

# Web-based Interactive Stories for Cyber Education

# CyberWISE

There is a pressing need for more and better education about basic principles of safe computing. Cyber security is no longer the exclusive domain of specialists, but something everyone should be familiar with. With the rapid evolution of risks, awareness education needs to be an ongoing process. Educators need tools to help impart memorable and meaningful lessons to students at all levels, from children to seniors, students to the workforce, novice to professional.

This is hard because complacency is the enemy. The target audience must be made to understand that:

1. Risks apply to *them*
2. The risks, and consequences, are *real*
3. There are things they *can* and *should* do to reduce those risks

Explaining cause and effect of cyber events can be difficult: they don't always occur in a context that is easily or immediately visible.

***How can we help people of all ages and backgrounds explore both risky and safe cyber behaviors, make choices, and see the consequences of those choices all in a safe environment?***

## Branching interactive storytelling

Stories are powerful teaching tools: they build on prior experience through analogy and metaphor, and can be used with any group (students to workforce, kids and adults). Branching, graphic "choose your own adventure" stories take it further by letting readers make choices on behalf of a character, causing the story to follow a variety of branches with different outcomes.

This is a novel genre for teaching safe computing because these stories give the learner an opportunity to **make decisions** and, more importantly, **explore the consequences** of those decisions in a **safe environment**.

Until now, creating these branching, graphic stories as curricula has been labor-intensive, requiring the combined skills of domain experts, education scientists, graphic artists, and programmers.

## The CyberWISE solution

CyberWISE is a tool for educators that integrates the curricula- and comic-creation workflows; you build your lesson and the interactive story that will teach that lesson all in one integrated process. There's no need to acquire, learn, and integrate a basket of unrelated tools. The unified user interface of CyberWISE lets you plan, design, and create graphic branching stories in a single easy to use web-based application. And the best part is that no programmers or artists are required.

**Plan the lesson** CyberWISE guides you to identify important attributes of target learners, and information about the specific topic such as key concepts and *real-life scenarios*, including decisions and choices that illustrate the concepts being taught. You define specific learning objectives within the context of **Bloom's Taxonomy**, and the real-life scenarios can be associated with learning concepts.

**Write the script** The lesson plan helps develop the script. Scenarios appear as possible story scenes, and creating additional scenes and choices grows the branching storyline as a *graph*, showing the relationship of scenes and branches in the story. Choices from a scene are associated to specific learning objectives, and are connected to scenes that illustrate the consequences of the choice.

**Layout the storyboard** After completing the branching script you begin storyboarding the comic, using a collection of comic panel layouts and a library of low-fidelity graphics. The selection of graphic assets are intentionally constrained in this phase, to focus on dividing the visual layout between text (dialog and narration) and pictures (characters, setting, props, and actions).

**Create the final comic** Once the storyboard is complete, CyberWISE helps you turn it into final artwork comic panels. A deep library of higher-quality graphic assets is provided, so you can assemble a visually compelling work with no artistic skills required. The comic is then ready to be made available to your learners, under your complete control.



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## Uses

Interactive graphic stories can be powerful teaching tools for many environments, including:

- Education in K-12 classroom
- Informal education, such as after-school and community groups
- Member-awareness campaigns by organizations
- Organizational safe computing awareness and workforce education
- “Continuing Ed” for technologists and cyber security specialists

There are other uses beyond initial instruction, including:

- Use as evaluation tool (testing) or for exploratory learning
- Use as a “capstone exercise” for learners: they create a comic to demonstrate their mastery of the topic

## Looking ahead

CyberWISE is a long-term initiative that will expand the reach and impact of critically important lessons. We have already identified ways to grow the technology to increase its value.

**Collaboration** CyberWISE will support sharing of comic assets at *any* phase in the workflow. This will allow educators to develop their own local repositories of safe computing materials, either for internal curriculum development, or as participants in sponsored cyber security competitions. Sharing of new seed material with among educators will further enrich the available cyber security curriculum.

**Exercises and competitions** have been well established as powerful vehicles for raising cyber security awareness. CyberWISE can become a valuable component of these activities:

- It can be used to visually tell the story of a cyber exercise, either during the process or as a review.
- CyberWISE itself can be the competition vehicle, for example letting school children create and distribute interactive stories to see who creates the toughest challenge and who has the most success in following the story to a successful conclusion.

## System Specifications

CyberWISE is a web-hosted application that requires, at minimum, Microsoft IIS 7.5 and SQL Server 2012, on Windows 7. It can be hosted internally, or in the cloud.

Users access CyberWISE through a web browser. Firefox, Chrome, and Internet Explorer 11 are explicitly supported, but CyberWISE will likely run properly on any contemporary browser that supports HTML5.

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## Key Benefits

### Innovative Education

- A new cyber security educational technology that is engaging to learners across many age groups
- Provides visual interface to story structure, greatly simplifying the task of modifying a branching story

### Rapid Development

- Create cyber curricula using branching graphic stories in days, rather than the weeks required by current manual process

### Easy to Deploy and Use

- No distribution or per-user fees: once you create a story you can use it as much as you like
- Supports deployment-specific branding for seamless integration into your environment

## What’s special about CyberWISE?

There are partial solutions in the market (Pixton, Bitstrips for Schools, ToonDoo, Storyboard That, ComicLife, Toontastic, and more) but they all have their limitations. Among them are:

- They require programming and/or artistic skills
- No support for multiple branching graphic story lines
- Costly and complicated software license fees associated with each user or deployment
- Minimal support for curriculum development (learning objectives, scenarios, metadata, etc.)
- Restricted access: you can only use their website to deliver content, you can’t host it yourself or brand it as your own

CyberWISE is designed to overcome these obstacles, making it easy for educators with all sorts of skillsets and all range of budgets, to create and deploy interactive graphic stories.



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