

A4: Design Plan – New Endoscopy Technician Onboarding Module

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Introduction

This is a Design Plan for an educational experience for New Endoscopy Technicians onboarding in an Endoscopy unit within a healthcare center. The purpose of this design is to outline the components of this educational experience and learner considerations reviewed and applied to the module. This paper describes the design using the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) and is organized into sections that align with each step of the model. The final product of this design is a browser-based learning experience that is self-directed and includes a competency assessment. This module provides the New Endoscopy Technician with the core knowledge required to perform job tasks related to flexible endoscopes.

Learner & Needs Analysis

This module is designed as the first step in the onboarding process for a New Endoscopy Technician (NET). The goal of this learning experience is to introduce the NET to the core concepts and knowledge of flexible endoscopes used in the Endoscopy unit. The foundational information contained in this learning experience applies to all job duties and allows the NET to have a firm knowledge base with which to build upon throughout the onboarding process. One or more flexible endoscopes are used for every Endoscopy unit procedure, and the Endoscopy Technicians are responsible for selecting and setting up the appropriate endoscopes for each procedure type. Identifying the correct endoscope visually and functionally is at the core of the New Endoscopy Technician's job duties.

Individuals hired into the Endoscopy Technician role are adult learners who may have prior experience with flexible endoscopes, or the devices may be entirely new to them. To continue through the onboarding process and successfully build up the knowledge base that allows the

NET to perform their job duties well, they must learn the devices and terminology used within the department. The solution to this gap is to ensure that all incoming hires complete the same learning experience, whether or not they have previous experience with the devices.

The learner base consists of individuals with varied educational/social backgrounds and language proficiencies. The job requires extensive physical capabilities, but new hires may have vastly different technological, reading/writing, and psychological traits and skills. Taking this all into consideration, this introductory module is designed to be a self-directed learning experience and core competency assessment, as well as a constant resource for the NET to refer to throughout their onboarding experience. Having an open digital environment allows the NET to choose what areas of the educational experience they interact with in what order, without a linear organizational structure. This encourages greater interest, ownership, and transfer of the material while allowing the NET to adjust the learning experience to their specific learning preferences, experience, and speed (Garrison, 1997). The NET can progress through the various content categories at-will and repeat any content activity they desire until they achieve understanding.

Design

New Endoscopy Technician Onboarding - Endoscope Identification Module		
Instructional Goal: The goal of this learning experience is to familiarize the New Endoscopy Technician with core concepts and knowledge required to understand and perform job duties related to flexible endoscopes.		
Objective	Instructional Strategies	Applicable Assessments
1. Identify flexible endoscope anatomy by name.	<ul style="list-style-type: none"> • Multimedia features • Interactive knowledge checks • Gamification • Self-guided user interface • Instant response feedback • Unlimited practice drills 	<ul style="list-style-type: none"> ○ Matching tasks ○ Practice game ○ Final assessment quiz
2. Identify flexible endoscope type by model number and anatomical details.	<ul style="list-style-type: none"> • Chunked content groups • Multimedia features • Interactive knowledge checks • Gamification • Self-guided user interface • Instant response feedback • Unlimited practice drills 	<ul style="list-style-type: none"> ○ Matching tasks ○ Practice game ○ Final assessment quiz
3. Describe the purpose of each anatomical part of the flexible endoscope.	<ul style="list-style-type: none"> • Multimedia features • Interactive knowledge checks • Gamification • Self-guided user interface • Instant response feedback • Unlimited practice drills 	<ul style="list-style-type: none"> ○ Matching tasks ○ Practice game ○ Final assessment quiz

Using the Understanding by Design/Backward Design framework, the first lesson plan displayed below was built out starting with the objectives listed above and consistent with competency-based assessments in the medical environment. The instructional strategies and assessments are quite similar between varied endoscope models as this is a heavily instructivist approach focusing on lower-order thinking skills (Larson & Lockee, 2020). To further build out the lesson plan, the components were broken down using Gagne's Nine Events of Instruction model.

