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IDT602 (Instructional Analysis II):

Instructional Design Project Proposal

Submitted in partial fulfillment of the requirements for the degree of

Master of Science in Instructional Design and Technology (MSIDT)

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To

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Executive Summary

The purpose of the presented course is to provide dental radiograph training to veterinary staff members. A needs analysis revealed a training gap that caused participants to be less successful during their first training and after they return to their clinic environment. Developing practical skills that last past the training experience will efficiently integrate dental radiograph capabilities into the dental service of a veterinary clinic.   The course will be delivered in three sessions – pre-training, active training, and post-training. The pre-training session will prepare and assess the participant for the future active training session. The post-training session will provide a final assessment of the participant performance. The participant will also share their experience navigating through the three training phases.

Content and materials for this project will be designed following the AECT Professional Code of Ethics to avoid copyright and privacy infringement and avoid any cultural or socioeconomic bias. Following the code of ethics will ensure a high-quality course that will fulfill the learning needs of the participants. Proposed ethical strategies are elaborated in this document.

The needs analysis produced a list of learning goals for the course. The learning goals were developed into learning outcomes to focus the training on tasks that will serve as the performance outcomes. The performance outcomes identify the actions required by the participant to perform the task correctly. There are three learning goals. Each learning goal has two to three performance outcomes attached.

Instructional strategies are aligned with the learning outcomes. These strategies will effectively present the course content to the participant. The course is focused on the performance of tasks. The trainer demonstrates these tasks. These types of training are prescribed strategies for execution.

Once the instructional objectives, performance outcomes, and instructional strategies were aligned to ensure the participant had a clear understanding of the training goals, instructional resources are integrated to expand the learning experience. The pre-training session uses asynchronous learning to prepare the participant for future active training. The active training provides the participant with hands-on activities to build confidence and procedural skills in dental radiology. The course materials will also be printed for the participants to follow along during the training. The printed materials can also be used for review after the training is completed.

The delivery methods for this course were investigated. A delivery analysis was performed to find the most efficient way to deliver the content. Delivery methods include a virtual classroom for the pre-training session, printed materials, and demonstration models for the active training session. The goal is to keep the delivery methods as simple and user-friendly as possible for the participants to get the most out of the course activities.

Assessments are going to be implemented at every stage of the course using a summative assessment technique. The assessments will be a way to measure participant success. During the pre-training online session, participants will be assessed after each unit and allowed to provide feedback at the end of the online course. During the active training session, participants will be assessed using direct testing through observation and anecdotal record keeping. Each

performance outcome will come with a rubric to ensure the learner is completing all the steps

and how successful they are. The results of the testing and the rubric will be shared with the

participant at the end of the course. Lastly, there will be a post-training session where the

participants will be asked to provide feedback on their experience with each phase of the

training. The feedback will allow us to make changes to improve the training experience.

Needs Statement

 The development of effective skills and techniques for taking dental radiographs using proper

positioning of the digital sensor will improve the assessment and diagnosis of pathology.

Surveys collected from trainers revealed a training gap that caused participants to be less

successful during the first training and when they apply their newly learned skills. The lack of

success is attributed to three tasks:

1. **Demonstrating correct placement of the sensor.**

     Inadequacies in identifying anatomy and lack of attention will cause the participant to

     position the sensor in the mouth incorrectly. The difficulty is the result of inadequate

     knowledge of anatomy or lack of attention during the training demonstration.

2. **Demonstrating correct angulation of the tube head.**

     Incorrect angulation of the tube head will result in a non-diagnostic radiograph due to the

     tooth image being elongated or foreshortened. The challenge is translating a simplified

     positioning concept to hands-on training and subsequent mastery.

3. **Identifying solutions to errors found on the finished dental radiograph.**

Participants become frustrated when they must repeat x-rays. Focusing a portion of the training on identifying errors improves problem-solving skills. Correctly solving the cause of the error will diminish the need to perform repeat x-rays.

Ethics Summary

Instructional designers should conduct themselves within the codes and rules of a professional organization. The codes and regulations of a professional organization help instructional designers make ethically sound decisions when interacting with the organization requesting help with a training project to the content and materials chosen. Recognizing and preventing potential ethical issues should be a part of every design and development projects. Chen (2007) explains that instructional designers are confronted with issues of copyright violations, privacy infringement, cultural and socioeconomic bias. The Association for Educational Communications and Technology (AECT) has designed and published The Code of Professional Ethics that should be followed by teachers, instructional technologists and instructional designers (The code of professional ethics, 2012).

Ethical Dimensions of the Instructional Intervention

One of the essential competencies in the IBSTPI Standards states that designers must develop content that does not violate ethical, legal, and political codes or rules. According to Koszalka, Russ-Eft, and Reiser (2013), if the competencies are followed properly, the instructional designer will perform ethically.

