
Authentication At Hogwarts: Lessons in Security Usability From the Wizarding World of Harry Potter

Ann-Marie Horcher

Central Michigan University
Mt. Pleasant, MI
horcher@nova.edu

Michele Weigel Bartosek

Central Michigan University
Mt. Pleasant, MI
barto1ma@cmich.edu

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Abstract

Security usability is a complex topic of critical importance to any computer user which, these days, can be almost anyone. Examples illustrating security usability concepts from a well-known and well-loved literary source like Harry Potter enhance both recognition and retention. Traditionally people have learned life lessons from fables, fairy tales, parables and even urban legends. The ubiquity and popularity of the wizarding world of Harry Potter makes it a highly accessible source to mine for security usability education.

Author Keywords

Security Usability; Folk Models, Mental Models

ACM Classification Keywords

H.5.2 [Information Interfaces and Presentation]: User Interfaces—evaluation/methodology, user-centered design;

Introduction

Cybersecurity is a complex topic of critical importance to any computer user which, these days, can be almost anyone [22]. The increase in cybercrime, particularly targeting the ignorant makes security education

essential [19]. Helping computer users in the general population as well as university students understand the intricacies of how a lack of usability combined with human nature can undermine any security measure [6] requires examples to which they can relate.

The Harry Potter book series by J.K. Rowling has been both a literary and cultural phenomena, changing the rules of book marketing and reaching an unprecedented audience of readers worldwide [2]. Beyond the obvious use of the series to instruct on literature [20], Harry Potter has been successfully used to teach mathematics [23], politics [5], psychology [4], and even foreign languages [11]. An examination of the seven Harry Potter books reveals a wealth of examples of usable security best practices and failures that could be used in security awareness education.

Background

Non-expert computer users do not typically receive formal security education [21]. Updates through the media don't translate to informed decisions because the users lack a theoretical grounding to absorb the complex topic. Research on the use of folk models to communicate security information has revealed stories are a powerful source of security information [12]. The sources of the informal information exchange are trusted and the concepts are expressed in an entertaining fashion which makes the information easy to recall and understand [24].

Security advice dispensed by relatable characters in television shows was shown to be an effective teaching tool [13]. Folk models and fairy tales are also used to communicate complicated usable security technology concepts, as shown by paper titles such as "Goldilocks

and the two mobile devices: going beyond all-or-nothing access to a device's applications" presented at SOUPS 2012 [8].

Security in the Wizarding World

Connecting security awareness, typically not a popular topic, with the immensely popular Harry Potter series creates a pleasant experience for the learner that improves retention. Using the ripple model of education motivation in computer science education [3], the dangers of cybersecurity drive the "Need to learn" ripple and the familiarity and positive associations of the Harry Potter context drive the "Want to learn" ripple. The combined ripples produce a much higher effect than either alone, just like the additive property of synchronized waves. The learning outcome is to better retain the concepts of security usability and practices over time, as well as during the presentation of material. In addition, non-expert users are more likely follow security advice they understand and, consequently, believe [10].

For today's learners, the use of Harry Potter reaches them with a reference probably well-known from their childhood [9]. References to Harry Potter abound in pop culture, much like Shakespeare quotes that are easily recognized. This ubiquity yields a wealth of audio and visual materials to deploy in the classroom to illustrate the examples. Therefore the examples can be introduced with a wide range of activities that involve students in active learning, an approach proven to be effective in the information systems context [7]. In addition to the books themselves, there are also audio recordings and movie adaptations. The Harry Potter world has also has an extensive collection of music inspired by the books known as Wizard Wrock [1].

These songs from over 500 bands elaborate upon concepts from the books, and provide mnemonics to remember specific information.











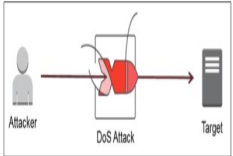

Figure 1: Reminding participants of known security stories

The Content

The security concepts chosen for the first presentation were extracted from the security awareness chapter of a college level text on Information Systems. These included phishing, password-hacking, authentication, and other topics that appear in Table 1. Each of the concepts was then mapped to an incident in the Harry Potter series of stories.

Various multi-media methods are used to present the concepts. Though all of the topics have a reference within the books, and on audio-recordings of the books, a subset also have been illustrated within the films adapted from the book. In addition there is a large collection of fan art depicting the Harry Potter content not illustrated in the books.

Table 1: Subset of Security Concepts and HP Reference

Security Concept	Harry Potter Reference
Trojan virus 	Tom Riddle's diary  Chamber of Secrets [14]
Encryption 	Marauder's Map  Prisoner of Azkaban[15]
Biometric authentication 	Voldemort's Cave guarding the Slytherin ring  Deathly Hallows [18]
Two Factor Authentication 	Questions about private info to verify identity of Order member  Order of the Phoenix [17]
Denial of Service Attack 	Owl delivery  inundating Dursley home Sorcerer's Stone [16]

Assessment of Hogwarts as Security Model

The participants are told they are attending a talk on security usability and awareness. As the session begins, a pre-education assessment is done using a mobile app with ten questions. Next the materials introducing security usability and best practices are presented using video and audio Harry Potter examples. The concepts illustrated in the first version of the presentation include hacking and password change issues (Harry breaking into Dumbledore's office), two-factor and passive authentication (Ravenclaw common room), passwords (Slytherin common room), poor security (Hufflepuff common room), identity theft (Moody/polyjuice), and password management (Neville's password list).

Midway through the lecture, the participants' comprehension is assessed using polling the Poll Anywhere software. The results of the poll, which participants respond to using a smartphone/tablet, are displayed live. Three weeks after the discussion participants are requested to take a follow-up quiz to track retention over time in exchange for an incentive.

Results and Discussion

The participants show a 85-90% retention of the basic security concepts at the time of the lecture. In the pilot version of the study, the three week follow-up is still in progress.

The earlier version of the Harry Potter material did not have an attached assessment. However the material was presented on a week's time, and each succeeding group had a larger percentage of attendees who had heard about the Harry Potter theme. The next step will

be to add a component to the pre-assessment to see if the Harry Potter security stories are travelling.

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