Understanding By Design Model

Stage 1 - Desired Results		
<p>At completion of this module, the New Endoscopy Technician will be able to:</p> <ul style="list-style-type: none"> • Identify flexible endoscope anatomy by name. • Identify flexible endoscope type by model number and anatomical details. • Describe the purpose of each anatomical part of the flexible endoscope. 	<i>Transfer</i>	
	<p>Learners will be able to independently use the core information from this lesson to scaffold further training upon as they progress through the New Endoscopy Technician Onboarding.</p>	
	<i>Meaning</i>	
	<p>UNDERSTANDINGS <i>Students will understand that...</i></p> <ul style="list-style-type: none"> ○ Flexible endoscopes used in the esophagus have identifiable characteristics. ○ Flexible endoscopes used in the colon have identifiable characteristics. ○ Flexible endoscopes have universal anatomical details from other medical devices. 	<p>ESSENTIAL QUESTIONS</p> <ul style="list-style-type: none"> ○ How do I know which type of endoscope this is? ○ What identifying factors let me know what area of the body this scope is used in? ○ What features make a medical device a flexible endoscope?
	<i>Acquisition</i>	
<p><i>Students will know...</i></p> <ul style="list-style-type: none"> ○ How to identify flexible endoscope models. ○ What the parts of the endoscope anatomy are called. ○ What the parts of the endoscope are used for. ○ Formal and informal terminology for flexible endoscope types. 	<p><i>Students will be skilled at...</i></p> <ul style="list-style-type: none"> ○ Choosing the correct endoscope when requested by various names. ○ Describing universal features of flexible endoscopes. ○ Identifying which region of the body the endoscope is used in. 	

Stage 2 - Evidence	
Evaluative Criteria	Assessment Evidence
<p>Learner engages with all required education materials</p> <p>Learner accurately completes the assessment questions</p>	<p>PERFORMANCE TASKS:</p> <ul style="list-style-type: none"> ○ Learner views the introductory presentation ○ Learner completes all activities and knowledge checks in the Colonoscope content category ○ Learner completes all activities and knowledge checks in the Gastroscope and Enteroscope content category ○ Learner completes all activities and knowledge checks in the Bronchoscope content category ○ Learner completes all activities and knowledge checks in the Ultrasound content category ○ Learner completes all activities and knowledge checks in the Endoscopic Retrograde Cholangiopancreatography (ERCP) content category ○ Learner completes practice matching game ○ Learner completes the final competency assessment
<p>Learner takes initiative to pursue further information</p>	<p>OTHER EVIDENCE:</p> <ul style="list-style-type: none"> ○ Learner engages with TouchSurgery app ○ Learner engages with the educational materials more than once ○ Learner utilizes external links for further resources

Stage 3 - Learning Plan

Summary of Key Learning Events and Instruction

1. *Introduction to Endoscopy* presentation is a high-level overview of the unit and devices and objectives for the module.
2. *What's a Colonoscope?* content presentation includes videos, images, interactive matching exercises connecting the name of the endoscope parts with an image, an auditory script, and includes a knowledge check at the end of the presentation. Content includes the names of the anatomical parts of the endoscope, the location the scope is used procedurally, different names for the anatomy of the endoscope and the procedures the device is used for.
3. *What are Gastrosopes and Enteroscopes?* content presentation includes videos, images, interactive matching exercises connecting the name of the endoscope parts with an image, an auditory script, and includes a knowledge check at the end of the presentation. Content includes the names of the anatomical parts of the endoscope, the location the scope is used procedurally, different names for the anatomy of the endoscope and the procedures the device is used for.
4. *What's a Bronchoscope?* content presentation includes videos, images, interactive matching exercises connecting the name of the endoscope parts with an image, an auditory script, and includes a knowledge check at the end of the presentation. Content includes the names of the anatomical parts of the endoscope, the location the scope is used procedurally, different names for the anatomy of the endoscope and the procedures the device is used for.
5. *What are Ultrasound Scopes?* content presentation includes videos, images, interactive matching exercises connecting the name of the endoscope parts with an image, an auditory script, and includes a knowledge check at the end of the presentation. Content includes the names of the anatomical parts of the endoscope, the location the scope is used procedurally, different names for the anatomy of the endoscope and the procedures the device is used for. Unlocks after the first three endoscope presentations are completed.
6. *What is ERCP?* Endoscopic Retrograde Cholangiopancreatography (ERCP) content presentation includes videos, images, interactive matching exercises connecting the name of the endoscope parts with an image, an auditory script, and includes a knowledge check at the end of the presentation. Content includes the names of the anatomical parts of the endoscope, the location the scope is used procedurally, different names for the anatomy of the endoscope and the procedures the device is used for. Unlocks after the first three endoscope presentations are completed.
7. *Practice matching game* includes images of scopes that the learner must connect with the proper names via click and drag and multiple-choice activities.
8. List of external links for voluntary use.
9. Final competency assessment questions.
10. Feedback form.