Ethical dimensions come into play when planning content for the instructional intervention. In the training program, the areas that will require scrutiny are accessibility, bias, and copyright infringement.

Accessibility. Accessibility of the materials allows all participants to work with the materials that will address their learning needs. Instructional strategies must address the diversity of the participants (Bahr, 1999). According to Rao, Edelen-Smith, and Wailehua (2015), detailed participant surveys with learning assessments could give us some information about any accessibility needs. The difficulty comes if the participant does not share personal information.

Bias. When writing materials, it is crucial that the designer shows no racial, cultural, or socioeconomic predisposition. Biases are destructive to the learning process as the participant will not feel included in the training. Inclusive and varied materials must span the digital divide. The digital divide excludes people or cultures or economic background. For participants in a lower socioeconomic situation, access to current technological resources used to present the course content can be challenging. Problems could include participants who are at-risk students, those participants that come from a different country with a different viewpoint of their experience.

Solutions include:

- The use materials that are written using inclusive language targeted to the project audience.

- According to Handshaw (2014), a delivery system analysis of the current technological resources available in the work and home environment is necessary.

Copyright infringement. Adhering to copyright and intellectual property rights is critical to the success of the project.

Solutions include:

- Review all written and multimedia materials to confirm that resources are cited, and appropriate permission forms are located and correctly filled out.

Legal Dimensions of the Instructional Intervention

Legal dimensions in the instructional intervention can include privacy encroachment, a potential violation of the disability laws, and copyright infringement.

Privacy encroachment. Participant surveys will give us essential information to develop units, lessons, activities, and assessments.   Surveys can help narrow the scope of the materials to be the most essential and effective for the participant. Other benefits include the participant's attitude about training. The materials and methods are adjusted to provide a means for the participant to interact and fully engage with the training topic.

Interviewing participants will be done either face-to-face or by survey. Information about the participant is provided through the clinic manager or owner-veterinarian. Currently, permission requests for interviews are made by phone or email.

Solutions include:

- To bring the survey request up to the IBSTPI standards, a signed release form from the interviewees will be obtained.

    Violation of disability laws. All students must have access to education. Disabilities are addressed by adding an accessibility tool that can best handle any potential situation. Materials need to reach as many potential learning needs as possible. Careful planning is crucial to be sure materials are as inclusive as possible.

Political Dimensions of the Instructional Intervention

Participants in a veterinary clinic range in age, education, work experience, and duties. When planning materials, the political climate of the clinic can influence the involvement of the participant. You will have participants who are ready to be there and those that must be there.

    When working with a clinic group, it is essential to treat all participants equally. This recognition of all participants gets them motivated to participate.

Planned Strategies

Table 1

Potential Dimension Strategies

Intervention	Potential Dimension
Oral and dental anatomy of the dog and cat	Accessibility - Ethical Strategies Dental models. Handling the model while visually identifying the structures. Body-

	Kinesthetic engagement. Can be used for participants with visual disabilities.
	Copyright infringement - Legal
	Worksheet with graphic identifying the oral structures. Permission needed for graphic taken from the outside.
	Accessibility - Legal
	Video clips are identifying oral structures. Linguistic and visual-spatial engagement. Closed captioning could be added for auditory disabilities.
	Copyright Infringement
	Written and downloadable transcripts of the video clips.
The Modified Triadan Numbering System	Accessibility – Legal
	Live review session on the Modified Triadan Numbering System which they will need to know to run the imaging software. Visual-Spatial, Kinesthetic
	Pre-recorded video of the software showing how the numbering system works with closed captioning and printable transcripts. Linguistic
General Radiology Principles	Accessibility – Legal
	Live discussion on the function of Ma, KvP. Checklist to be sure the activities are being done. Body-Kinesthetic.
State X-Ray Safety Laws and Inspection Requirements	Copyright infringement – Legal
	Have management download and pass out the document. Copies can be downloaded and sent before the training. Review at the

	beginning of the session. Post the handout or poster in a safe location.
Dental x-ray generator	Accessibility – Legal
	Demonstrate the steps to making adjustments.
	Copyright Infringement – Legal
	If using materials from manufacturers, be sure to get written permission
Digital sensor	Accessibility – Legal
	Demonstration of placing the plate it in the mouth.
	Discussion of how the sensor gets bitten.
Dental x-ray	Accessibility – Legal
	Demonstrate placing the sensor in the correct location. Repeated by students. Kinesthetic
	Manual with photographs of positions and tube angles

Learning Outcomes

The purpose of the learning outcome is to list what the participant must know after the training is complete. Learning outcomes are written using active verbs and clear, concise language. The learning outcome states the behavior the participant must exhibit during a specific part of the training (Piskurich, 2015). Learning outcomes are broken down into the steps needed to accomplish the task.

