Congratulations!

You have been selected to participate in The Capture the Flag (CTF) Exercise Design Study **by responding to an online survey via SurveyMonkey! This research is being conducted by Kammi Kai Hefner, EDD as partial requirements for completing a** Doctorate of Science in Cybersecurity **degree from** Capitol Technology University**.**

Anonymity & Confidentiality
Please click here **to review Anonymity and Confidentiality information.**

What is a CTF Exercise (or Challenge)?
A CTF Exercise is a "cyber" problem (i.e., exercise, scenario, task) presented to a Player during a CTF Competition.

What is a Capture the Flag (CTF) Competition?
A Capture the Flag (CTF) Competition is a type of game where the Players search for flags in a cyber environment via solving a CTF Exercise.

Purpose(s) of this Study
The objective of this study is to capture the *informal* **teaching constructs used in developing CTF Exercises and to map these** *informal* **teaching constructs to the traditional theories of Instructional Design Strategies. The results of this study will document a CTF Exercise Teaching Paradigm (i.e., archetype, model, pattern, standard, theory (Merriam-Webster Dictionary, 2018)), so teachers from other disciplines (e.g., STEM) may also embrace the potential educational benefits of how CTF Exercises are designed.**

Description of Procedures
This study involves completing a Web-based questionnaire and will take approximately 15 minutes for seasoned CTF Exercise Designers to respond to 40 questions. Approximately, 300 subjects are expected to participate in this study. Questions marked with an asterisk require an answer. You may view the questionnaire **before deciding to participate.**

* 1. Do you wish to participate in The CTF Exercise Design Study?

◯ Yes

◯ No

* 2. **Instructions**

Please read and respond to all questions, by clicking the Next button to navigate to the next question. Questions marked with an asterisk (*) require an answer.

Results of this Study

Please contact the Principal Investigator at kkhefner@captcehu.edu or DrHefner@pobox.com after September 1, 2022 or visit TheCTFExerciseStudy.guru website to see a summary of the results of this research.

Survey Response Period(s)

The survey will be open 15Feb22 through 01Mar22.

Age Eligibility

You must be at least 18 years of age to participate in The CTF Exercise Design Study.

What is your age?

○ less than 18 years   ○ 45-54 years

○ 18-24 years   ○ 55-64 years

○ 25-34 years   ○ 65+ years

○ 35-44 years

* 3. Have you written (i.e., authored, co-authored, created, designed) and published at least five CTF Exercises used in a public-accessible CTF Competition in the last five years?

○ Yes

○ No

* 4. Approximately, how many CTF Exercises have you written (i.e., authored, co-authored, created, designed) and published a CTF Exercise used in a public-accessible CTF Competition in the last five years (an estimated number is fine)?

○ less than 4   ○ 31-35

○ 5-10   ○ 36-40

○ 11-15   ○ 41-45

○ 16-20   ○ 46-50

○ 21-25   ○ more than 50

○ 26-30

* 5. **Cross Site Request Forgery** is a web application vulnerability in which the server does not check whether the request came from a trusted client or not. The request is just processed directly.

◯ True

◯ False

* 6. Please indicate the CTF Competition(s) <u>where your CTF Exercises have been published</u> for competition (select all that apply).

☐ *ctf	☐ BackdooCTF
☐ 0CTF/TCTF	☐ BSIDES CTF
☐ Access Denied	☐ Break in CTF
☐ AceBear Security Contest	☐ BSides Delhi CTF
☐ AltayCTF	☐ Byte Bandits CTF
☐ angstromCTF	☐ Carthage Cyber Arena
☐ ASIS CTF Quals	☐ CODE BLUE
☐ b00t2root	☐ Codefest CTF

7. Do you prefer to write (i.e., author, co-author, create, design) and <u>publish</u> a CTF Exercise for use in a public-accessible CTF Competition for <u>Individual</u> Competition or <u>Team</u> Competition?

