# Availability of Open Educational Resources for IS Security

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## Abstract

This poster describes an ongoing research project to survey currently available Open Educational Resources (OERs) for potential use in an Information Systems Security (ISS) curriculum. Key phrases representative of information security topics were extracted from learning objectives for an introductory course in the Information Systems Security track of the undergraduate Computer Information Systems program at a large private-sector university. These key phrases were submitted as search terms to major OER repository sites. Faculty subject matter experts reviewed the search results and assessed each OER for relevance, quality, appropriate licensing, and suitability for use in the course. Acceptable OERs were categorized by learning objective, forming a pre-screened resource pool for updating and enriching the course. Preliminary findings indicate that currently available OERs can make a significant contribution to an ISS curriculum, but gaps exist for important topics; moreover, considerable effort is required to find and validate these resources. In addition to illuminating the availability of OERs for ISS education, this research outlines a systematic process for OER discovery, assessment, and cataloging that may be applicable for other disciplines.

## About OERs

- Digital materials for teaching and learning that are freely available online for adaption, repurposing, and reuse (Geser, 2012)
- Potential to reduce costs and improve quality of course development through reuse
- Issues encountered (Richards, Marshall, & Ives, 2010):
  - Availability
  - Discoverability
  - Quality
  - Suitability for specific applications
- An OER recommender system based on key phrases extracted from course syllabi via machine learning algorithms delivered promising results (Walker, 2012)

## Objectives of Current Study

- Assess availability of OERs suitable for use in an introductory Information Systems Security course for undergraduates
- Explore feasibility of a semi-automated process for finding and cataloging OERs based on course learning objectives

## OER Examples

**C-Bay's Security Policy Critique**

Experiential Learning Center (http://elc.fhda.edu/faculty/available.html)

Students review an online real estate auction company's flawed security policy and make recommendations


**SecurityXperts**

IE Learning Network, S.A. – Instituto de Empresa S.L. (http://openmultimedia.ie.edu/openproducts/securityxperts_i/securityxperts_i/index.html)

Interactive game/case study of technical and legal concepts in information security

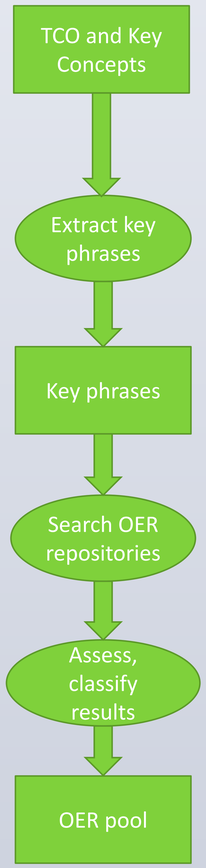

## The Course: Principles of IS Security

- Broad overview of information systems security in organizations
- Required course for all students in BS-CIS program
- Introduction to specialty for students on IS Security track (prerequisite to all later specialty courses)
- Students on other tracks may or may not take additional security courses
- Offered in online and blended delivery modalities

**Terminal Course Objectives (TCOs)**

- Basic concepts and terms pertaining to security of an organization
- Security management including risk management, security policies, and security education
- Security mechanisms and controls
- Cryptographic encryption
- Telecommunications and networking security standards
- Security concerns for application/system development
- Outage or loss of service mitigation (business continuity)
- Legal and privacy aspects of security
- Computer-related crime investigation and forensics

## OER Discovery and Assessment Process




Example: Given a security case, describe the investigation process and evidence as it relates to a computer-related crime.

- Describe the collecting of evidence.
- Describe the steps in and importance of the evidence chain of custody.

Alchemy keyword extraction API from AlchemyAPI, Inc. (http://www.alchemyapi.com/)

Examples:
"evidence chain"
"computer-related crime"
"security case"
"investigation process"

MERLOT (http://merlot.org)
openstax CNX (http://cnx.org)
OER Commons (http://oercommons.org)

By faculty Subject Matter Experts

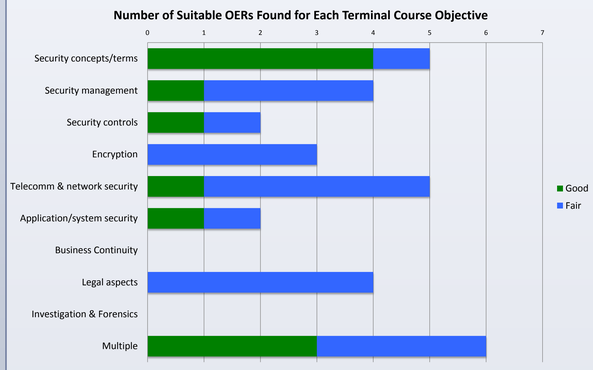
- Relevance
- Quality
- Licensing
- Overall suitability

Scale: 1=poor, 2=fair, 3=good

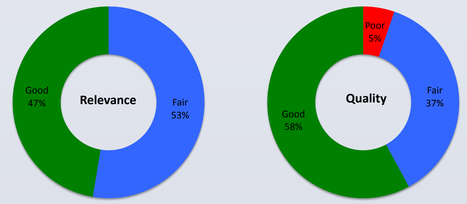
Pre-screened, available for course development and improvement

## Results

- Identified a total of **38** relevant OERs (relevance fair or good)
- Of these, **31** were suitable for use in the course
  - Fair suitability: 20 (usable with limitations /changes)
  - Good suitability: 11 (highly usable as is)

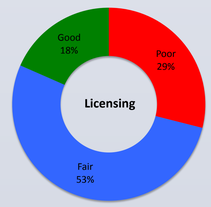


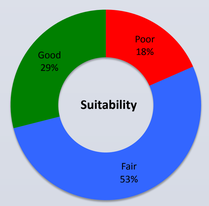

**Subject Matter Expert Ratings of Relevant OERs (Relevance Fair or Good)**



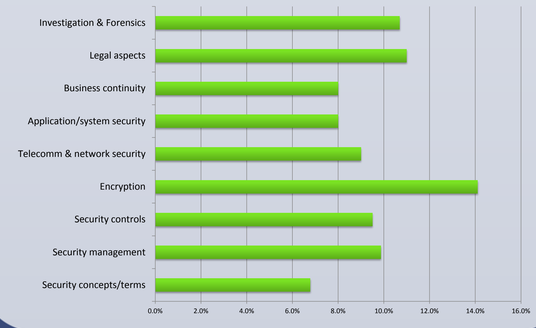







**Precision of Search Results for Terminal Course Objective Keywords**




## Conclusions

- Various suitable OERs are available to enrich an introductory IS security course
- In the repositories surveyed:
  - OER availability appears greatest for **basic security concepts** and **telecommunications/network security**.
  - OER availability appears limited for **business continuity** and **investigation/forensics**.
- Several OERs address multiple security topics and could be used at two or more points in the course, or in an introductory or summary activity
- Of the three repositories surveyed, MERLOT was the richest source for IS security OERs
- IS security OERs are available in many types and formats, including books, simulations, tutorials, drill and practice exercises, case studies, references, presentations, animations, and complete courses
- Quality of OERs found was generally high
- Licensing is a significant issue
  - No licensing or unclear licensing
  - Restrictive licensing
  - Registration required for access
  - Fee for access
- Search using extracted key phrases from TCOs found relevant OERs, but precision was poor
- Significant expert manual effort was required to screen, rate, and properly classify OERs
- The workflow used here may be helpful in creating course resource pools, but further improvements in OER search tools are needed

**Next Steps**

- Improve key phrase extraction (special-purpose tool)
- Improve repository search (Google custom search)
- Include additional repositories
- Apply to additional courses
- Incorporate OERs into course and observe effects

## References

Geser, G. (Ed.) (2012). *Open educational practices and resources: OLCOS roadmap 2012*. Open e-Learning Content Observatory Services. Retrieved from http://www.olcos.org/english/roadmap/

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