Gagne's Nine Events of Instruction Model

New Endoscopy Technician Onboarding – Flexible Endoscope Identification Module		
<p>Goal: The goal of this learning experience is to familiarize the New Endoscopy Technician with core concepts and knowledge required to understand and perform job duties related to flexible endoscopes.</p>		
<p>At completion of this module, the New Endoscopy Technician will be able to:</p> <ul style="list-style-type: none"> • Identify flexible endoscope anatomy by name. • Identify flexible endoscope type by model number and anatomical details. • Describe the purpose of each anatomical part of the flexible endoscope. 		
Gagne Event	Relevant Instructional Component(s) and Strategies	Interaction Time
Gain Attention	Begin with an introductory component that offers an overview of the Endoscopy department and equipment with video and images, as well as the interface of the module. This will launch automatically when the learner first accesses the experience.	5 min
Inform Learners of the Objectives	Objectives are included in the introductory component. The self-directed components of the module will unlock once the introduction is viewed.	[included in intro]
Stimulate Recall of Prior Knowledge/Learning	The quick overview of endoscope types included in the introduction will act as a refresher for learners with prior experience, and identify any components that are unfamiliar so the learner knows they only have to engage with relevant materials.	[included in intro]
Present the Stimulus	Components will be chunked by endoscope type, each information group delivered via multimedia presentation.	10 min (x5)
Provide Guidance	Fun knowledge checks are included in each endoscope component group.	2 min (x5)
Elicit Performance	A practice questions component is available for the learners to try at any time, with unlimited retries. The practice questions include comparison questions involving multiple endoscope models.	10 min

Provide Feedback	Practice questions generate immediate feedback for both right and wrong answers and link the learner back to the component teaching the relevant material(s) for review.	[included in practice]
Assess the Performance	There is a competency assessment quiz that confirm completion of the module and can be taken at any time. Learners are allowed multiple attempts to pass it.	15 min
Enhance the Retention & Transfer of the New Skills, Knowledge, and/or Attitudes	Outside materials offered to the learner for voluntary use: Mobile application TouchSurgery; links to relevant industry websites with additional education and reading. Module lessons are available even after completion of the quiz for future reference.	Unlimited

Develop

This educational experience will be delivered through a web browser format and an LMS login so the New Endoscopy Technician (NET) can track their progress and refer to the information at will. The NET will be asked to create a login during the first day of in-unit onboarding and is given the entirety of their onboarding period to complete all the assessments within the LMS. The Flexible Endoscope Identification module is the first to unlock and will be mandatory for further modules to become available. The NET is encouraged to complete this module within the first week of employment.

The educational interface includes an introductory video that gives a high-level overview of the Endoscopy unit and the types of procedures they provide. From there, the learner can access individual content groups related to each endoscope model. The content groups include videos, presentations with images and audio explanations, and interactive knowledge checks with a supplantive strategical approach. Additionally, the educational environment includes a practice area that provides active feedback on question responses and interactive activities such as

matching terminology to the appropriate anatomical feature in an image. The practice area includes comparison and grouping practice to encourage higher-order thinking skills via matching and multiple-choice problems involving multiple endoscope models. External resources are provided to the NET to pursue further knowledge related to this module, including publications by professional endoscopy organizations, a game-styled mobile application that walks learners through the procedural process, and links to video resources of procedures and training. There is a formative assessment quiz to denote competency of the material that must be passed before the NET proceeds to the following onboarding modules.

The developmental timeline includes a lot of filming and editing time for the video resources, and extensive editing and manipulation of photo and media resources for multimedia presentations. The formative assessments and practice activities should go through a test run with experienced Endoscopy Technician Trainers and feedback collected on how the material could be presented better. The content of this module will not go through many changes as the industry develops, so once the materials and videos have been created, they will still be applicable for a number of years. Having such a strong competency assessment and resource pool for New Endoscopy Technicians will improve their capabilities within the job and streamline the onboarding process, reducing the hands-on time with departmental trainers, educators, and managers.

Implement

Acting as the Subject Matter Expert as well as the designer, I will be performing all the preparation of materials. This is a labor-intensive role involving multiple technologies for video, image, and presentation development. If possible, this will be developed without a monetary

requirement, but a major issue will be determining if this format can be delivered as designed without purchasing a web host and LMS template or a license to Articulate 360. If access to particular software programs is not possible, this will limit the scope of what can be successfully implemented from the initial design. If the course materials cannot be implemented as designed, the interactive components and activities will be eliminated, and the content group materials can be delivered solely as a presentation.

Endoscope Identification Module – Implementation Plan			
Education Component	Component Parts	Required Resources	Estimated Work Hours
Introduction to Endoscopy	Presentation; Images	Photo Camera; Photo Editing Software; Presentation Software w/ LMS integration	3
What's a Colonoscope?	Presentation; Videos; Images; Knowledge Checks	Photo Camera; Photo Editing Software; Filming Equipment; Video Editing Software; Presentation Software w/ LMS integration	10
What are Gastrosopes and Enteroscopes?	Presentation; Videos; Images; Knowledge Checks	Photo Camera; Photo Editing Software; Filming Equipment; Video Editing Software; Presentation Software w/ LMS integration	10
What's a Bronchoscope?	Presentation; Videos; Images; Knowledge Checks	Photo Camera; Photo Editing Software; Filming Equipment; Video Editing Software; Presentation Software w/ LMS integration	10
What are Ultrasound scopes?	Presentation; Videos; Images; Knowledge Checks	Photo Camera; Photo Editing Software; Filming Equipment; Video Editing Software; Presentation Software w/ LMS integration	10
What is ERCP?	Presentation; Videos; Images; Knowledge Checks	Photo Camera; Photo Editing Software; Filming Equipment; Video Editing Software; Presentation Software w/ LMS integration	10
Practice Matching Game	Images; Formative Questions	Photo Editing Software; Presentation Software w/ LMS integration	3
External Links	List of hyperlinks	Web Development Software	1

Final Competency Assessment	Images; Formative Questions	Photo Editing Software; Presentation Software w/ LMS integration	2
Feedback Form	Automatic feedback form	Web form integration	1

Evaluate

This educational experience will be measured through a summative competency assessment, identified by the learners completing a formative assessment when they feel that they are comfortable with the material. Success will be monitored through completion of the assessment, but also considering how frequently the learners interacted with the material and resources. If the learners chose to interact with all the materials before completing the assessment, then the module should be deemed successful as it inspired the learners to interact with all the resources on their own volition. Competency is measured through a direct pass/fail grade on the assessment, and engagement is measured by collecting metrics on how the learners interacted with the varied materials offered. A good result from both these categories indicates that the New Endoscopy Technician is both a knowledgeable and motivated learner and these traits likely indicate good performance within the department.

Question types for the competency assessment include:

- Multiple-choice
- Click and drag
- Word and image matching
- True-False
- Select the correct image

Summary

The Endoscope Identification Module is the first step in the New Endoscopy Technician (NET) Onboarding process, and teaches core knowledge and concepts to the New Endoscopy Technician that are applicable to job functions and future learning. The module is designed to be a self-directed, single-site learning experience and resource website that the NET can use for initial information and reference as they proceed through the onboarding process. The learning events are interactive and cover all endoscope models used in the Endoscopy unit, training skills that will easily translate into physical actions. The scope of the module is minimal but requires extensive development and time to create the content areas and activities, since the module has a strong multimedia component and interactive practice. The summative evaluation is in line with industry standards on competency assessments and will be easy to record completion and track progress.

References

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