◯ Individual Competition

◯ Team Competition

8. What is your gender (please share if you have no concerns)?

◯ Male

◯ Female

◯ Other

◯ Prefer not to answer

9. What is your ethnicity?

○ White or Caucasian   ○ American Indian or Alaska Native

○ Black or African American   ○ Native Hawaiian or other Pacific Islander

○ Hispanic or Latino   ○ Prefer not to answer

○ Asian or Asian American   ○ Another ethnicity group

○ Other (please specify)

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10. What is the highest level of school you have completed?

○ Primary school   ○ 4-year college degree

○ Some high school, but no diploma   ○ Graduate-level degree

○ High school diploma (or GED)   ○ Doctorate-level degree

○ Some college, but no degree   ○ Government/DoD Trained

○ 2-year college degree

11. Which of the following best describes your current Job Category?

○ Accounting   ○ Information Technology

○ Admin - Clerical   ○ Installation - Maintenance - Repair

○ Biotech   ○ Legal

○ Business Development   ○ Management

○ Consultant   ○ Marketing

○ Design   ○ Professional Services

○ Education   ○ Real Estate

○ Engineering   ○ Research

○ Entry Level   ○ Science

○ Executive   ○ Skilled Labor - Trades

○ Finance   ○ Strategy - PLanning

○ Human Resources   ○ Training

○ Other (please specify)

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12. What is the **primary** reason you have written and published CTF Exercises for public-accessible CTF Competitions?

○ I heard (i.e., from friends, read on the Internet, through the grapevine, etc.) designing CTF Exercises was <u>one way to get started</u> at competing at CTF Competitions

○ I heard designing CTF Exercises was the <u>best way to get started</u> at competing at CTF Competitions

○ I know designing CTF Exercises is a FREE way to learn about cybersecurity

○ I know designing CTF Exercises is a FREE way to develop cybersecurity skills

○ I know I usually learn something valuable from designing CTF Exercises

○ I know I might <u>get better at solving challenges</u> by designing CTF Exercises

○ I know I might <u>get quicker at solving challenges</u> by designing CTF Exercises

○ I know I might discover better technical ways to solve a challenge by designing CTF Exercises

○ I know designing CTF Exercises is one of the best ways to become the best CTF Competitor I can become

○ Another reason (please specify)

○ I am training for my next CTF Competition, so I design CTF Exercises for practice

○ I want to check up on the competition, so I re-design their CTF Exercises

○ I am establishing myself as a "known" Author of a certain "style" of CTF Exercises

○ After I compete in a CTF Competition, I usually attempt to improve the design of the CTF Exercises, for challenges I could solve myself

○ After I compete in a CTF Competition, I usually attempt to reverse engineer the design for challenges I could not solve myself

○ As a team player, my Team encourages me to design CTF Exercises for practice

○ As a team player, my Team reviews my CTF Exercises designs and provides feedback

○ I have no real reason

13. What is the **secondary** reason you have written and published CTF Exercises for public-accessible CTF Competitions?

- ◯ I heard (i.e., from friends, read on the Internet, through the grapevine, etc.) designing CTF Exercises was <u>one way to get started</u> at competing at CTF Competitions

- ◯ I heard designing CTF Exercises was the <u>best way to get started</u> at competing at CTF Competitions

- ◯ I know designing CTF Exercises is a FREE way to learn about cybersecurity

- ◯ I know designing CTF Exercises is a FREE way to develop cybersecurity skills

- ◯ I know I usually learn something valuable from designing CTF Exercises

- ◯ I know I might <u>get better at solving challenges</u> by designing CTF Exercises

- ◯ I know I might <u>get quicker at solving challenges</u> by designing CTF Exercises

- ◯ I know I might discover better technical ways to solve a challenge by designing CTF Exercises

- ◯ I know designing CTF Exercises is one of the best ways to become the best CTF Competitor I can become

- ◯ Another reason (please specify)

[   ]

- ◯ I am training for my next CTF Competition, so I design CTF Exercises for practice

- ◯ I want to check up on the competition, so I re-design their CTF Exercises

- ◯ I am establishing myself as a "known" Author of a certain "style" of CTF Exercises

- ◯ After I compete in a CTF Competition, I usually attempt to improve the design of the CTF Exercises, for challenges I could solve myself

- ◯ After I compete in a CTF Competition, I usually attempt to reverse engineer the design for challenges I could not solve myself

