

# Teaching Information Assurance Online

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## ABSTRACT

*Cyber security threats, systems vulnerabilities, privacy concerns, and other security developments are progressing and proliferating rapidly.*

*This article describes experience accumulated in teaching an online Information Assurance course at a 4-year college for graduate and undergraduate students. The course content is based on the security curriculum structured by ten security domains of knowledge, as defined by the (ISC)<sup>2</sup> for professional certification programs CISSP of (ISC)<sup>2</sup>. Only eight out of ten domains are included in the 10-week IA-Study course. The courses uses several basic e-learning activities - online studies supported with Via Voice-narrated slides presentation, video presentation, online reference book and supplemental readings; collaborative and individual coursework supported by Online WorkBook (WB) in Google Docs, assessment quizzes administered online via Blackboard/WebCT, and team/class discussions and networking supported with a dedicated Google Blog.*

*WB facilitates collaborative students' work using Wiki technology; it provides both work instructions and the place to submit the students work. Using a log in the Google Docs, the instructor can see individual contributions of team members to a collaborative project. In addition, each team is required to submit members' peer evaluations.*

*WikiDigest project – a value-added work-in-progress - opens opportunities for the instructor and the students to work together on collecting Tips and Recommendations for an Information Security Awareness knowledge base that can be used on campus by students and faculty.*

*In conclusion, the article reviews students' perceptions of online learning such as acceptance of online learning in general, time needed and actually spent to study the course, and effectiveness of team collaboration.*

**Keywords:** E-learning; Information Security; Collaborative Learning; Google Technology

## INTRODUCTION

Unprecedented growth of Internet communications and applications brings formidable security challenges. Responses from the academic community have been ranging from setting Information Assurance Awareness programs to pursuing advanced studies. Some information security training programs for professionals are available online. With proliferation of online teaching and learning at colleges and universities, there is also a need for online graduate and undergraduate courses in information assurance.

This article describes an online course in Information Assurance with Creative Use of Technology (IA-Study) developed and implemented at California State University, Los Angeles (CSULA) in the Fall 2008 – Spring 2010 for matriculated graduate and undergraduate students. Another, but *unsupervised*, online training - Information Assurance Awareness (IA-Aware) as a public service program for faculty and students - is under development.

The IA-Study is focused on the Common Body of Knowledge defined by The International Information Systems Security Certification Consortium, Inc. - (ISC)<sup>2</sup> - for its primary professional certification program - CISSP® - *Certified Information Systems Security Professional*. (ISC<sup>2</sup>, 2010)

The online IA-Study course is based on the concepts of meaningful and ongoing collaboration among students, with the ultimate goal of enhancing the teaching, learning, and professional contributions by the students and the instructor.

*Discipline Amplifications* is one of the concepts of the IA-Study course. Its purpose is meeting diverse and distinct needs of students that seek Information Assurance knowledge in a variety of fields within and outside of traditional Computer Information Systems (CIS) curriculum (e.g., IS management, healthcare management, accounting, criminal justice, etc.). Thus, two discipline amplifications have been already implemented - HIPAA for healthcare management and Computer Forensics for CIS and accounting students.

*The Learning Management Platform* of the online IA-Study course consists of several multimedia-enabled components - Blackboard/WebCT, Google Sites, Google Docs, Google Blog, Merlot, YouTube, Web, etc. The tools of the platform are selected based on the purpose and functions that are demanded by individual learning tasks.

*Methodologically*, the IA-Study is divided into weekly modules, each of which includes studies, collaborative team practical work, quizzes/tests and assessments, contributions to the test databank, contributions to the Information Security Tips and Recommendations in the Information Security Awareness knowledgebase.

The *content* of the IA-Study is composed using materials developed by educators, industry practitioners, and the author of this project.

## **IT e-LEARNING PLATFORM**

Often, at conferences on online teaching and learning, there are proponents of one exclusive tool for e-learning vs. another. Such emphasis on exclusivity might be misleading. The focus in selecting an Information Technology (IT) platform for e-learning must be on the objectives and functions of learning that need to be supported with e-learning tools.