I. **Effectively set up the location of the sensor after identifying the appropriate teeth.**

The ability to identify structures of the oral cavity in the dog and cat is necessary to learn proper placement of the sensor or plate.

II.   Effectively set up the correct angulation of the tube head after confirming correct placement of the sensor.

The sensor or plate must be put under or behind the intended tooth or teeth, which requires the tube head to be angled to produce a tooth image that is the correct length. The right image length is approximately the same length as the tooth itself (DuPont, 2009).

III.   Provide solutions to correct errors identified in the radiograph results.

Focusing a portion of the training on identifying errors improves problem-solving skills. Correctly solving the cause of the error will diminish the need to perform repeat x-rays.

Performance Outcomes

Performance outcomes are the measurable steps the participant must perform to show mastery. Performance objectives must be clear and concise using active action verbs. Each step of the performance outcome must reflect a cognitive function that can be measured by the trainer (Articulate your learning objectives, 2015). Clearly articulating each step will show the trainer that the participant is performing the correct skills. Below are the performance outcomes necessary to achieve each learning outcome.

1. **Identifying the appropriate teeth, set up the correct location of the sensor.**

   1.1. Given a specific oral location to radiograph, the participant will point to the requested location on the dental model. Proficiency will show the participant is confident with oral anatomy.

1.2. The participant will verbally justify the best position of the sensor plate to obtain the requested radiograph. Proficiency will show the participant remembered the sensor positioning portion of the demonstration. The participant understands the interrelation between correct identification of the teeth and the placement of the sensor.

1.3. The participant will position the plate in the dental model. This step demonstrates active engagement for the participant.

2. **Confirming correct placement of the sensor, set up the correct angulation of the tube head.**

    2.1. Given a specific area to radiograph, the participant will describe an effective angulation to obtain the requested radiograph. Proficiency will show the participant comprehended the instruction given during the training demonstration.

    2.2. The participant will select the correct angle using the protractor on the tube head. By correctly manipulating the protractor on the tube head, the participant has comprehended the instruction given during the training demonstration.

    2.3. The participant will align the tube head over the sensor. Success will show the participant understand the correlation between correct alignment and a diagnostic radiograph.

        2.3.1. The participant will propose the correct angle of the tube head if there is no protractor on the tube head.

3. **Identify solutions to technique errors found on the finished dental radiograph.**

    3.1. The participant will identify the components of a diagnostic radiograph. Success will show the participant can correctly identify the components of a diagnostic radiograph.

3.2. Presented with the completed radiograph, the participant will analyze the result using the

following criteria:

3.2.1.   Are the requested teeth positioned in the middle of the plate?

3.2.2.   Are there sections of the tooth that are missing?

3.2.3.   Are there technical errors such as cone cut-off, an image of the circuit, contrast or

density problems?

3.3. If technical errors are found, the participant will retake the radiograph with the

corrections. Repeating the radiograph will show the participant how adjustments can, in

most cases, correct the flaw. The learning moment comes when the participant can

compare the first attempt to the second attempt.

Outcome Alignments

Table 2

Outcome Alignments

Learning Outcome	Aligned Performance Outcome
Identifying the appropriate teeth, set up the correct location of the sensor.	Given a specific oral location to radiograph, the participant will point to the requested location on the dental model.
	The participant will justify the best position of the sensor plate to obtain the requested radiograph.
	The participant will effectively position the plate in the dental model.
Confirming correct placement of the sensor, set up the	
	The participant will select the correct angle using the protractor on the tube head.

correct angulation of the tube head.	The participant will align the tube head over the sensor.
Identify solutions to technique errors found on the finished dental radiograph.	The participant will explain the components of a diagnostic radiograph.
	Presented with the completed radiograph, the participant will analyze the result by answering the following questions: 1. Are the requested teeth positioned in the middle of the plate? 2. Are there sections of the tooth that are missing? 3. Are there technical errors such as cone cut-off, an image of the circuit, contrast or density problems?
	The participant will retake the radiograph with the corrections.

Instructional Strategies

Instructional strategies are used to help the instructional designer take the learning objective and effectively present the content to the participant (Morrison G. R., 2012). Well defined and implemented instructional strategies will make the training successful.

Instructional strategies are activities that align with and turn the objective into a learning moment for the participant (Center, 2016). It is also essential to achieve a deeper understanding of the material by providing ways for the participant to retain the information. The best way for the participant to retain information is to connect the material with the participant's current knowledge of the topic called generative learning (Morrison G. R., 2012, p. 138). Utilizing the participant's current knowledge helps to relate to the material, which causes increased

motivation more easily. There are four categories of strategies that create generative learning.