- ◯ As a team player, my Team encourages me to design CTF Exercises for practice

- ◯ As a team player, my Team reviews my CTF Exercises designs and provides feedback

- ◯ I have no real reason

14. How would you describe your <u>overall level of knowledge</u> for competing in CTF Competitions?

○ 7 - **Expert** - I have been actively placing in the top 10 in CTF Competitions for over 5 years and working in the security industry in technical roles for more than 10 years. I am well versed in all security topics inclusive of reverse engineering, forensics, and offensive methodology and tooling. I am capable of operating within any constraints or odd requirements. I am comfortable in all attack scenarios. I can pick out vulnerabilities and likely attack scenarios with new technologies with little to no hands-on experience with these new technologies. I have CVEs under my name. I keep 0days in my back pocket.

○ 6 - **Master** - I am well versed in the usage and combination of offensive tools. I am learning advanced offensive security methodology and chaining. I am well versed in most forensics topics. I have been engaged in CTF competitions for 3 years and regularly place in the top 50%. I have been working in the security industry in technical roles for more than 5 years. I am well versed with known vulnerabilities and am capable of discovering and exploiting new vulnerabilities.

○ 5 - **Proficient** - I know how to use offensive tools. I am well versed in nearly all security and reverse engineering concepts. I have mastered the command line on multiple operating systems. I am familiar with well-known vulnerabilities in general. I am learning how to discover and attack new vulnerabilities.

○ 4 - **Competent** - I am proficient in at least one of the scripting languages such as Perl, Python, Ruby, Powershell, batch scripting or BASH. I understand many security topics. I am familiar with some offensive tools. I am comfortable on the command line. I am learning common vulnerabilities. I am learning the basics of forensics.

○ 3 - **Beginner** - I am learning a scripting language or two. I am learning general security topics. I am learning of offensive security tools. I am well versed in most system administrative and networking topics.

○ 2 - **Novice** - I am learning the command line. I am learning the basics of system administration and networking.

○ 1 - **Introductory** - I am just now hearing about CTF Competitions.

15. On a scale of 1 to 10, how important do you feel it is for a CTF Exercise Designer to have competed in a CTF Competition, <u>before attempting</u> to write (i.e., author, co-author, create, design) and publish a CTF Exercise for use in a public-accessible CTF Competition?

1 - Least Important	Most Important - 10	

16. Do you access, execute, read, review and/or use <u>CTF Writeup</u>s to aid in your design of CTF Exercises?

○ Yes

○ No

* 17. As a CTF Exercise Designer, what **primary** *teaching construct* do you incorporate to *gain the attention of the Player*?

○ I show a teaser video to create an awareness

○ I share an interesting animated video to set the context

○ I outline WIIFM (What Is In It For Me)

○ I pose thought-provoking questions to help players channelize their attention on what follows

○ I offer a reward as an incentive

○ I use animations

○ I use scenarios

○ I include problem statements

○ I made an announcement

○ I incorporate leading questions

○ I present a dilemma

○ I present an analogy

○ I present something controversial

○ I play a video

○ I play an audio recording

○ Someone else did this for me

○ I do not do anything special to *gain the attention of the Player*

○ I really don't understand what you are asking?

○ I do something else to gain the attention of the Player (please specify):

[   ]

18. As a CTF Exercise Designer, what **secondary** *teaching construct* do you incorporate to *gain the attention of the Player*?

○ I show a teaser video to create an awareness

○ I share an interesting animated video to set the context

○ I outline WIIFM (What Is In It For Me)

○ I pose thought-provoking questions to help players channelize their attention on what follows

○ I offer a reward as an incentive

○ I use animations

○ I use scenarios

○ I include problem statements

○ I made an announcement

○ I incorporate leading questions

○ I present a dilemma

○ I present an analogy

○ I present something controversial

○ I play an audio recording

○ Someone else did this for me

○ I do not do anything special to *gain the attention of the Player*

○ I really don't understand what you are asking?

○ I do something else to gain the attention of the Player (please specify):

[   ]

* 19. As a CTF Exercise Designer, <u>when</u> do you inform the Player of the *Learning Objectives* for your CTF Exercise?

