser. The name is a bit of a programming joke (if there is such a thing) since it's a recursive acronym i.e. the P in PHP stands for PHP.

## 12. MySQL

MySQL (pronounced "my ess cue el") is an open source relational database management system (RDBMS) that uses Structured Query Language (SQL), the most popular language for adding, accessing, and processing data in a database. Because it is open source, anyone can download MySQL and tailor it to their needs in accordance with the general public license. MySQL is noted mainly for its speed, reliability, and flexibility.

## 13. SQL

Structured Query Language (SQL), pronounced "sequel", is a language that provides an interface to relational database systems. It was developed by IBM in the 1970s for use in System R. SQL is a de facto standard, as well as an ISO and ANSI standard.

## 14. Procmail

Procmail is a mail delivery agent (MDA) or mail filter, a program to process incoming emails on a computer, widely used on Unix systems. It is typically invoked from an MTA like Sendmail; this makes the mail processing event-driven. The companion-tool formail allows procmail to be used in batch-processing on mail that already is in your mailbox.

## 15. .forward

A file used in an email account to forward incoming email messages and text messages to a desired location.

## **VII) Conclusion**

Chick Clique is a pervasive mobile health and fitness monitoring application. It offers a way to reach out to young women who need encouragement or motivation to continue eating healthy and staying physically fit. Chick Clique changes the isolated process of self-monitoring into a supportive, cooperative process that allows friends to share personal fitness information and encourage one another through positive and constructive feedback.

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