The categories are recall, integration, organizational, and elaboration (p. 139).

Each learning objective needs a type of content and strategy that would present the

material effectively to allow the participant to demonstrate the task correctly.   The strategies are

developed using prescriptions. Prescriptions are aligned with each outcome. Prescriptions are

created to achieve the intended performance of the participant using the planned materials. The

prescriptions used to develop instructional strategies are fact, concept, principle, procedure,

interpersonal skill, and attitude (Morrison G. R., 2012, p. 140).

For this project, the prescription for procedures best suits the content and the learning

objectives. Procedures are a predetermined list of steps that the participant follows to complete a

task. The generative strategy occurs in two steps. The first step is the development of a mental

model to review the steps of the exercise for the participant. The review of the steps can be

presented in multiple ways, such as providing a written list or multimedia demonstration of the

steps. The second step is a practice session where the participant performs the steps of the task.

Table 3 demonstrates how the chosen strategy effectively aligns with the objective.

Table 3

Alignment of Outcome to Strategy

Learning Outcomes	Performance Outcomes	Instructional Strategy	Explanation
Identifying the appropriate teeth, set up the correct location of the sensor.	Given a specific oral location to radiograph, the participant will point to the requested location on the dental model.	Expose, Inquire, Discover, Create, Experiment	The trainer identifies the oral anatomy structures that need to be radiographed. The

			participant recalls the location and performs the exercise.
	The participant will justify the best position of the sensor plate to obtain the requested radiograph.	Expose, Inquire, Discover, Create, Experiment, Share	After watching the trainer's demonstration, participants should develop a mental picture of how the tube head aligns with the protractor. The participant will paraphrase the steps of how the tube head aligns with the protractor.
	The participant will effectively position the plate in the dental model.	Expose, Inquire, Discover, Create, Experiment	After watching the trainer's demonstration, participants should develop a mental picture of how to position the sensor plate in the dental model. The participant performs positioning the plate in the dental model.
Confirming correct placement of the sensor, set up the correct angulation of the tube head.	The participant will select the correct angle using the protractor on the tube head.	Expose, Inquire, Discover, Create, Experiment	The trainer demonstrates the correct angle for each view. The participant must recall the correct angle and demonstrate that they understood the instruction.

	The participant will align the tube head over the sensor.	Expose, Inquire, Discover, Create, Experiment	After watching the trainer's demonstration, participants should develop a mental picture of how the tube head aligns with the sensor. The participant performs positioning the tube head over the sensor.
Identify solutions to technical errors found on the finished dental radiograph.	The participant will explain the components of a diagnostic radiograph.	Expose, Inquire, Discover, Create, Experiment, Share	After watching the trainer's lesson on the components of a diagnostic radiograph, the participant should develop a mental picture of how a diagnostic radiograph should look. The participant will paraphrase the components of a diagnostic radiograph. Presented with a diagnostic radiograph, the participant will point out the necessary components.
	Presented with the completed radiograph, the participant will analyze the result by answering the following questions:	Expose, Inquire, Discover, Create, Experiment, Share	After watching the trainer's lesson on common technical errors found on dental radiographs,

1. Are the requested teeth positioned in the middle of the plate? 2. Are there sections of the tooth that are missing? 3. Are there technical errors such as cone cut-off, an image of the circuit, contrast, or density problems?		the participant should develop a mental picture of common errors of the dental radiograph. The participant will paraphrase the common errors found on a dental radiograph. Presented with the attempted radiograph, the participant will be able to decide if their radiograph is diagnostic or what errors are present on the radiograph.
The participant will retake the radiograph with the corrections.	Expose, Inquire, Discover, Create, Experiment, Share	If errors were present on the attempted radiograph, the participant will list the adjustments required. The participant will transfer the adjustments to the dental x-ray tube head and sensor. The participant will retake the radiograph.

Instructional Resources

When identifying instructional resources, it is important to remember that the content must be

effective and efficient with a focus on essential knowledge and skills that the participant will

retain.   The next step is to integrate technology that expands the content to the diversity of the

participants. The way a participant grasps a concept can vary from individual to individual. The

goal is to find a way to present a concept or fact that resonates and engages the participant.

According to Morrison, Ross, Kalem, and Kemp (2012), the more the content resonates, the

more likely it will be retained (p. 138). Also, Wiles, Rose, Curry-Lourenco, and Swift (2015)

noted the combination of good content and well-chosen technology is a course that supports

evidence-based practice, critical thinking, and clinical judgment skills.