○ <u>Before</u> a Player starts the CTF Exercise

○ <u>All through out</u> the CTF Exercise

○ <u>After</u> a Player finishes the CTF Exercise

○ I do something else to address when to inform the Player of the Learning Objectives (please specify):

○ I do not do anything special to address <u>when</u> to inform the Player of the *Learning Objectives*

○ I really don't understand what you are asking?

[   ]

20. As a CTF Exercise Designer, what **primary** *teaching construct* did you incorporate to *identify the Learning Objectives* of your CTF Exercise to the Player?

○ I highlight what skills they will walk away with after attempting to solve this CTF Exercise

○ I do not do anything special to convey the *Learning Objectives* of my CTF Exercise to the Player

○ I point out how playing this CTF Exercise will help them perform better or acquire a new skills

○ I really don't understand what you are talking about

○ Someone else did this for me

○ I did the following to identify the Learning Objectives to the Player (please specify):

[   ]

* 21. As a CTF Exercise Designer, what **primary** *teaching construct* did you incorporate to *stimulate a Player's recall* of previous knowledge (or learning)?

○ I provide a personalized learning path based on their proficiency or preference. This can be determined by using a pre-test or a survey.

○ I show how prior knowledge relates to new topic.

○ I ask Players to reflect on their prior learning or personal experiences related to the CTF Exercise.

○ I use Information Highlights to draw their attention to what they know (for instance, use "Did You Know" and connected them back to the current schema).

○ Someone else did this for me

○ I do not do anything special to stimulate a Player's recall

○ I drive Players to relate new ideas to what they already know.

○ I really don't understand what you are asking?

○ I have the Player review prior material.

○ I explain how prior knowledge relates to new topic.

○ I did the following to stimulate a Player's recall of their previous knowledge (or learning):

[   ]

22. As a CTF Exercise Designer, what **secondary** *teaching construct* did you incorporate to *stimulate a Player's recall* of previous knowledge (or learning)?

○ I provide a personalized learning path based on their proficiency or preference. This can be determined by using a pre-test or a survey.

○ I show how prior knowledge relates to new topic.

○ I ask Players to reflect on their prior learning or personal experiences related to the CTF Exercise.

○ I use Information Highlights to draw their attention to what they know (for instance, use "Did You Know" and connected them back to the current schema).

○ Someone else did this for me

○ I do not do anything special to stimulate a Player's recall

○ I drive Players to relate new ideas to what they already know.

○ I really don't understand what you are asking?

○ I have the Player review prior material.

○ I explain how prior knowledge relates to new topic.

○ I did the following to stimulate a Player's recall of their previous knowledge (or learning):

[   ]

* 23. As a CTF Exercise Designer, what **primary** *teaching construct* did you incorporate to *present the content* to the Player?

○ I use active learning featuring guided exploration

○ I use audio lectures

○ I use flowcharts (i.e., diagrams)

○ I use microlearning (including learning journeys) for formal training

○ I use microlearning (including learning journeys) for Performance Support intervention

○ I use PowerPoint with audio

○ I use rabbit holes

○ I use readings

○ I use scenario-based learning interactive videos

○ I did the following to present the content to the Player (please specify):

○ I use scenario-based learning videos with complex and branching simulations

○ I use storytorials or story-based learning

○ I offer training nuggets

○ I use videos

○ I use websites

○ Someone else did this for me

○ I do not do anything special to *present the content* to the Player?

○ I really don't understand what you are asking?

24. As a CTF Exercise Designer, what **secondary** *teaching construct* did you incorporate to *present the content* to the Player?

○ I use active learning featuring guided exploration

○ I use audio lectures

○ I use flowcharts (i.e., diagrams)

○ I use microlearning (including learning journeys) for formal training

○ I use microlearning (including learning journeys) for Performance Support intervention

○ I use PowerPoint with audio

○ I use rabbit holes

○ I use readings

○ I use scenario-based learning interactive videos

○ I did the following to present the content to the Player (please specify):

○ I use scenario-based learning videos with complex and branching simulations

○ I use storytorials or story-based learning

○ I offer training nuggets

○ I use videos

○ I use websites

○ Someone else did this for me

○ I do not do anything special to *present the content* to the Player?