Consequently, no one tool (at least for now) can serve all functions, and probably never will as the knowledge is being dispersed more and more across the Internet and new knowledge networks are being created from time to time. An educator should evaluate and select the tools that will closely support the chosen objectives and tasks of e-learning. For example, an educator may wish to simplify and reduce the number of tools used when dealing with the audience that does not possess prior knowledge about the information technology (IT) tools or cannot follow the steep curve of learning them quickly. Contrary to that, the information technology courses can utilize a large set of IT tools without any significant impact on the students' ability to use them all.

The *Learning Management Platform* of the IA-Study course consists of several functional components, each supported by a specific IT tool as shown in Figure 1.

There are four basic functional areas for e-learning: a) study of learning materials in a repository, b) learning assessments, c) collaborative assignments, and d) online discussions:

- *Learning materials* are obviously at the core of the platform; they are residing on a Google Site – *ia.onlineprofessor.info* (where IA - Information Assurance). Links are provided to other Web resources such as Merlot, YouTube, and variety of websites.
- *Learning assessments* include graded activities such as quizzes and online tests, completed assignments (projects, lab assignments, etc.), team self-evaluation, etc. The assessments are supported with *Blackboard/WebCT* software.

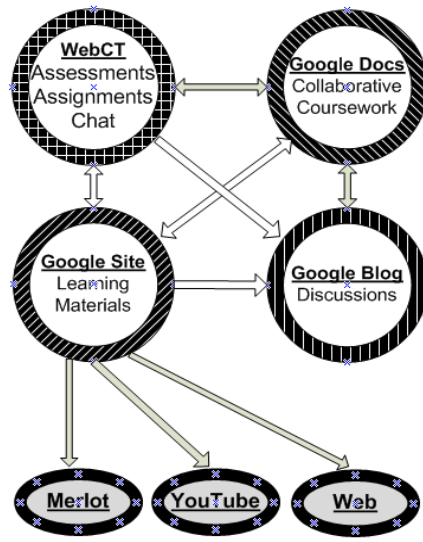


Figure 1: Learning Management Platform

- *Collaborative assignments* include multitude of tasks assigned to students individually or to a team collectively. This functional area requires strong collaborative software such as Google Docs – [docs.onlineprofessor.info](http://docs.onlineprofessor.info). The structure and management of collaborative work are discussed below.
- *Online discussions/interactions* are the closest alternative to face-to-face (F2F) exchanges among the participants of online courses. In this course, online discussions are implemented using Google Blog – [blog.onlineprofessor.info](http://blog.onlineprofessor.info).

Some of these components (e.g., collaborative assignments) may require students to install client software on their home computers, and the Internet access is must. The course includes the Learning Tools module that familiarizes students with the components of the e-Learning Platform.

## COURSE CONTENT

Information Security is a multidisciplinary science. The thrust of this course is on learning diverse domains of information security specified by the (ISC)<sup>2</sup> for CISSP. Due to limited time (10-week study course), only eight (out of ten) domains are included in the course:

- Access Control
- Application Security (excluded)
- Business Continuity and Disaster Recovery Planning
- Cryptography
- Information Security and Risk Management
- Legal, Regulations, Compliance and Investigations
- Operations Security (excluded)
- Physical (Environmental) Security
- Security Architecture and Design
- Telecommunications and Network Security

The material is large and spreads across several disciplines. But the benefits of learning are proportionally significant. This class is not intended for in-depth comprehensive coverage of each domain of knowledge starting from fundamentals; rather it is a summation of pre-requisites in Information Technology with an additional layer of security.

An information systems security professional in charge of managing the overall information security of an organization needs a broad knowledge of security issues that would allow him/her to see the implications of vulnerabilities and defenses for the entire organization no matter where these vulnerabilities/defenses took place. Such broad coverage of diverse topics may present a challenge for learners.

One of the design considerations for this course was to give preference to the learning materials available online in public domain. It is not unusual for some authors, who recognize the need for free access to knowledge, to publish their books (as short versions or in their entirety) on the Web. However, such free online copies are frequently hard to read and are incomplete without the supplemental materials otherwise available with the printed copies. Although, a shorten version of the textbook for the IA-Study course has also been available online, students choose a printed edition with a CD containing a test bank of questions and answers.