The content of the course should first allow the participant to quickly navigate through

each of the steps in the goal sequence. Secondly, the content should provide active learning to

build the confidence of the participant.   Handshaw (2014) found that building participant

confidence will assure better retention of the skill and assure the passing of the skill to the

participant's clinic environment. The content will also have assessments at pre-determined

points throughout the training. Assessments will be given at the end of each unit to ensure the

material is completed. Assessments will be set up to be repeated to allow the participant to

improve results as needed.

The course is divided into three sections: pre-training, active training, and post-training.

Pre-training materials will be reviewed and completed by the participant before the active

training session. Active training materials will be reviewed and completed during the face-to-

face portion between the participant and the trainer. Post-training materials will be reviewed and completed immediately after the active training.

Pre-training session.

The pre-training will be held online. A course will be designed to prepare the participants for the future active learning session. The designer will have all the pre-training materials prepared for building the course site.

Active Training Session

The Active Training Session will provide skill-building through interaction with course materials and the trainer. A manual will be distributed to the participants which divide the training into modules with activities attached to each module.

Post Training Session

The post-training session will gather feedback from the participants. The survey results will then be compared with the feedback from the pre-training session and observations of the active session to make modifications to the course design.

Existing Emerging Technologies

The important rule when choosing technology is to prepare the training first and then fit the technology to the training (Piskurich, 2015). The technology should be kept as simple as possible to avoid confusion on the part of the participant while they are in the course.

Technology will be chosen to support the three phases: the pre-training, active, and post-training session.

Materials

In this subsection, Table 4 looks at the important content that supports the content analyses, proposed technologies, delivery methods, and instructional strategies.

Table 4

Alignment of Design Considerations with Materials

Design Consideration	Materials	Explanation
Content Analysis Pre-training Session	• Written goal statement for the course. • Written and downloadable instructions for navigating around the course site. • Written and downloadable instructions are explaining the course layout. • The homepage should have links to all aspects of the course to allow the participant access right away.	The pre-training session will be held as a course on an LMS. The first page of the LMS will be the introduction.
Content Analysis: Pre-training Session	• Written goal statement for the course. • Written and downloadable instructions for navigating around the course site. • Written and downloadable instructions explaining the course layout. • The homepage should have links to all aspects of the	In the LMS for the pre-training session, there will be instructions for navigating through the materials and the course.

	course to allow the participant access right away.	
Content Analysis: Pre-training Session	• The units and lessons of the pre-training course will be mapped out using concept mapping software.	In the LMS for the pre-training session, the units and lessons will be mapped out for easier navigation for all levels of computer users.
Content Analysis: Pre-Training Session	• Written introduction to each unit. • The written outline is showing the name of the unit, the objective(s) of the unit, the course materials, and the planned assessment for the unit. • Assessments will be in the form of a quiz taken online. • Quiz questions will need to be written based on the course materials for the unit. • Questions must be easily referenced back to the course materials. • Questions will be forced answer or short answer. • Each question will require a feedback statement explaining the reasoning behind the correct answer.	In the LMS for the pre-training session, the objectives, instructions, chosen materials, and assessments will be listed for each of the following units: Unit 1: Recognize and locate the four types of teeth in the oral cavity of the dog and cat. Unit 2: Charting the oral cavity using the Modified Triadan System. Unit 3: Review basic computer skills covering commands used in word processing.
Content Analysis: Pre-Training Session	• Using the concept map, break each unit down into lessons and add them to the course outline. • Written introduction with instructions on how to navigate the lesson layout.	In the LMS for the pre-training session, the lessons will be sub listed under each corresponding unit. Each lesson will have instructions.
Content Analysis: Pre-Training Session	• Written lesson objectives and course materials for each lesson.	In the LMS for the pre-training session, the objectives and materials will be listed for each objective.

Content Analysis: Pre-Training Session	• Participants final assessment results will be added to the assessment rubric. The rubric should have comments from the instructor covering the success of the student.	In the LMS for the pre-training session, the final assessments results for each participant will be provided.
Content Analysis: Pre-Training Session	• Printable or downloadable certificate the participant will need to bring to the Active Training Session	In the LMS for the pre-training session, each participant will be able to download or print a certificate of completion.
Content Analysis: Pre-Training Session	• Polling or survey software to allow the participants to provide feedback on their experience with the course. • The survey will include forced answer questions and an area to add comments.	In the LMS for the pre-training session, each participant will fill out a post-course survey to provide feedback.
Content Analysis: Active Training Session	The manual will be a bound document covering: • Training agenda. • Training objectives. • Course modules with objectives • Activities that correspond with the module. Each activity will be listed in a step-by-step format	In the active training session, each participant will receive a manual that provides an agenda for the day's activities.
Content Analysis: Active Training Session	• Group discussion - Recap and review of pre-training session and how they connect to the active learning session.	In the active training session, there will be a brief review of the pre-training session to connect the content to the active training session.
Content Analysis: Active Training Session	• Written instructions including diagram or photograph pointing out the location of the settings buttons. • Group orientation session is demonstrating how the settings are adjusted.	In the active training session, Module 1 of the training will cover learning the settings of the dental x-ray generator.