○ I really don't understand what you are asking?

* 25. As a CTF Exercise Designer, what **primary** *teaching construct* did you incorporate to *provide guidance* to the Player?

○ I use analogies and metaphors to assist in comprehending complex concepts

○ I include examples and non-examples

○ I use cheat sheets

○ I identify deadlines

○ I encourage group discussions

○ I use job aids

○ I use rabbit holes

○ I provide additional references

○ I use role playing

○ I use rubrics

○ I use scaffolds/hints and cues as they progress through the learning path

○ I use scenarios to help them relate to real-life situations

○ I provide study guides

○ I present tip boxes

○ Someone else did this for me

○ I really don't understand what you are asking?

○ I did the following to provide guidance to the Player (please specify):

[   ]

26. As a CTF Exercise Designer, what **secondary** *teaching construct* did you incorporate to *provide guidance* to the Player?

○ I use analogies and metaphors to assist in comprehending complex concepts

○ I include examples and non-examples

○ I use cheat sheets

○ I identify deadlines

○ I encourage group discussions

○ I use job aids

○ I use rabbit holes

○ I provide additional references

○ I use role playing

○ I use rubrics

○ I use scaffolds/hints and cues as they progress through the learning path

○ I use scenarios to help them relate to real-life situations

○ I provide study guides

○ I present tip boxes

○ Someone else did this for me

○ I really don't understand what you are asking?

○ I did the following to provide guidance to the Player (please specify):

[   ]

* 27. As a CTF Exercise Designer, what **primary** *teaching construct* did you incorporate to *provide room for practice for the Player*?

○ I provide adequate opportunity for practice (without consequences)

○ I use role playing

○ I encourage scenario-based discussions

○ I administer short quizzes

○ I did the following to provide room for practice for the Player (please specify):

[   ]

○ Someone else did this for me

○ I do not do anything special to provide room for practice for the Player

○ I really don't understand what you are asking?

28. As a CTF Exercise Designer, what **secondary** *teaching construct* did you incorporate to *provide room for practice for the Player*?

○ I provide adequate opportunity for practice (without consequences)

○ I use role playing

○ I encourage scenario-based discussions

○ I administer short quizzes

○ I did the following to provide room for practice for the Player (please specify):

[   ]

○ Someone else did this for me

○ I do not do anything special to provide room for practice for the Player

○ I really don't understand what you are asking?

* 29. As a CTF Exercise Designer, what **primary** *teaching construct* did you incorporate to *provide feedback to the Player*?

○ I use corrective (or formative) feedback

○ I use analytical feedback

○ I encourage group discussions

○ I redirect for remediation

○ I provide just-in-time learning aids to reinforce

○ I include feedback on quizzes

○ I provide instructor review or feedback

○ I allow for peer review or feedback opportunities

○ I provide immediate feedback for online quizzes

○ Someone else did this for me

○ I did not do anything specific to *provide feedback to the Player*

○ I really don't understand what you are asking?

○ I did the following to provide feedback to the Player (please specify):

[   ]

30. As a CTF Exercise Designer, what **secondary** *teaching construct* did you incorporate to *provide feedback to the Player*?

- ◯ I use corrective (or formative) feedback
- ◯ I use analytical feedback
- ◯ I encourage group discussions
- ◯ I redirect for remediation
- ◯ I provide just-in-time learning aids to reinforce
- ◯ I include feedback on quizzes

- ◯ I provide instructor review or feedback
- ◯ I allow for peer review or feedback opportunities
- ◯ I provide immediate feedback for online quizzes
- ◯ Someone else did this for me
- ◯ I did not do anything specific to *provide feedback to the Player*
- ◯ I really don't understand what you are asking?

- ◯ I did the following to provide feedback to the Player (please specify):

[ ]

* 31. As a CTF Exercise Designer, what **primary** *teaching construct* did you incorporate to *assess the Player's performance*?