Cyber Security is not an activity limited to a narrowly defined group of people; it involves the entire personnel of the organization and public security awareness. The level of the security awareness differs among computer end-users, organization executives, and general public and should be assessed prior to studies of the course content. Therefore, it is important that students complete a Questionnaire on relevant computer skills and a Cyber Security Awareness tutorial (UC Davis, 2006) at the beginning of the course.

The course starts from an introduction to the field of the Information Security illustrated with a collection of Cyber Crime Stories selected from YouTube and other sources. The main body of the course consists of several modules, each representing a specific security domain.

All modules are structured following the same template of components:

- Short introduction to the topic in text
- Topic summary in audio
- Detail outline of concepts and topics included in the module
- Estimated total required time for study and for assignments
- Study materials and references
- Description of studies and assignments
- Optional supplemental materials
- Optional video presentations
- Online WorkBook for team assignments

## **COURSEWORK**

Several e-learning systems are used in the IA coursework - Blackboard/WebCT, Google Site, Google Docs, Google Blog. They support basic e-learning functions as illustrated in Figure 2.

*Learning materials* for a domain consist of online reference book, supplemental readings, audio summary description of the domain, audio-narrated slides presentations, and video presentations adopted from YouTube and other sources.

*Practice assignments* include *individual* and *collaborative* parts aligned with the specific IA domain. A *collective assignment* may include a project, case study, field trip investigation, etc.

One of *Individual assignments* requires students to develop trial test questions (with answers and explanations) for possible inclusion into the course's test databank. The instructor assesses the quality, the breadth, the depth, and the originality of a question in deciding whether to place it in the databank for future exams. The idea has been adopted from the (ISC)<sup>2</sup> organization's practice of conducting the CISSP exam. It works as follows: a) submitted questions are evaluated by the instructor; b) selected questions are included for testing as non-graded questions (but undistinguishable from other graded questions) in regular exams; c) if proven to be acceptable, these selected questions are included as graded questions for future exams.

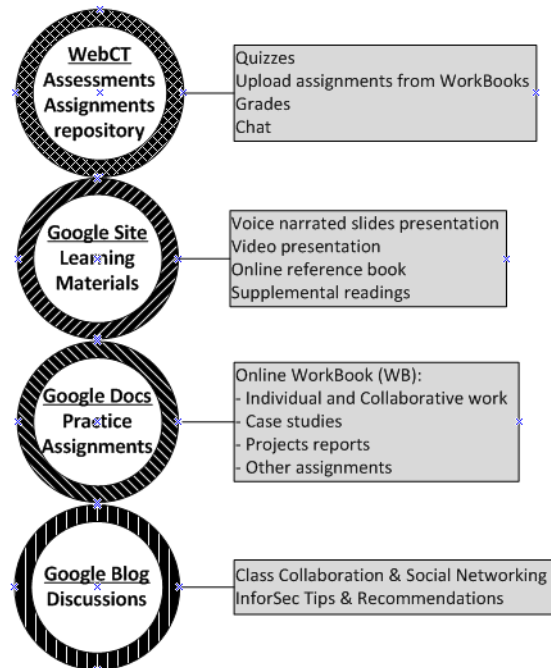
Typical weekly per-domain tasks and assignments are as follows:

- Reading the textbook.
- Viewing videos and voice-narrated slide presentations (found in ai.onlineprofessor.info Google site).
- Self-quizzing using the test databank provided with the textbook or CISSP online quizzes (found in [www.cccure.org](http://www.cccure.org); free but registration is required).
- Completing domain-specific project assignments collaboratively within a team or individually using Online Workbook to practice concepts, methods, and tools and to share project effort related to the domain.
- Creating trial Test Questions in Online WorkBook to re-enforce and demonstrate understanding of the domain.
- Creating Tips and Recommendations in the course Blog to promote advanced learning and for possible inclusion in the Information Security Awareness knowledge repository – an ongoing course project “Digest of Tips and Recommendations.”
- Taking a graded Quiz in Blackboard/WebCT.
- Participating in class networking supported by the course Blog to share knowledge and enjoy social interactions within the class.

With exception of Telecommunication and Network Security domain, which is covered within two weeks, each other domain is assigned to one week only.

Planning of online studies is an essential part of the instructional materials. A student must be navigated to use his/her time budget wisely. It should be apparent to both a student and the instructor that online learning involves a somewhat different set of skills and priorities than the face-to-face teaching and learning. So, the student’s expectations need to be aligned with the requirements dictated by online learning.

Four major components of Online Learning Academic Skills are illustrated in Figure 3 below.



**Figure 2: Coursework Framework and Support Functions**



**Figure 3: Online Learning Skills**

*Time Management* is undoubtedly one of the major objectives of the student who chooses an online course. Time saved on the reduction in travel contributes to extra time for studies. Flexible study hours and portable multimedia presentations are add-on features further enhancing customization and productivity of study.

Typically, researchers recommend allocating 8 to 12 hours a week for one 4-unit class and maintain study in short but frequent stretches (30-45min) (Cliffs, 2010). There are several valuable online resource materials with recommendations on how to plan this time. Overall, time management is not easy for students if they do not know in advance how much time is suggested to allocate to specific tasks. For online studies, budgeting the time is as critical as budgeting the money for living. To succeed in studies, some students may also require assistance with stress management, reading improvements, and collaborative studies. (Kizlik, 2010; TimeSkill, 2010; Stress; 2010, Reading 2010)

### COLLABORATIVE WORK

Online team working is widely debated in the literature and in-person discussions. Genuine efforts are made to prove that online teaming really works as well as in the F2F setting. However, statistical data that is often brought to demonstrate success or a par performance of online teams vs. traditional F2F teams is often based on a few, not comparable and statistically insignificant instances of classes. There could be, unquestionably, very significant differences in e-learning experience between some courses (e.g., a research course in psychology vs. an applied course in programming), which makes conclusions derived from one course not applicable to another. Some educators outright avoid team work in selected (often, undergraduate) classes as ineffective.

Nevertheless, the online learning teams pursue two objectives. The first objective, adopted from the traditional F2F classes, is to increase the depths of learning in simulated real life practices. The second objective, specific to the online learning, is to compensate the lack of real life interactions by using virtual interactions.

In absence of truly collaborative synchronous video conferencing within a team, the obvious risk of asynchronous collaboration like “text messaging” is that members may not actually work together, but rather they split the assignments between themselves to work independently and pass the individual solutions as a collaborative one to the instructor, who then routinely applies a grade of one student to the entire team. Such averaging of a single performance for the entire team may, of course, occur in the F2F environment as well. But it would be less likely there since a F2F team has an option of working synchronously during at least a part of in-class hours, the option that the online team practically does not have.

So, how can it be helped? One of the solutions is to use a collaborative synchronous tool (e.g., Google Docs) for editing and modifications of the team deliverables.

In the IA-Study course, a team work consists of two components: one is a *collective component* where individual contributions are obscure for grading, and another one is an *individual component* which is completed by

an individual but made visible to the entire team. The first component promotes collaboration, while the individual component promotes competition.

Individual participation of team members can be emphasized by promoting individual competition for quality of contributions within a team. And, if “punitive actions” are needed to deal with low or absent participation, then such actions can be substantiated by, for example, reviewing the history log of users’ activities.

Google Docs, used in IA-Study, can assist in reviewing individual contributions to a *collective component* by recording in a log all “reads” and “writes” made by individual team members. Of course, reviewing logs can provide an objective and semi-quantifiable measure of individual contributions, but such investigative control is excessively time consuming and practically can only be used in cases of disputes arising within a team.

Overall, collaborative assignments in the IA-Study course elevate the level of knowledge for all; but it is also understood that these collective assignments may not accurately reflect the individual performance, and therefore should not contribute much (not more than 25%) to the final grade of a student.

Frequently practiced *peer-evaluation* in graduate courses requires a team member to grade other members of the group and submit it privately to the instructor. If such evaluation is focused on the intellectual contributions of a member, then the evaluation may be deficient for several reasons. First and foremost, it relies on the students’ professional ethics and honesty, the qualities that instructor has no time or opportunity to assess. It is even less likely to find such qualities universally shared in undergraduate classes. If students realize that the results of such evaluation are directly fed into the final grades and that the submitted peer-evaluation affects positioning of individuals within the group in terms of their relative performance, such evaluation may (and often does) promote ill-directed intentions of the members. Second, a student may have a distorted view of intellectual quality of individual contributions, and judge it inappropriately.