Content Analysis: Active Training Session	• Written instructions on dental x-ray safety. • Group discussion is covering dental x-ray safety techniques.	In the active training session, Module 2 will teach the participants proper dental x-ray safety techniques.
Content Analysis: Active Training Session	• Group presentation covering the theory of the interaction between sensor placement and tube head angulation to produce a diagnostic radiograph. • Cadaver specimens of a dog and cat head. • Dog and cat skulls, clear acrylic dog and cat mouth models. • Written checklist of the steps to properly position the sensor for each x-ray view. • Written checklist of the steps to properly angle and align the tube head for each x-ray view. • Group demonstration by the trainer showing the steps to position the sensor accurately, angle the tube head and align the tube head for each view.	In the active training session, Module 3 will cover sensor placement and tube head angulation.
Content Analysis: Active Training Session	• Written checklist of the steps to assess the produced x-ray image. • Written list with graphics of common technical flaws with solutions. • A copy of a high-quality image with arrows pointing to features that demonstrate a high-quality image. • The image produced by the participant.	In the active training session, Module 4 will teach the participants how to evaluate the finished image.

Content Analysis: Active Training Session	Written instructions covering: • How to enter a patient into the system. • How to acquire an image. • How to annotate an image. • How to operate the software to write and maintain dental x-ray records. • Group demonstration showing each of the above tasks.	In the active training session, Module 5 will teach the basic skills needed to run the dental x-ray software.
Content Analysis: Post-training Session	• Written survey to be filled out by the participants.	In the post-training session, the participants will fill out a survey to share their training experience and give feedback.
Proposed Technologies	• Authoring system.	The online pre-training course will need to be written using an authoring system. The content of the course will be uploaded from reusable sources or created by the designer.
	• Test development software	In the online pre-training course, each unit will have an assessment. The software will deliver and grade the evaluations.
	• Media and graphics	Multimedia content is needed to provide diverse ways for the participant to grasp the skills needed to produce radiographs. The multimedia format allows for in-depth exploration of the topic.
	• Dental models	Dental models are used to point out anatomy and demonstrate dental skills. The models are designed to be as close to real-life as possible.
	• Dental x-ray generator and sensor	During the active training session, the x-ray equipment needs to be present to allow the participants to interact with it. The interaction

		will engage the participant and build confidence while learning the steps of the task.
	• Dental x-ray software	For the active training phase, the x-rays are acquired by placing the tooth on a sensor, and the x-ray beam hits the sensor. The image appears on the computer screen through the software program. The participant needs to complete the basic tasks required to learn how to use the software.
Delivery Methods	• Learning Management System (LMS) or Learning Content Management System (LCMS)	The pre-training session will be an online course. The platform for the course will be on an LMS or an LCMS.
	• Printed Materials	Handouts will be provided to the participants as part of the active training session. Each handout will contain instructions and a list of activities.
	• Demonstration Models	Demonstration models will be used during the active training session to point out anatomy and assist in demonstrating positioning techniques.
	• Video	Video clips will be used during the pre-training session to demonstrate features of the anatomy and provide a preliminary positioning training.
	• 3D Simulation	3D simulation can bring another dimension to the preliminary positioning training. The simulation can offer more views on each position than 2D video can. The participant can also run the simulation, and the software can assess the success of the positioning attempt.

	• Demonstration Equipment	For the active training, the dental x-ray generator and the sensor will be present for the participant to practice taking dental radiographs and gain confidence using the equipment.
Instructional Strategies	• Asynchronous e-learning	• Pre-instructional activities. • Gain participant attention. • Inform the learner of the objectives. • Present interactive materials. • Provide learning guidance. • Provide feedback. • Assess performance. • Enhance retention to active training.
	• Printed Materials	• Inform participant of objectives. • Organize the objectives. • Provide learning guidance.
	• Demonstration models	• Presents interactive materials. • Allows guided practice. • Allows independent practice. • Creates an experience.
	• Video	• Presents interactive materials. • Creates an experience. • Develop concepts and skills. • Orientation.
	• 3D Simulation	• Orientation to positioning skills. • Participant training. • Simulation operation. • Participant assessment.
	• Demonstration equipment	• Presents interactive learning. • Orientation to the x-ray equipment and software. • Provides structured practice. • Provides guided practice.

Design Integration

      Demonstrating correct placement of the sensor.

The design will use materials and training personnel to demonstrate the correct placement of the sensor. The training personnel will provide a psychomotor component to engage the participant. The participant will watch the demonstration and create a mental picture of the anatomy and how the sensor is positioned in the mouth. The participant will recall the steps and place the sensor in the mouth. Printed or downloadable handouts containing graphics and links to video clips will further reinforce the training after completion.

      Demonstrating correct angulation of the tube head.

The design will use materials and training personnel to demonstrate how to correctly angle to tube head using the protractor on the tube head as a guide. The training personnel will provide a psychomotor component to engage the participant. The participant will watch the demonstration and create a mental picture of the steps to measure the tube head angle using the protractor. The participant will recall the steps and manipulate the tube head to the correct angle. Printed or downloadable handouts containing graphics and links to video clips will further reinforce the training after completion.

      Identifying solutions to errors found on the finished dental radiograph.

The design will use materials and training personnel to review the components of a diagnostic radiograph. After the demonstration, the participant will have a mental picture of a diagnostic radiograph. Next, the trainer will review common technical errors found on the dental radiograph. After the review, the participant will have a mental picture and hard copy images of

common technical errors. The participant will follow the steps to produce a dental radiograph.

The participant will assess the radiograph and decide whether the image is diagnostic or if the

image needs to be retaken to correct errors. Printed or downloadable handouts containing

graphics and written explanations will further reinforce training after completion.

Delivery Methods and Anticipated Learner Experience

Choosing a delivery method combines selecting a location of the training and the best way to

share the material with the participant. Piskurich (2015) explains that what is important is that

the delivery efficiently and effectively presents the course content.   Organizing the materials

into the appropriate delivery method is the next step. Table 5 is an estimate of the planning

hours needed to write and prepare the materials for the course. According to Piskurich, a general

rule of thumb is to plan 25 hours for each hour of preparation for online content for a ratio of

25:1. For in-classroom content, Piskurich recommends 10 hours of preparation for each hour of

class content for a ratio of 10:1. Piskurich's Delivery Analysis form was used as a guide (p. 59)

Table 5

Delivery Analysis

	Delivery Method	Reasons for Delivery	Days/Hours
	Virtual Classroom/Learning Environment– LMS, LCMS	The pre-training session will be an online course. The platform for the course will be on an LMS or an LCMS.	25:1 75 hours

	3D Simulation	3D simulation can bring another dimension to the preliminary positioning training. The simulation can offer more views on each position than 2D video can. The participant can also run the simulation, and the software can assess the success of the positioning attempt.	(Dr. A – suggestions on a time frame for this portion or resources to get an average time frame?)
	Multimedia materials: Videos	Video clips will be used during the pre-training session to demonstrate features of the anatomy and provide a preliminary positioning training.	25:1 75 hours
	Printed materials	Handouts will be provided to the participants as part of the active training session. Each handout will contain instructions and a list of activities.	10:1 40 hours
	Demonstration equipment	For the active training, the dental x-ray generator and the sensor will be present for the participant to practice taking dental radiographs and gain confidence using the equipment.	0-1 hour For in-clinic training, the equipment will already be on site. Phone time to confirm.

	Demonstration models	Demonstration models will be used during the active training session to point out anatomy and assist in demonstrating positioning techniques.	0-1 hour The trainer or the clinic will provide these materials. Phone time to confirm
Total Number of Days/Hours			Days: 10-14 days Hours: 271-336 hours

Assessment Plan

This course will be presented using the three principles of experiential learning. Hirumi et al. (2016), describe the three principles as 1) framing the experience, 2) activating the experience, and 3) reflecting on the experience. InterPLAY advances experiential learning using story, play, and game/simulation. The use of story play and game/simulation increases participant engagement and learning (p. 1305). It is crucial to remember that instruction is integrated into the story, play, or game/simulation, and the instruction is enhanced.

For this course, we will be using the grounded instructional strategies for InterPLAY – Expose, Inquire, Discover, Create, Experiment, and Share. In Table 6, the strategies will be aligned with each one of the learning outcomes. The assessments that will be used to measure the progress and success of the participants is also aligned with the learning outcomes. Additionally, Morrison, Ross, Kalman, and Kemp (2012) note that when outcomes, strategies, and assessments align, it will increase the reliability and validity because it specifically measures what it learned.

Table 6

Alignment of Outcomes, Strategies, and Assessments

Learning Outcome 1: Identifying the appropriate teeth, set up the correct location of the sensor.				
Performance Outcomes	Given a specific oral location to radiograph, the participant will point to the requested location on the dental model.			
	The participant will justify the best position of the sensor plate to obtain the requested radiograph.			
	The participant will effectively position the plate in the dental model.			
Instructional Strategy	Expose, Inquire, Discover, Create, Experiment			
Assessment Method	Summative			
Explanation	Throughout the training, the participant will be assessed on their success to achieve the learning objectives.			
Learning Outcome	Learning Experience	Assessment	Rubric	Formative/Summative
Identifying the appropriate teeth, set up the correct location of the sensor.	Experiential learning using live simulations. Demonstration by trainer followed by participant activation using live simulations. Reflection on experience	Direct testing Anecdotal records	Yes	Summative

Learning Outcome 2: Confirming correct placement of the sensor, set up the correct angulation of the tube head.	
Performance Outcomes	The participant will select the correct angle using the protractor on the tube head.
	The participant will align the tube head over the sensor.
Instructional Strategy	Expose, Inquire, Discover, Create, Experiment, Share

Assessment Method	Summative			
Explanation	Throughout the training, the participant will be assessed on their success to achieve the learning objectives.			
Learning Outcome	Learning Experience	Assessment	Rubric	Formative/Summative
Confirming correct placement of the sensor, set up the correct angulation of the tube head.	Experiential learning using live simulations. Demonstration by trainer followed by participant activation using live simulations. Reflection on experience	Direct testing Anecdotal records	Yes	Summative

Learning Outcome 3: Identify solutions to technical errors found on the finished dental radiograph.				
Performance Outcomes	The participant will explain the components of a diagnostic radiograph.			
	Presented with the completed radiograph, the participant will analyze the result by answering the following questions: 1. Are the requested teeth positioned in the middle of the plate? 2. Are there sections of the tooth that are missing? 3. Are there technical errors such as cone cut-off, an image of the circuit, contrast or density problems?			
	The participant will retake the radiograph with the corrections.			
Instructional Strategy	Expose, Inquire, Discover, Create, Experiment, Share			
Assessment Method	Summative			
Explanation	Throughout the training, the participant will be assessed on their success to achieve the learning objectives.			
Learning Outcome	Learning Experience	Assessment	Rubric	Formative/Summative

Identify solutions to technical errors found on the finished dental radiograph.	Experiential learning using live simulations. Demonstration by trainer followed by participant activation using live simulations. Reflection on experience	Direct testing Anecdotal records	Yes	Summative

Project Timeline

A project timeline is embedded into the document as a hyperlink. Each course component has

been put on the schedule. The project should be ready to launch in about 10-14 days.

Milestones

Position	Date	Milestone
1	8/25/2019	Start
-2	9/1/2019	Virtual Classroom Introd
1	9/9/2019	Virtual Classroom Unit 1
-1	9/16/2019	Virtual Classroom Unit 2
-1	9/24/2019	Virtual Classroom Unit 3
-1	10/2/2019	Virtual Classroom Unit 4
2	10/2/2019	Multimedia integration- virtual classroom Unit 1
1	10/9/2019	Multimedia integration- virtual classroom Unit 2
-1	10/17/2019	Multimedia integration - virtual classroom Unit 3
-1	10/24/2019	Multimedia integration - virtual classroom Unit 4
1	10/21/2019	Printed materials preparation for active training session- Unit 5
-2	10/24/2019	Printed materials preparation for active training session- Unit 6
3	10/26/2019	Printed materials preparation for active training session - Unit 7
-1	10/28/2019	Printed materials preparatin for active learning session - Unit 8
1	11/2/2019	Printed materials preparation for active learning session - Unit 5
1	11/4/2019	Confirm presence of demonstration equipment
-3	11/5/2019	Confirm presence of demonstration models
-2	11/6/2019	Review and edit virtual classroom materials

2	11/7/2019	Review and edit multimedia materials
-1	11/9/2019	Review and edit printed materials
1	11/11/2019	Virtual Classroom test
-3	11/13/2019	Send out printed materials for publishing
2	11/16/2019	Assemble materials
1	11/17/2019	Launch LMS to first pre-training class

Summary of Edits

High Use of Passive Language

Writing for instructional design requires clear and concise language. Clear and concise language requires the use of active verbs. The use of active verbs conveys confidence and an understanding of the needs of the project.

Wordiness

I write as I think. If I am tackling a topic I do not completely understand, I think and write about it. A solution to this is to review the sentence and use more active language.

You will complete this section of the template during the Week 4 Assignment in IDT602. In this section, describe in substantial detail the summary of edits made to the final IDPP based on instructor and classmate feedback. If appropriate, use Level 2 and Level 3 subheadings to organize this section.

Compound Sentences

The objectives were written in compound sentences. Each objective sentence had two objectives. This can be confusing for the participant. The participant does not have clear direction when there are two objectives instead of one.

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