- ◯ I craft an assessment strategy that pushes the Player's cognition from recall or understanding to application
- ◯ I use repeated assessments to keep Players aligned to their learning goals
- ◯ I use interim check-points
- ◯ I administer a Pre-test
- ◯ I discuss this training with the Player
- ◯ I administer a summative test (and compare gain vs the pre-test)
- ◯ I conduct a survey
- ◯ I execute on-the-job type performance evaluations
- ◯ I ask the Plater to respond to an essay exam

- ◯ I ask the Player to write a finished paper
- ◯ I assign the Player to create a portfolio
- ◯ I ask the Player to deliver a presentation
- ◯ I ask the Player to produce a final product
- ◯ I administer quizzes
- ◯ Someone else did this for me
- ◯ I do not do anything specific to *assess the Player's performance*
- ◯ I really don't understand what you are asking?

- ◯ I did the following to assess the Player's performance (please specify):

[ ]

32. As a CTF Exercise Designer, what **secondary** *teaching construct* did you incorporate to *assess the Player's performance*?

○ I craft an assessment strategy that pushes the Player's cognition from recall or understanding to application

○ I use repeated assessments to keep Players aligned to their learning goals

○ I use interim check-points

○ I administer a Pre-test

○ I discuss this training with the Player

○ I administer a summative test (and compare gain vs the pre-test)

○ I conduct a survey

○ I execute on-the-job type performance evaluations

○ I ask the Plater to respond to an essay exam

○ I did the following to assess the Player's performance (please specify):

[   ]

○ I ask the Player to write a finished paper

○ I assign the Player to create a portfolio

○ I ask the Player to deliver a presentation

○ I ask the Player to produce a final product

○ I administer quizzes

○ Someone else did this for me

○ I do not do anything specific to *assess the Player's performance*

○ I really don't understand what you are asking?

* 33. As a CTF Exercise Designer, what **primary** *teaching construct* did you incorporate to *enhance the Player's retention while on the job*?

○ I craft an assessment strategy that pushes the Player's cognition from recall or understanding to application

○ I use performance support intervention to aid recall and application on the job

○ I use nudges to mastery by incorporating challenges (quizzes) that help the learners keep their information current, and they can be progressively fed tougher challenges

○ I use social media and newsletters

○ I debrief the Player on what has been learned

○ I summarize the learning that has occurred and apply it to new situations

○ I did the following to enhance the Player's retention and its application on the job (please specify):

[   ]

○ I ask the Player to document their learning experience by journaling or blogging

○ I identify a new situation or application for the new knowledge

○ Someone else did this for me

○ I do not do anything special to *enhance the Player's retention and its application on the job*

○ I really don't understand what you are asking?

* 34. As a CTF Exercise Designer, what **secondary** *teaching construct* did you incorporate to *enhance the Player's retention while on the job?*

○ I craft an assessment strategy that pushes the Player's cognition from recall or understanding to application

○ I use performance support intervention to aid recall and application on the job

○ I use nudges to mastery by incorporating challenges (quizzes) that help the learners keep their information current, and they can be progressively fed tougher challenges

○ I use social media and newsletters

○ I debrief the Player on what has been learned

○ I summarize the learning that has occurred and apply it to new situations

○ I ask the Player to document their learning experience by journaling or blogging

○ I identify a new situation or application for the new knowledge

○ Someone else did this for me

○ I do not do anything special to *enhance the Player's retention and its application on the job*

○ I really don't understand what you are asking?

○ I did the following to enhance the Player's retention and its application on the job (please specify):

[   ]

35. As a CTF Exercise Designer, what are the *learning challenges* students have in meeting the goals set?

[   ]

36. As a CTF Exercise Designer, in your own words, what design techniques do you use in *developing your CTF Scenario Exercises* to facilitate learning (in case we missed something you do)?

[   ]

37. What is it about how you design the CTF Scenario Exercises that *creates a learning event* (i.e., a learning situation) for the Player?

[   ]

* 38. On a scale of 1 to 10, as a CTF Exercise Designer, **how important** do you feel it is to write CTF Exercises that r*eflect current, real-life events* (i.e., a particular challenge reflecting hackers breaking into a system recently published in the news like the North Korean Hackers stealing $400 million in crypto)?

1 - Not at all Important   Extremely Important - 10

○———————————————————————— [   ]

39. As a CTF Exercise Designer, do you rely more on **art** or **science** in developing your CTF Exercises?

○ I never paid much attention to this aspect of creating a CTF Exercise, so I don't know.