Despite of its shortcomings, peer-evaluation offers some benefits. The IA-Study uses student peer evaluation based on scholarly-recommended five parameters [<http://mgt.buffalo.edu/departments/mss/djmurray/mgs351/PeerEval.doc>]:

1. *Quality of Work* considers the degree to which the student team member provides work that is accurate and complete.
2. *Timeliness of Work* considers the student team member's timeliness of work.
3. *Responsibility* considers the ability of the student team member to carry out a chosen or assigned task, the degree to which the student can be relied upon to complete a task.
4. *Involvement* considers the extent to which the student team member participates in the exchange of information (does outside research, brings outside knowledge to group).
5. *Leadership* considers how the team member engages in leadership activities.

Such parameterized peer assessment is a more accurate representation of a student’s individual participation and his/her role in teamwork. All educators recognize that teamwork in class setting is an important part of preparation for workplace requirements. So, aside from the quality of the completed assignments, the collaboration itself, the ability to hold responsibilities within a team, to be supportive and be on time in collective efforts can be judged collectively for each member. For that purpose, peer-rating is very constructive, serving as a mechanism to embolden personal responsibilities for keeping up with the schedule and being supportive to other members. It is in fact a stimuli factor for increasing individual performance within a team. Still, to minimize the effect of error of judgment, the number of points apportioned for such peer review should be minimal.

Among other assessment parameters, the *leadership* role requires special consideration. In the IA-Study course, a leader is not usually assigned or formally selected. But, when the “fate” is shared within the team, often one individual takes control of coordinating the effort and on-time delivery of team work assignments. The role of such individual may become evident directly from a team’s statement or indirectly from who actually uploads the completed assignments, speaks on behalf of a team, and from correspondence of such person to other team members (if copied to the instructor).

In the IA-Study course, the results of the peer-evaluation are credited in the “class participation” category of grading. It goes without saying that the overall assessment of individual or collaborative work is an exclusive function of an instructor.

## **ONLINE WORKBOOK**

Homework in the IA-Study course is structured with templates. All assignments, instructions, references to support materials, and template forms are organized into an Online Workbooks (WB) which consists of separate domain-focused modules (except for the Telecommunication and Network Security domain, which subdivided into two modules). The Online WorkBooks (WBs) are maintained in Google Docs.

Google Docs is a collaborative tool, very effective for collectively writing assignments, projects, research papers, etc. It provides basic access control of identification and authentication verifiable with Google Gmail account and supports two types of permissions: to collaborate (write) and to view.

Furthermore, Google Docs is capable of tracking down all changes (add/delete/modify) made separately by the users to a document, so the owner of the document (instructor, in the case of WB) is able to see the group work in progress and the level of participation of each student.

Each team gets and shares one copy of the WB. There are two levels of privileges (roles) available for the team members accessing WBs – collaborators (to edit) and viewers (to view only).

Following the Google Docs procedures, the owner of an Online WorkBook (instructor) invites collaborators (student team members) and/or other viewers to a WB. The instructor can easily create new copies of WBs, change or revoke student’s privileges, and re-allocated them from one WB (and the corresponding team) to another one if necessary.

Students can use an online WB in pretty much same way as an ordinary Word document; but, in addition, they can work collaboratively and simultaneously in real-time on the same WB, writing or viewing changes by others in the document.

The WB is self-explanatory with the introductory part describing how to use WB, listing and explaining typical weekly (per-domain) activities and assignments, instructing on how to submit assignments, and providing quick links to other components of the IA-Study Learning Platform.

A WB is partitioned by domains into several modules, each consisting of the following four components:

- An Introduction or purpose of the WB module assignments
- Description of the assignments
- Forms for semi-structured reports and/or entry boxes for unstructured reports (with a specified minimum amount of material to be entered)
- Forms for student-created Trial Test Questions.

Module also includes some additional information for accountability: the due date/time, report length, collaboration level, start and completion dates, and the names of students who actively participated in the module. That way a team member may be excluded from a module where he/she did not participate.

## **ONLINE CHAT AND DISCUSSIONS**

It is commonly agreed that the lack of opportunities for physical interactions among students, even with proliferation of social network technologies, is the weakest area of online leaning.

The IA-Study course employs online interactions in two forms: *online chat* and more formal *online discussions*.



*Online chat* is available through Blackboard/WebCT and Google Apps. In the IA Study course, regular Blackboard/WebCT chat sessions occur every week before and after take-home Online Quizzes that are also conducted on Blackboard/WebCT. Chat sessions are helpful to mitigate any problems students may encounter during the quizzes. Blackboard/WebCT supports online chat in the Common Room, where anyone in the class can participate, and in several Private Rooms (for a private chat). If necessary, the transcript of a chat session can be saved and placed online for other students to view.

*Online discussions* are implemented using Google Blog (blog.onlineprofessor.info). There are two tracks in the IA blogging: (1) Class Collaboration & Social Networking, and (2) InforSec Tips & Recommendations. Both are for registered students only and closed to the public.

The purpose of the first track is to create and maintain a virtual class with its own social network. It encourages collaboration with sharing and discussions within the entire class. Students' participation in this track is optional but promoted by the instructor. Here, students share ideas, tips on matters related to practicing information technology (e.g., setting up a home network, asking questions on topics in domains, raising curiosity questions, etc.) as they would do in the F2F class setting. This track is not monitored on a day-to-day basis, but the instructor reserves the right to remove the entries that are not appropriate.

The purpose of the second track is more involving: for students, it is to demonstrate the scope and depth of their learning; and for the instructor, it is also to assemble WikiDigest, an envisioned future public wiki site for sharing knowledge in Information Assurance Awareness. Each student is required to provide at least one entry per security domain.

## **WIKIDIGEST PROJECT**

The purpose of the WikiDigest, currently at its initial stage, is to create and maintain knowledgebase in Information Assurance Awareness (IAA) for students and faculty of various academic programs on campus as well as for general public. It is foreseen as a searchable collection of Tips and Recommendations developed and maintained by the students of the IA-Study as home assignments.

Students are required to classify their Tips and Recommendations by the scope (breadth) and the level (depth) categories of technical knowledge.

*Scope (breadth) of knowledge* is distinguished as belonging to one of three classes:

S3 - Broad, executive (appropriate for Business Managers & Executives)

S2 - Limited (appropriate for Business End-Users)

S1 - Basic (appropriate for General Public)

*Levels (depth) of knowledge* are defined as one of two levels:

L2 -Advanced (study) level

L1 - Introductory (awareness) level

Students' entries into Tips and Recommendations are filtered for possible plagiarism using *Turnitin*, an Internet-based plagiarism-detection service (iParadigms, 2009). Separately, students are encouraged to share and publish online on WebCT articles or other findings related to the course studies.

## **STUDENTS' PERCEPTION**

In an online course, students are the main participants and developers of learning outcomes, while the instructor's role is to assist the learning process. Therefore, to a large degree it is the students' perception that determines how well the course meets their needs.

J.C. Engelbrecht (2006) investigated the impact of web-based undergraduate mathematics teaching on developing academic maturity. Specifically, he aimed his research at determining the extent to which the web facilitates or hinders students’ abilities to:

- Be more self-reliant and self-sufficient in their studies
- Be less dependent on lecturers and contact sessions
- Become academically more responsible, conscientious and able to think independently

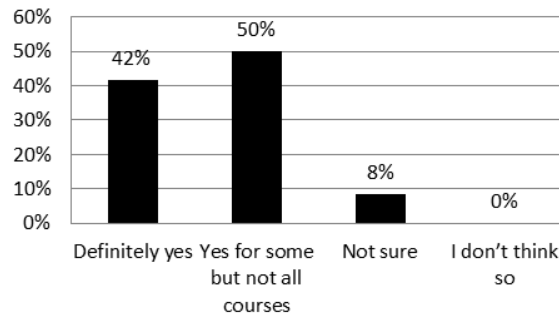
He further identified three characteristics of academic maturity beneficial to undergraduate studies:

- Organizational maturity referring to students’ ability to keep the administrative side of study under control
- Educational maturity referring to a study approach that would facilitate learning and encompass learning and cognitive maturity

Social maturity is referring to the features, such as having self-confidence, successful interpersonal relationships, being able to communicate, and to co-operate with others.

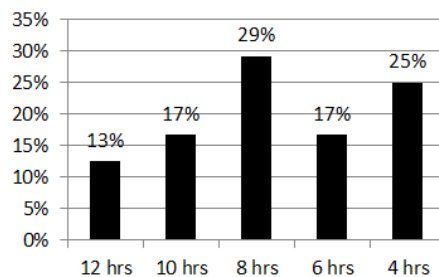
Summarized below are some survey questions and the statistics of students’ opinions that reveal their perceptions of an online learning of the IA-Study course and of Information Security in general.

*Survey Item 1: Does online learning, designed for flexible time management, suit your needs?* This question, addressed to undergraduate students, is particularly interesting because of the learning subject (security management) demanding academic maturity of undergraduate students. As responses in Figure 4 show, 92% of the respondents answered “Yes” for all or some courses.



**Figure 4: Acceptance of Online Learning**

*Survey Item 2: Approximately how much time per week, on average, do you actually spend studying for this course (do not include the in-class time)?* On the average, the students spent approximately 7.5 hours per week. The IA-Study course supports time management by informing a learner about the weekly time estimates for each assigned material and for performing each project assignment. The weekly estimated totals are between seven and eight hours, as shown in Figure 5.



**Figure 5: Actual Time Spent for Studies**

Survey Item 3: *Approximately how much time (hours) per week, on average, do you feel you need to spend studying for this course (do not include the in-class time)?* On the average, the students felt they need approximately 10.08 hours per week for course studies, as shown in Figure 6.

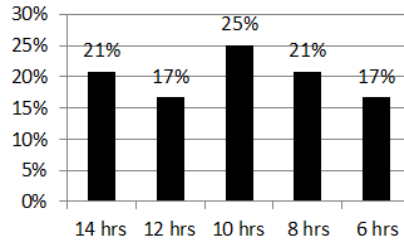


Figure 6: Time Needed for Studies

Survey Item 4: *How important for your studies was collaboration with other members of your team?* Collaboration within a team is a very important aspect of online learning. However, only 67% of students consider it very or somewhat important, as shown in Figure 7. The problem is likely to be in the group team formation and in a relatively short term of the teamwork (only 10 weeks).

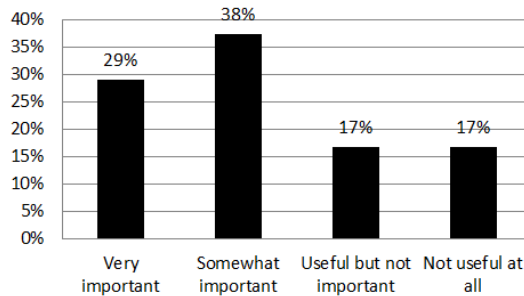


Figure 7: Importance of Team Collaboration

Survey Item 5: *What social networking would you prefer to use for an online class?* More and more often, virtual social networking finds and increases its footprint in education, business, and personal life. People’s preferences for one or another social network change over a period of time. At the moment, the students sensibly voted for blogging, Facebook, and LinkedIn, leaving behind Twitter, as shown in Figure 8.

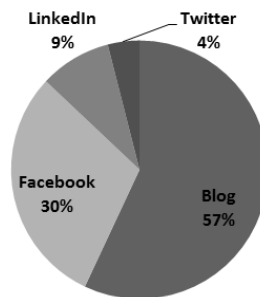


Figure 8: Preferred Social Networks for Online Studies

In response to another question, the students identified Network Security, Security Architecture, and Access Control as three most challenging domains to study.

## CONCLUSION

Teaching online has never been a simple proposition. On one extreme, there is no equal substitute, for example, to face-to-face tutoring that requires ongoing questions and answers and the tutor's leadership to assist understanding of the learning material (an online tutorial is not the same as it does not involve ongoing Q&A nor active instructor's leadership). On another extreme, no course material can be fully absorbed and understood by students without reading materials and applying the acquired knowledge in exercises. Yet, physical F2F interactions in education and business are increasingly often substituted by virtual interactions, including virtual F2F, while there is no meaningful substitute for reading so far.

In online teaching, the subject matter, concepts, and words are communicated with precision, bridging the meaning of the message from the instructor to students effectively. That's on the plus side. What the virtual communication is lacking sometimes are two-way (instead of one-way) communication and the expressiveness of personality from both the instructor and a student. The IA-Study course attempts to compensate it with online chat sessions, frequent email exchanges, weekly video and audio presentations, collaborative teamwork, and the course-wide WikiDigest project where all class students and the instructor can participate. Some other course enhancements are in the pipeline. One of them is setting an organized and managed online (virtual) workbench of software tools or a Lab for information security practices using free tools available on the Web. In organizational systems - the managed IA-Study class is one of them - managing communications is a foremost important aspect. Newstrom (2007) emphasizes that the key to successful transmission of an idea to students for acceptance and use is "framing [which] uses rich, colorful, carefully selected language to shape the perception of recipients."

In online teaching, the center of gravity shifts more towards management (of content, delivery, perception), and less to the "on-podium" performance. So, it should not be taken for granted that managing of an online class remains the same (in terms of complexity, timeliness, involvement) as in traditional face-to-face classes. It demands much more virtual attention (chats, emails, class announcements, student-instructor collaboration, etc.) and finer sensing of students' perception and currency of studies. Also, it largely depends on the objectives of the course; i.e., if it is focused on preparations for a professional examination (as the IA-Study course, which is partially turned to), then online course is well suited for amassing and retaining in the students' memory voluminous information within a short period of time. For some other topics of study, that are investigative in nature and require seminar-type discussions and case-studies, the online learning may not be a good choice.

The IA-Study course remains a work in progress, allowing to test various ideas for building online learning content, probing delivery methods, and inventing new forms of students' engagement.

## AUTHOR INFORMATION

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## REFERENCES

1. Cliff (2010). How much outside class study time is recommended for every hour of class time for college freshmen? Cliffs Notes. Retrieved April 24, 2010, from <http://www.cliffsnotes.com/WileyCDA/Section/id-305397,articleId-7601.html>
2. Engelbrecht, J. C. (2006). "Impact of web-based undergraduate mathematics teaching on developing academic maturity: a qualitative investigation," in Proceedings of The 8th Annual Conference On World Wide Web Applications. 6-8 September 2006. Cape Peninsula University of Technology. Cape Town. South Africa.
3. iParadigms (2009). iParadigms introduced plagiarism prevention technology to the world with Turnitin. iParadigms, LLC. Retrieved April 24, 2010, from <http://www.iparadigms.com/>
4. ISC<sup>2</sup> (2010). The International Information Systems Security Certification Consortium, Inc., ISC<sup>2</sup>. Retrieved April 24, 2010, from <http://www.isc2.org/>
5. Kizlik, B (2010). Effective Study Skills. How to Study and Make the Most of Your Time. October 22, 2009. Retrieved April 24, 2010, from <http://www.adprima.com/studyout.htm>
6. Newstrom, J. W. (2007). *Organizational Behavior: Human Behavior at Work*, 12th edition, McGraw-Hill/Irwin. 2007.
7. Reading (2010). Academic Success Videos: Reading Improvement. Academic Skills Center. Dartmouth College. Retrieved April 24, 2010, from [http://www.dartmouth.edu/~acskills/videos/video\\_ri.html](http://www.dartmouth.edu/~acskills/videos/video_ri.html)
8. Stress (2010). Academic Success Videos: Stress Management. Academic Skills Center. Dartmouth College. Retrieved April 24, 2010, from [http://www.dartmouth.edu/~acskills/videos/video\\_sm.html](http://www.dartmouth.edu/~acskills/videos/video_sm.html).
9. TimeSkill (2010). Academic Success Videos: Time Management. Academic Skills Center. Dartmouth College. Retrieved April 24, 2010, from [http://www.dartmouth.edu/~acskills/videos/video\\_tmcap.html](http://www.dartmouth.edu/~acskills/videos/video_tmcap.html).
10. UC Davis (2006). Computer User Security Responsibilities. Revised November 2006. The University of California at Davis. Retrieved April 24, 2010, from <http://www.google.com/url?q=http%3A%2F%2Fsecurity.ucdavis.edu%2Fpresentations%2FITSecurityTutorial.ppt&sa=D&sz=1&usq=AFrqEzeaupXqfFpT8ueHEiqcpvXB26j8IQ>.

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