○ Art

○ Science

○ Both

○ Someone else did this for me

○ I really don't understand what you are asking

* 40. As a CTF Exercise Designer, which **primary** *Learning Style* do you target for your anticipated Players when developing your CTF Exercises?

○ Auditory Learner (i.e., I like to hear people explain things out loud - I listen).

○ Kinesthetic Learner (i.e., I need to physically repeat the steps on my own computer as I feel the keys on the keyboard and/or touch the screen - I touch).

○ Textual Learner (i.e., I prefer to read a written description of the solution or follow a checklist of steps - I read).

○ Video Learner (i.e., I want to hear the Author talk through the steps, watch a demonstration of the Author typing and moving their mouse to show their solution, and see the computer respond accordingly - I look & listen).

○ Visual Learner (i.e., I prefer to see charts/diagrams/graphics/pictures/screenshots to show the steps - I watch).

○ Four Senses Learner (i.e., I want to hear the solution explained, while I watch the results of the Author typing and moving their mouse, and I like to see the computer respond accordingly. Then I will physically repeat the steps on my own computer.

○ I don't know, because I never thought of considering the Player's Learning Style.

○ Someone else did this for me

○ I do not consider the Player's Learning Style when developing my CTF Exercises

○ I consider the following Learning Style when developing my CTF Exercises (please specify):

[   ]

41. As a CTF Exercise Designer, which **secondary** *Learning Style* do you target for your anticipated Players when developing your CTF Exercises?

○ Auditory Learner (i.e., I like to hear people explain things out loud - I listen).

○ Kinesthetic Learner (i.e., I need to physically repeat the steps on my own computer as I feel the keys on the keyboard and/or touch the screen - I touch).

○ Textual Learner (i.e., I prefer to read a written description of the solution or follow a checklist of steps - I read).

○ Video Learner (i.e., I want to hear the Author talk through the steps, watch a demonstration of the Author typing and moving their mouse to show their solution, and see the computer respond accordingly - I look & listen).

○ Visual Learner (i.e., I prefer to see charts/diagrams/graphics/pictures/screenshots to show the steps - I watch).

○ Four Senses Learner (i.e., I want to hear the solution explained, while I watch the results of the Author typing and moving their mouse, and I like to see the computer respond accordingly. Then I will physically repeat the steps on my own computer.

○ I don't know, because I never thought of considering the Player's Learning Style.

○ Someone else did this for me

○ I do not consider the Player's Learning Style when developing my CTF Exercises

○ I consider the following Learning Style when developing my CTF Exercises (please specify):

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```

42. Please elaborate, in your own words, on how you perceive the Player's **primary** Learning Style when developing a CTF Exercise.

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```

43. Please elaborate, in your own words, what techniques (i.e., *learning constructs*) you incorporate when developing a CTF Exercise to accommodate your anticipated Players.

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* 44. How important do you feel it is for the Author of a CTF Exercise, to take into account the Learning Style of the anticipated players?

1 - Least Important   Most Important - 10
○━━━━━━━━━━━━━━━━━━━━━━━━━━ [   ]

45. Please tell us about your CTF Exercise Design Survey experience (e.g., accessibility of survey, clarity of questions, focus of the study, readability, navigation through questions, structure of the questions {comment box vs. multiple choice vs. ranking}, use of SurveyMonkey, terminology, etc.). Your comments will be used to improve the CTF Exercise Design Survey experience!

46.

THANK YOU!   THANK YOU!   **THANK YOU!**

for Participating in The CTF Exercise Design Study

THANK YOU!   THANK YOU!   **THANK YOU!**

Please visit
The CTF Exercise Design Study Web Site
to learn more about this study,
see a copy of the results, and/or
contact the Principal Investigator!

**THE FOLLOWING DATA IS ONLY BEING COLLECTED
FOR THE PILOT STUDY SO I MAY CONTACT YOU
TO DISCUSS THIS QUESTIONNAIRE.**

Your Name for the Pilot Study:

Your Email Address for the Pilot Study:

Your Phone Number for the Pilot Study: