

Creating a Training Module for WebSphere Portal Information Development Co-Ops

Final Project Packet

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I. Needs Analysis

Context

The WebSphere Portal information development team at IBM is responsible for writing product documentation for WebSphere Portal, a website-building software program for mid- and large-sized companies. The core team comprises four full-time writers who are supported, at any given time, by one or two co-ops. The co-ops are students in Master's-level information development programs who are interested in learning more about software technical writing. Because the information development team and the wider Portal organization have adopted an agile philosophy, their work is iterative and fast-paced, so it is imperative that all team members can complete their work efficiently. The information development team works closely with the product design, development, test, and support teams, and if they do not complete their work efficiently, the ability of these stakeholders to complete their own work efficiently is affected.

Co-ops on the team are treated like full-time, permanent employees throughout the duration of their contract: they receive as much work as their teammates, their work is held to the same standards as their teammates', and they are expected to be as independent and self-sufficient as their teammates. To prepare new co-ops to be fully independent, contributing members of the team, the team spends approximately one week training each new co-op. This training is a blend of shadowing team members and watching tutorial videos. At the end of the week, the co-op completes a test that asks them to use Oxygen XML Editor and Acrolinx to write a simple task topic using DITA, a markup language. If the co-op completes the task successfully, he/she is phased into

independent work with little to no support. If the co-op does not complete the task successfully, he/she completes another similar, brief test.

Past co-ops have expressed frustration at the lack of hands-on training they received with Oxygen and Acrolinx prior to completing the test, and the team lead has expressed concern that the current training structure does not prepare new co-ops for the hands-on nature of their work. Because the team is small and the content they maintain is expansive, they do not have more time to spend training new co-ops and employees how to use and optimize these tools, which can prevent co-ops from contributing as much or as quickly as they should.

Statement of problem

We believe the lack of formal training in Oxygen and Acrolinx is a problem with an instructional solution. The problem is indicated by several factors. A survey of five former co-ops revealed that all five felt overwhelmed while they were being trained. None of the five felt prepared to work independently after they completed training, suggesting that it took too long for them to become productive the tools they needed to work independently. Most co-ops earn \$35 an hour (the staff writers are paid even more), so when the newly hired writers join the team and spend a week in inefficient training, the company loses at least \$1,400 per employee due to inefficient use of their time. It's even a bigger problem with co-ops who have limited-time contracts. By the time the co-ops become fully independent and productive, they are halfway through their contracts, and then new co-ops come in and repeat the cycle.

Type of needs assessment

Newly trained co-ops on the WebSphere Portal information development team often feel overwhelmed by training and unprepared when training is complete. This lack of skills is a problem with an instructional solution that can be analyzed using a problem-solving needs assessment. The problem itself is fairly straightforward: Co-ops need to be trained quickly so that they can contribute to the team, but there are no hands-on training activities available to help them learn and practice the programs they need to complete their daily work. This problem is caused by the team's lack of time as well as their lack of experience developing instructional solutions. The four team members are responsible for maintaining over 1,000 individual documentation topics as well as developing new topics for new product features, which leaves them no time to dedicate to developing any formal training materials. Even if they did have time, none of them have experience with developing trainings, and they have expressed that they would not know where to begin.

We believe that an instructional intervention is appropriate for this situation because the problem “results from a lack of skills, knowledge, or information” rather than administrative, political, or logistical issues (Larson & Lockee, 2014, p. 28). There is also a need to design the instruction because almost no written or designed instruction exists. The only training artifact available is a single sheet of paper describing a short exercise that co-ops complete at the end of their training. There are also some tutorial videos produced by another team within IBM, but these focus on optimizing the programs rather than getting started with them.

The learning environment in which learners will complete the proposed training and the performance environment in which they will ultimately apply what they learn are nearly identical. The information development team sits in its own row of cubicles, and each team member has his or her own cubicle, which creates a quiet, semi-isolated work environment. When co-ops are training, their learning environment is quiet: they typically sit in their cubicles and use their computers to access tutorial videos. Similarly, when co-ops are trained and working independently, they sit in their cubicles and use their computers to complete their work. However, a key difference between the two that could affect the way that learning in the learning environment transfers to application in the performance environment is the level of distractions inherent in each. The learning environment will be focused on the task of learning, whereas the performance environment will require the co-op to multitask. For example, in the performance environment, the co-op might simultaneously write documentation and take a phone call, or write documentation and converse with co-workers through instant messaging. The co-op's attention is likely to be divided in the performance environment in ways that it will not be in the learning environment, which is a challenge that must be kept in mind as the instructional solution is designed.

Data collection plan

To learn more about the needs of the WebSphere Portal information development team, we collected data in three ways: through first-hand knowledge, through interviews, and through anonymous surveys. One of our team members works on the information development team, and we used her first-hand knowledge to gather basic data about how the team is structured and what the team does. To ensure that

this team member's closeness to the information development team did not introduce bias in our data, we only relied on her for objective information about the team.

Then, we interviewed the team lead about her perceptions of the team's current approach to training, her assumptions about learning, and her vision for a more formal training module. We chose not to interview the team's manager because he was very recently assigned to the team, is unfamiliar with the team's training processes, and indicated that he defers to the team lead about matters of training.

Finally, to gain another perspective on the needs of the team, we developed a brief survey about the WebSphere Portal information development training experience and asked five past co-ops to complete it (the team lead could only furnish contact information for five; these five all underwent training on the team within the last five years). The survey included Likert scale questions and short-response questions that asked co-ops about their emotions throughout the training process, their preparedness after training was complete, and their learning preferences. Participants' responses were recorded anonymously.

Analysis of the data and findings

By using a combination of first-hand knowledge, interviews, and surveys, we were able to gather qualitative and quantitative data from both those who administer training and those who undergo training. Perhaps the most significant finding of the surveys was that none of the five past co-ops felt prepared to work independently after their training was complete. Similarly, none of them felt that their training was well organized. Two tools stood out as most problematic: RTC (3 of 5 participants) and Oxygen (2 of 5 participants). These are the two most basic tools that information

developers on the WebSphere Portal team use to complete their daily work, which suggests that these co-ops struggled to complete their basic daily work after training was complete, leading to lost company time and money. Two participants indicated that they thought more hands-on training activities with these tools would have made their trainings more effective: they said they wished they'd had "more hands on activities before actual work" and "more opportunities to learn and practice the tools hands on." Another suggested that training would have been more effective if a "clear goal and set of tasks" to complete, echoing another participant's wish for an "organized training system."

Based on the data and analysis, we determined the following as the primary goal of this instructional intervention: Co-ops will be able to independently produce a task, concept, and reference topic correctly using their respective DITA tagging hierarchies and IBM style using Oxygen and Acrolinx. Co-ops who met this goal would demonstrate a conceptual and practical understanding of Oxygen and Acrolinx, which would ready them to work independently.

Implications of the findings

Based on the survey data, we think there needs to be an online, asynchronous instructional solution. The team lead has expressed that the staff writers are too busy to train the new team members with a synchronous face-to-face instruction on the use of the key tools, Oxygen XML Author and RTC, as well as the key concepts of the IBM writing style the conformity to which is checked by the Acrolinx, a linguistic analytics software plugin. The asynchronous instructional product will allow new hires to complete the training independently, freeing up other team members, as well as allow the learners to process the new information at their individual pace.

In addition, we are planning to design this instructional product in the online format for the following reasons:

- The learners would be able to access it anytime and anywhere, which would cater to individual learning styles and productivity schedules.
- The online training product would orient new hires to using the computer and the relevant programs (Oxygen XML Author and Acrolinx) to complete work, matching the learning environment to the performance environment.

Resources

We will utilize several resources to create this instructional solution. Perhaps most importantly, we will need access to Oxygen and Acrolinx, the two tools that our solution introduces. This implies that we will also need hardware on which to use the tools, either desktop computers or personal laptops. We will also need a screen capture program to take screenshots of the tools' UIs (user interfaces) to complement the written instruction we create. Additionally, to build our training module, we will need to utilize basic HTML and web building skills.

Another important resource for this solution is the continued input from the WebSphere Portal information development team. To ensure that our solution is learner-centered, we need to work iteratively and obtain their feedback on our designs. To complete this analysis, we were using this online survey and gathered data from 5 participants who had completed a co-op or had joined the team as junior staff writers. The full text of the survey questions as well as the responses is attached in Appendix A.

Evaluation

We will evaluate the success of our solution by gathering both objective and subjective data about it from the team lead and from future co-ops. Objectively, we will

develop an “answer key” against which the tasks completed by co-ops during the training can be evaluated. This will help the team lead know, immediately after the co-op completes an activity during the training, what he/she seems to understand and what he/she might need more practice with. We will also develop a pre-training and post-training test that evaluates how well they retain core concepts about how to use and optimize the tools.

To gather subjective data, we will develop pre-training and post-training surveys that evaluate how the co-ops feel about their preparedness to work. A primary factor driving this instructional solution is past co-ops’ dissatisfaction with their training experiences, so it is important to the client that our instructional solution not only teaches the co-ops about the tools, but that it also leave them feeling more confident about their ability to complete their work efficiently and effectively.

II. Learner Analysis

Target audience

The target learner audience for this instructional project is co-ops at IBM WebSphere Portal information development team. The co-ops are students in Master's-level information development programs and are interested in learning more about software technical writing.

Co-ops on the team are treated like full-time, permanent employees throughout the duration of their contract: they receive as much work as their teammates, their work is held to the same standards as their teammates', and they are expected to be as independent and self-sufficient as their teammates. To prepare new co-ops to be fully independent, contributing members of the team, the team spends approximately one week training each new co-op. This training is a blend of shadowing team members and watching tutorial videos. At the end of the week, the co-op completes a test that asks them to use Oxygen XML Editor and Acrolinx to write a simple task topic using DITA, a markup language. If the co-op completes the task successfully, he/she is phased into independent work with little to no support. If the co-op does not complete the task successfully, he/she completes another similar, brief test.

Past co-ops have expressed frustration at the lack of hands-on training they received with Oxygen and Acrolinx prior to completing the test, and the team lead has expressed concern that the current training structure does not prepare new co-ops for the hands-on nature of their work. Because the team is small and the content they maintain is expansive, they do not have more time to spend training new co-ops and

employees how to use and optimize these tools, which can prevent co-ops from contributing as much or as quickly as they should.

Data collection plan

The procedures that our team has been following to gather the first-hand data about our target learner audience are described in the Information Gathering Procedures subsection; a list of the survey questions used for the data gathering is outlined in the Survey Questions section. Full descriptions of the survey questions and answers are provided in Appendix B and Appendix C, respectively.

Information gathering procedures

To gather first-hand data for the project's Learner Analysis, Rachel performed in-person interviews with each individual, asking them whether they would be willing to complete a survey about their learning preferences and experiences as IBM co-ops. When we obtained consent from five past WebSphere Portal co-ops, we assembled a survey based on Larson and Lockee's (2014) five categories of learner characteristics. Of the five, we designed the survey to address: demographic and group data; physiological; cognitive abilities; prior knowledge and experiences; and motivation, goals, and interests. Rachel used Google Forms to design an anonymous online survey. The survey contained 4 sections with 20 questions of mixed types, including open-ended, multiple choice, Likert scale, and Yes/No-questions. These particular question types were chosen to minimize the amount of time participants spent completing the survey.

We emailed a link to the survey on a Monday morning and asked participants to complete it by Friday evening, allowing enough for reflection and survey completion.

Survey data was collected anonymously to ensure that participants felt comfortable answering questions about their workplace without potential repercussions.

Survey questions

1. What is your age?
2. What is your current level of education?
3. If you have completed some Bachelor's work or have completed a Bachelor's degree, what is/was your major?
4. If you have completed some Master's work or have completed a Master's degree, what is/was your major?
5. If you have completed some PhD work or have completed a PhD degree, what is/was your major?
6. Is English your first language?
7. If you speak more than one language, what other language(s) do you speak?
8. Do you prefer to work on projects individually (by yourself) or collaboratively (with others)?
9. How do you like to learn new concepts and skills? Check all that apply.
10. When you are working on a task, how long can you typically focus before you need or want to take a break?
11. Briefly describe a positive learning experience. What do you think made it a positive one?
12. Briefly describe a negative learning experience. What do you think made it a negative one?

13. What you started your co-op at IBM, how much experience did you have with writing software documentation?
14. What you started your co-op at IBM, how much experience did you have with using XML to write documentation?
15. What you started your co-op at IBM, how much experience did you have with using Oxygen XML Editor to write documentation?
16. What you started your co-op at IBM, how much experience did you have with using a style guide?
17. When you started your co-op at IBM, were you hoping to ultimately join the organization as a staff Information Developer?
18. How confident did you feel while you were training at the beginning of your co-op?
19. Do you feel that your co-op training fully prepared you to become an effective co-op?
20. Do you feel that your co-op experience fully prepared you to become an effective Information Developer?

Analysis of the findings

This section outlines the summary of the survey findings in the Summary of the Firsthand Data subsection and our interpretation of the first-hand data in the Data Analysis subsection. The complete response report is provided in Appendix C.

Summary of the firsthand data

- Most (75%) co-ops have a scholarly background in English

- Most (75%) co-ops speak English as a first language, and most (75%) can speak at least one other language as well
- Half (50%) prefer working individually (50%), while half (50%) prefer working in groups
- All (100%) co-ops prefer to watch instructional videos, and most (75%) prefer to read documentation to learn new skills
- Co-ops have a wide range of self-reported attention spans -- anywhere from 30 to 90 minutes
- Most (75%) said a favorable learning experience was one that allowed them to catch and correct mistakes along the way
- Half (50%) said a negative learning experience was one that provided no/little feedback
- Most (75%) had little experience writing software documentation before their co-op
- Most (75%) had little experience writing XML before their co-op
- All (100%) had no experience with Oxygen XML Editor before their co-op
- All (100%) wanted to join IBM permanently when they began their co-ops
- All (100%) felt moderately confident while they were training
- Half (50%) felt unprepared to work successfully as a co-op after training
- All (100%) felt prepared to work successfully as an Information Developer after their co-ops

Data analysis

The first section of our survey collected information about who our learners are as people, allowing us to explore demographic and group data. What stands out most about the data collected in this section is that our learners come to IBM with strong scholarly backgrounds. All of them earned undergraduate degrees in the humanities and continued on to graduate study in technical communication. This suggests that they bring sharp writing skills and strong work ethics to IBM: humanities and technical communication programs require an abundance of writing assignments, and graduate school requires significant work and commitment.

Although our learners are similar in their academic backgrounds, they vary in their ages. Two are in their twenties, while two are in their thirties. The younger learners are likely to be considered digital natives who have “grown up with technology” (Larson & Lockee, 2014, p. 49) due to how their childhoods coincided with the tech boom of the 1990s, but the learners in their thirties might be considered digital immigrants “who grew up *without* technology” (p. 49). Although all of our learners work at IBM and use technology on a regular basis, there could be a difference in how quickly or comfortably they learn and adapt to new technology based on their status as a digital native or immigrant.

The second section of our survey collected information about our learners’ preferences and experiences related to learning, allowing us to explore their cognitive characteristics, particularly their “awareness of their thinking and learning processes and strategies” (Larson & Lockee, 2014, p. 46). The results of this section provided somewhat contradictory insights: half of our learners indicated that they prefer to work

collaboratively instead of individually, but when given a variety of lesson formats, many of our learners chose individual formats over collaborative or interactive formats. All learners indicated a preference for tutorial videos, while 75% of our learners indicated a preference for written documentation. Just two of our learners indicated that they liked learning in a traditional face-to-face context. This suggests that our learners might lack some awareness of their own learning preferences. It also suggests that despite some learners' perceived preference for collaborative work and learning, they might actually enjoy and benefit most from individual learning experiences.

Another interesting insight garnered from our survey questions about learning preferences is that our learners almost unanimously associate feedback and the ability to catch and correct mistakes along the way with positive learning experiences. Their beliefs about what influences a negative learning experience are more varied: one stated that negative learning experiences do not have an end goal, while another shared that misaligned activities and assessments made learning experiences negative. These insights emphasize the importance of being clear about learning outcomes from the beginning and aligning our activities with our assessments. They also suggest that our learners value hands-on learning opportunities that allow for low-stakes formative assessment.

Finally, the third section of our survey gathered information about our learners' experiences as co-ops on the WebSphere Portal team, allowing us to explore our learners' prior knowledge and motivation. Our learners all indicated that they had little to no experience writing software documentation or using XML to write documentation prior to their co-ops. Similarly, all of our learners indicated that they had no experience

using Oxygen XML Editor when they started their co-ops. They reported feeling only somewhat or moderately confident throughout their training experience, and only half reported feeling prepared to work effectively as co-ops as a result of their training. Interestingly, all of our learners reported feeling prepared to work effectively as information developers as a result of their co-ops, and these differing levels of perceived preparedness at the culmination of the training and of the co-op suggests that the hands-on experiential learning that occurs during the co-op itself closes the learning gap that still exists after training ends. Ultimately, all of our learners hoped to get hired by IBM after graduation, which indicates that they are likely intrinsically motivated, so lack of motivation is an unlikely culprit for this learning gap.

Collectively, this data suggests that when our learners start their co-ops, they are prepared to write, but are hindered by the tools they are required to use. They are intrinsically motivated to get hired after graduation, but they do not feel very confident about their ability to contribute to the team after training. In order to sharpen the skills they lack, they prefer to watch videos and read documentation, and their most positive learning experiences include checks for understanding along the way. They can focus on tasks for quite a long time, and have no clear preference about completing tasks as teams or individuals.

Our survey asked questions about the demographic, cognitive, prior knowledge, and motivation characteristics of our learners. We chose not to ask about physiological characteristics because it did not seem appropriate to ask participants to disclose disabilities given Rachel's position as their co-worker.

Design implications

Based on the collected and analyzed first-hand data, our target learner audience seems to prefer a combination of visual and written instruction with lots of checkpoints along the way. Hence, interactive online video series supplemented with written job aids and built-in exercises, that would provide checkpoints for learner progress and understanding, could be a preferred instructional medium.

Learners in this environment want to become IBM employees; they are intrinsically motivated to successfully complete the training by acquiring the knowledge and skills necessary to perform day-to-day tasks of information development employees. For this reason, knowledge and skills outlined in the instructional product must be transferrable to other projects and teams within IBM.

Hands-on interaction with the software programs appears to significantly enhance learning for our target audience. This is supported by Knowles' (1970) work, which states that adult learners value information that is immediately useful. Therefore, the training should include exercises for using the Oxygen XML Author and Acrolinx software programs to increase the speed at which learners attain basic competence. This would bridge the gap between the learning environment and the performance environment with real tasks required on the job.

III. Context Analysis

Data collection and analysis plan

The procedures that our team has been following to gather the first-hand data about the context are described in the Information Gathering Procedures subsection. Full descriptions of the survey questions and results are provided in Appendix B and Appendix C, respectively.

Information gathering procedures

Rachel gathered first-hand data by performing in-person interviews with each former co-op, asking them whether they would be willing to complete a survey about their learning preferences and experiences as IBM co-ops. When we obtained consent from five past WebSphere Portal co-ops, we assembled a survey based on Larson and Lockee's (2014) five categories of learner characteristics. Of the five, we designed the survey to address: demographic and group data; physiological; cognitive abilities; prior knowledge and experiences; and motivation, goals, and interests. Rachel used Google Forms to design an anonymous online survey. The survey contained 4 sections with 20 questions of mixed types, including open-ended, multiple choice, Likert scale, and Yes/No-questions. These particular question types were chosen to minimize the amount of time participants spent completing the survey.

We emailed a link to the survey on a Monday morning and asked participants to complete it by Friday evening, allowing enough time for reflection and survey completion. Survey data was collected anonymously to ensure that participants felt comfortable answering questions about their workplace without potential repercussions.

Performance context

The knowledge and skills, acquired through the use of our instructional product, will be used by the customer, the IBM WebSphere Portal information development team, which is based in the Research Triangle Park (RTP), NC. The instructional product will be accessible online from anywhere, so that the co-ops can learn at home on their own time; this would also enable the team to hire remote co-ops, which would help the team to attract more talent located across the country.

In the RTP offices, the information development team sits in a traditional, silo-style work environment: Each team member has his or her own cubicle, equipped with a desk and a whiteboard; the team's cubicles are all located in one row; the team's row is situated between rows belonging to developers and testers, who work on the same product. The client's physical environment encourages individual work, but also allows team members to collaborate and seek help easily, by reaching out to other team members across the hall. There are also small team conference rooms available throughout the building; so, if co-ops prefer to complete training in a bigger and more isolated space, they have that option available as well.

The information development team is small, consisting of four full-time members, and very close. They often have meetings and collaborative development sessions together, and, because they sit in the same row, they have plenty of opportunities to socialize. They also often visit each other's cubes to collaborate or seek help/feedback from one another -- in other words, there is ample social support. However, someone new on the team might not feel comfortable seeking that help -- the work environment is quiet; people talk quietly, if they talk at all; and the presence of so

many cubicle walls encourages independent work. Hence, it is important to provide the learners with sufficient resources and practical exercises to enable them to gain confidence to work independently in the performance context.

Learning context

The learning context has major resource constraints: Due to the heavy workload, the four full-time writers have no time to spare on attending to the training of the new co-ops. The learners are forced to acquire new knowledge and skills and figure out shortcuts and best practices on their own. On the one hand, this leads to a sense of loss among many learners who have entered a new workplace, but, on the other hand, this environment simulates the performance context, in which every employee needs to balance own independent work with occasional collaborative and interactive group sessions. If we can provide the learners with enough resources and opportunities to complete small tasks, similar to those completed after the training, we will be able to offer the necessary guidance while preparing them to excel in the performance context.

Further, co-ops are often assigned to different tasks with a variety of deadlines and work requirements. To be effective, the training must fit into the co-ops' varying schedules. The online multi-module training would allow for flexible scheduling and foster a sense of independence, which would mirror the IBM's team values.

The learning assessment to reflect how the learners use the knowledge and skills in the targeted performance context will consist of a formative and summative evaluation:

- In the course of the training, each module will instruct the learners on how to complete a particular task, such as writing a DITA task topic using Oxygen XML Editor and Acrolinx, and will offer an exercise that would allow a learner to

practice the his or her own skill. Such incremental checkpoints will enable the learners self-assess their progress in a formative manner, giving them an opportunity to retake a module and fill the gaps in knowledge or skills for a given part of the training.

- After completing the training, the learners will complete a summative self-evaluation about their confidence to transition into the performance environment. The learners will be asked to assess their level of readiness to complete real information development tasks.
- A few days after the training completion, we will ask for the feedback from the staff writers or the team lead to assess the co-op's performance quality.

Cultural context

The social culture within the WebSphere Portal information development team is curiously conflicted. Larson and Lockee (2014) explain that the cultural context is composed of the “values, goals, attitudes, and practices” (p. 60) of an organization, but on this particular team, the values, goals, and attitudes do not always align with the practices.

The team places high value on teamwork and camaraderie -- in fact, many of its key goals and strategies for 2016 center on team trainings and team building. However, that emphasis on teamwork is somewhat lost in practice. Each team member sits in her own cube, and team members rarely work together for extended periods of time. In fact, team members will often “ping,” or send an instant message, to each other rather than walk to the next cube and talk face-to-face. When team members do work on

collaborative projects, they frequently consult together face-to-face, then return to their individual cubes to complete the work.

These contradictory values and practices suggest that although ample social support is available in times of need or confusion, there is an expectation that team members, including co-ops, will independently complete their own work and find answers to their own questions. This implies that a successful team member will possess a high capacity for self-direction. Because the team values teamwork but practices individual work, an effective instructional solution that aligns with the team's cultural context would help users not only to use, but also to *understand* the team's tools. If co-ops are trained to understand the rationale and logic behind the tools, they might be able to solve their own problems and answer their own questions, adhering to the team's practice of individual work. Also, if they were to encounter a problem they could not solve or a question they could not answer, they would have enough of an understanding of the tool that they could rely on the available social support and articulate their confusion effectively.

Theoretical context

The IBM team lead's stated philosophy is, "Anyone can be trained to do anything with the right approach." Currently, the team takes a behaviorist approach to training, i.e. the co-ops learn through hands-on practice experiences and observation. These beliefs and practices aren't misaligned with the instructional design team's beliefs. Survey results, however, indicate that co-ops might benefit from a learner-paced experience. An online learning environment will insure that the co-ops develop a comprehensive understanding of the software systems covered and will allow them to

review materials a second or third time for added clarity. A purely behaviorist approach would now allow them to easily review previously covered concepts.

Implications for instructional design

Several major considerations influence the design of this instructional solution. Perhaps the greatest consideration is related to the performance context: in the performance context, learners must be able to use and troubleshoot the tools on their own, as the team practices mostly independent and self-directed work. This aligns with the past co-ops' expressed preferences for more individualized learning tasks, such as instructional videos and written documentation. Consequently, our instructional solution should emphasize individual learning and performance.

Another important consideration that influences the design of this instructional solution is the team's and team lead's belief in behaviorist learning theory. All co-ops have been trained through experiential, hands-on learning that centers on observation and mimicry, and the team/team lead believe that this method is the most effective. This method also reflects the demands and expectations of the performance context, where the behavior of using the tools is more important than any cognitive knowledge about the tools themselves. It also aligns with insights shared by past co-ops, who almost unanimously shared that their most positive past learning experiences have been hands-on. Because of these factors, this instructional solution should emphasize hands-on learning and align with behaviorist theory.

A final consideration that has bearing on instructional design is the constraint of time. The team lead and other team members have stated that they simply do not have much time to spare to train new co-ops to use tools themselves. Because of this, an

effective instructional solution will not demand much time of the team lead or the team.

An online, asynchronous training module would facilitate hands-on training while not using much of the team's time. The co-op could sit in his/her cube or in a training room and work through the modules while the team lead/team completed their own work.

Similarly, co-ops themselves are often limited with time because they are also students, and an online asynchronous training would allow them to complete training anytime, anywhere, to fit their schedules.

IV. Content Analysis and Assessment Plan

Learning goal

Based on the first-hand data gathered through conducting the Learner and Context analyses, our team has concluded that the level of learning for this instructional project lie only in the cognitive domain (Morrison et al., 2004). The psychomotor domain, covering the skills that require “the use and coordination of skeletal muscles, as in the physical activities of performing, manipulating, and constructing,” and the affective domain, related to “attitudes, appreciations, values, and emotions,” are not relevant for the current instructional project because the target learner population already has strong typing and PC operating skills and is intrinsically driven to learn.

Given the unformatted content or SME input, our team defined the following learning goal for this instructional project: The learner will be able to select and write, in compliance with the IBM style, the correct type of DITA topic using Oxygen XML Editor and Acrolinx.

Task analysis

Our team has decided to conduct the procedural task analysis, which is best suited for job tasks (Morrison et al., 2004). Conducting the procedural analysis, we walked through the steps with our subject-matter expert (SME), Rachel Amity, who has completed the co-op in the WebSphere Portal Information Development team and has been performing information development tasks for a year. Through our interview with the SME, we identified that the task performance flow is the same for writing all three

DITA topic types, task, reference, and concept. Therefore, due to the limited availability of the SME, we observed her performance of writing only DITA task topic.

We completed the walk-through in the performance environment shadowing Rachel complete one of the most common information development tasks, writing a DITA task topic on her work computer, using the Oxygen XML Author and Acrolinx software. For each step of the procedural task analysis, we focused on the following questions:

1. What does the learner do?
2. What does the learner need to know to do this step?
3. What cues (tactile, smell, visual, etc.) inform the learner that there is a problem, the step is completed, or a different step is needed?

As a result, our analysis produced the following steps:

- 1) Write a task topic in DITA using Oxygen XML Author
 - i) Launch Oxygen
 - (1) Locate Oxygen on the computer desktop
 - ii) Select “task” from the list of available topic templates
 - iii) Write a topic title
 - (1) Apply IBM style guidelines for formatting task titles
 - iv) Write a short description
 - (1) Apply IBM style guidelines for writing short descriptions
 - v) Write a prerequisite section
 - (1) Consider the tasks a user must complete before starting the current task
 - (2) Apply IBM style guidelines for writing a prerequisites section
 - vi) Write a context section

- (1) Consider the user's context, goals, and limitations
 - (2) Apply IBM style guidelines for writing a context section
- vii) Write a steps section
 - (1) Consider the sequence of steps the user must take to complete the task
 - (2) Apply IBM style guidelines for writing a steps section
- viii) Write a results section
 - (1) Consider the cues that will indicate to the user that the task is complete
 - (2) Apply IBM style guidelines for writing a results section
- ix) Check in the newly written task topic to RTC
 - (1) Select an appropriate name for the new topic
 - (a) Adhere to the naming conventions for similar topics
 - (2) Select an appropriate folder in which to save the new topic
 - (a) Consider the information architecture of the Knowledge Center and which parent topic this new topic fits beneath
 - (b) Locate the folder for that parent topic
- 2) Create a DITA map using Oxygen XML Author
 - a) Launch Oxygen
 - i) Locate Oxygen on the computer desktop
 - b) Select "ditamap" from the list of available topic templates
 - c) Add link to task topic to map
 - i) Place cursor within the map
 - ii) Type "Option+A"
 - iii) Type "href (cross reference)"

- iv) Navigate to the topic to be added to the map
 - v) Click “Select”
 - d) Add a title to the new link
 - i) Click on the tags for the new link
 - ii) Type “Option+A”
 - iii) Type “navtitle”
 - iv) Type the name of the topic as you would like it to appear in the DITA map
 - v) Hit “Enter” or “Return” key
 - e) Check in the newly created DITA map to RTC
 - i) Select an appropriate name for the new map
 - (1) Adhere to the naming conventions for similar topics
 - ii) Select an appropriate folder in which to save the new map
 - (1) Consider the information architecture of the Knowledge Center and which parent topic this new map fits beneath
 - (2) Locate the folder for that parent topic
- 3) Revise a DITA topic using Acrolinx
 - a) Navigate to a topic that needs to be checked
 - b) Find and click on the Acrolinx icon to start generating an Acrolinx report
 - c) Read and interpret the Acrolinx report
 - i) Decide whether to accept or reject each proposed revision using knowledge about the IBM Styleguide and the structure of the three types of DITA topics.
 - ii) When in doubt, refer to the IBM Styleguide
 - (1) Access the Styleguide

- (a) Navigate to the Styleguide on the IBM server
- (b) Log in with your IBM intranet username and password
- (c) Locate and review the relevant information
 - (i) Search for the specific questions, such as the time and date format
 - (ii) Read the relevant reference article

In this walk-through with the SME's, we identified that each step and sub-step has only visual feedback: Both Oxygen XML Author and Acrolinx provide visual cues when things go wrong; for instance, Oxygen prevents users from adding tags in the wrong place, and Acrolinx underlines misspelled words.

Another significant observation we made, using the think-out-loud protocol and follow-up questions, was that every step and substep may be followed by an optional reference to the IBM Styleguide. The following flowchart visually demonstrates the order and the relationship between the task performance steps.

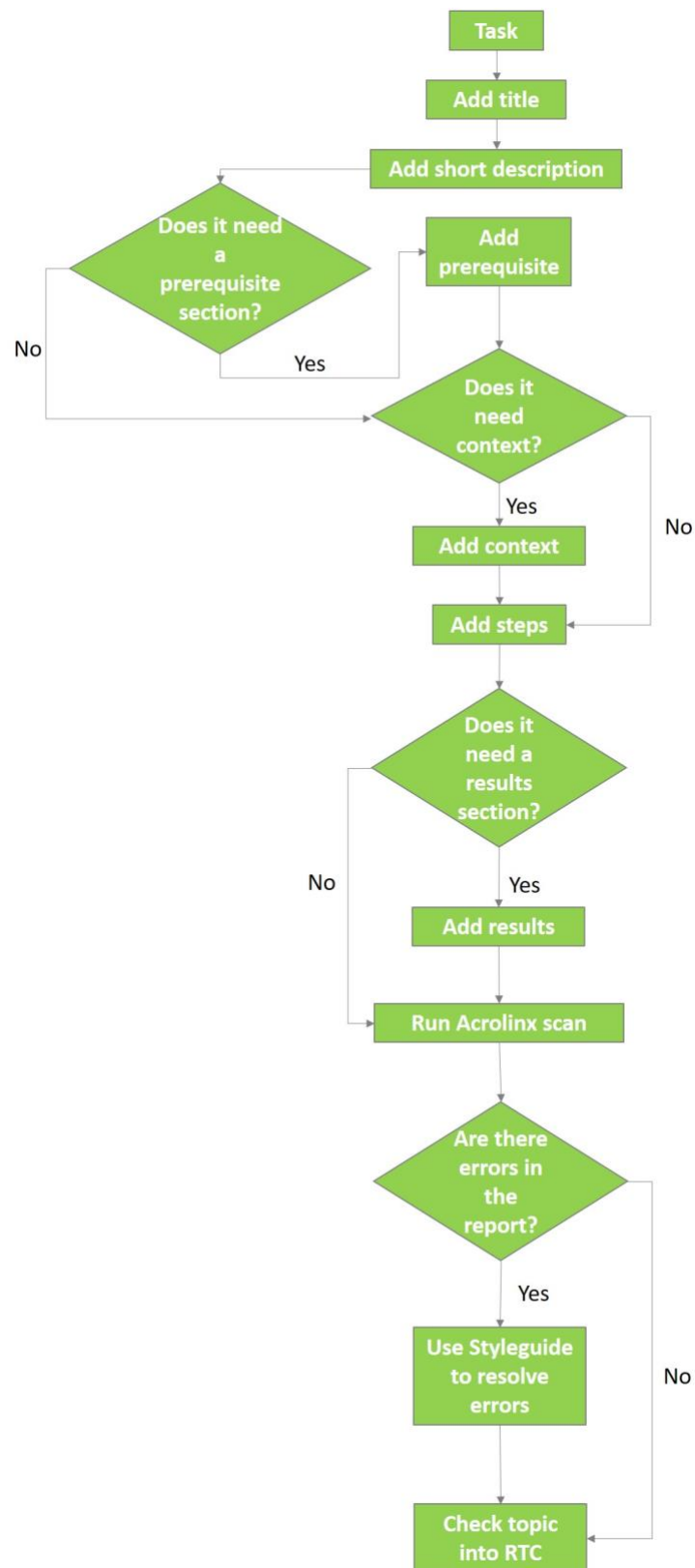


Figure 1. Order and relationship between task and performance steps

Learning objectives

Based on the identified broad learning goal and the results of the task analysis, our team decided to follow the cognitive approach to defining the learning objectives.

Our team has identified the following high-level cognitive learning objectives:

- Learners will be able to describe the purpose and basic functions of DITA
- Learners will be able to apply IBM style to task, concept, and reference topics using Oxygen XML Author
- Learners will be able to write task, concept, and reference topics in DITA using Oxygen XML Author
- Learners will be able to generate and interpret an Acrolinx report to revise task, concept, and reference topics in Oxygen XML Author

Each one of these learning objectives may be assigned the knowledge type, declarative or procedural, and assessment method, as indicated in Table 1 (Smith & Ragan, 2005).

Table 1. Learning Objectives with Knowledge Type and Assessment Item Outline

Objective	Type of knowledge	Assessment
Learners will be able to describe the purpose and basic functions of DITA	Declarative	Formative Learners will complete a quick self-check matching the DITA function to its definition. Summative Learners will complete a multiple choice, scored quiz testing their knowledge of DITA at the end of the lesson.

Learners will be able to apply IBM style to task, concept, and reference topics using Oxygen XML Author	Procedural	<p>Formative Learners will complete a short exercise on writing a topic in Oxygen XML Author utilizing the IBM Styleguide.</p> <p>Summative At the end of the video series, learners will complete a longer, scored writing sample using Oxygen XML Author. The writing sample will be evaluated for compliance with the IBM Styleguide.</p>
Learners will be able to write task, concept, and reference topics in DITA using Oxygen XML Author	Procedural	<p>Formative Learners will be asked to match sample topics with their appropriate label (task, concept, and reference).</p> <p>Summative Learners will be asked to complete a task, concept, and reference topic in DITA using Oxygen XML Author. A senior writer will then evaluate these for compliance.</p>
Learners will be able to generate and interpret an Acrolinx report to revise task, concept, and reference topics in Oxygen XML Author	Procedural	<p>Formative Learners will complete an exercise putting the steps to generate and interpret an Acrolinx report in order.</p> <p>Summative Learners will generate and interpret an Acrolinx report and will use their findings to revise a concept and reference topic. A senior writer will evaluate their approach.</p>

As our team continued developing the instructional strategy for the project, we classified the defined objectives into a matrix, using the Expanded Performance-Content Matrix Model (Morrison et al., 2004).

Table 2. Expanded Performance-Content Matrix Model

Content	Performance
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	Recall	Application
Fact	The learners will become acquainted with DITA and its main 3 topic types, concept, task, and reference.	The learners will be able to identify the functional and structural differences between the 3 DITA topics in a multiple-choice quiz.
Concept	The learners will get a grasp of the main writing standards of the IBM Styleguide.	The learners will practice applying IBM Styleguide standards while performing short writing exercises.
Principles and Rules	The learners will acquire knowledge of the relationships between the IBM Styleguide and Acrolinx, the software used to reinforce its standards, as well as the relationship between Oxygen XML Author and Acrolinx.	The learners will use Acrolinx with confidence by successfully applying the IBM Styleguide standards.
Procedures	The learners will watch instructional videos on how to write 3 types of DITA topics using Oxygen XML Author and Acrolinx.	Though embedded exercises, the learners will reproduce the steps from instructional videos on how to write 3 types of DITA topics using Oxygen XML Author and Acrolinx.
Interpersonal	Not applicable because the content will be online (self paced).	Not applicable because the content will be online (self paced).
Attitude	Not applicable because the learners are intrinsically motivated.	Not applicable because the learners are intrinsically motivated.

Prerequisite skills

The learners will need to have the following prerequisite knowledge/skills:

- A rudimentary understanding of markup language/concepts (e.g. HTML, XML, or LaTeX)

- Knowledge of standard documentation practices (e.g., version control software and editing conventions)
- A high level of competence using a PC and the ability to perform basic typing/kinesthetic skills
- A basic working knowledge of style guide (e.g., Chicago Manual of Style)
- An aptitude for self directed learning and ability to engage with online materials (as opposed to one-on-one or classroom instruction)

Since survey results indicate that all of the co-ops have at last an undergraduate degree and many are pursuing Masters degrees in technical documentation, one can reasonably assume that they already have many of the documentation-related skills. Further, the co-ops expressed a preference for self-directed learning (e.g., preferred to utilize written or online training over live classes).

If the co-ops are missing any of the skills listed, they could easily learn them via a quick online search. Alternately, they could seek guidance from more senior IBM employees. The proposed instruction is designed in such a way that the learner could easily pause the course and research any areas where their knowledge falls short.

V. Design Blueprint

Overview of the design plan

Using the goal and learning objectives as touchstones, we designed appropriate instructional activities that would allow our learners to accomplish the objectives. Our Instructional Plan and Strategy call for training that can be completed in one 3-hour session. Co-ops will be expected to complete this during their first week on the job.

The course will be hosted and designed online via Udemy.com. Online hosting will allow the co-ops to access the course wherever they are, whenever their schedule allows. (Data gathered during the Context Analysis indicates that an easily accessible course would work best with the co-ops' schedules.)

Course modules will have an introduction, a body, conclusion and an assessment following Smith and Ragan's (2005) expanded events of instruction model. According to Dirksen, it is most effective to include actual tasks as exercises instead of "activities based on content." Additionally, Dirksen states that the learning medium (videos, in our case) should create a sort of "friction," enabling learners to make connections between pieces of information they already know. We conceptualized our videos and corresponding exercises using her approach. After completing this course of instruction, learner knowledge should reflect the identified learning objectives.

Instructional plan

The context analysis revealed that the performance context is a fairly standard office environment: co-ops typically complete work at their own desks in their own cubicles. Because co-ops work independently in the performance context, it is important

that they become accustomed to working independently while they train. Thus, this training occurs online through Udemy, an online learning environment. The course is password-protected so that it is available only to the co-ops, but because it is not hosted on an IBM server, co-ops can access it anytime, anywhere. This way, if they would like to revisit any modules after the training is complete, they can do so from any place with an internet connection.

The training is designed to be completed in one 3-hour session, within each new co-op's first week on the job. However, the context analysis indicated that a co-op's schedule during the first week is hectic: they are expected to attend all team meetings, are introduced to teammates and mentors, and must complete corporate orientations and trainings. Thus, it is likely that the learners might need to pause the training and return to it later. With this temporal constraint in mind, this training is parsed into three distinct modules: Introducing the IBM Styleguide, Introducing Oxygen XML Author, and Introducing DITA. Each of these three modules follows Smith and Ragan's (2005) expanded events of instruction model with an introduction, body, conclusion, and assessment. Smith and Ragan (2005) suggest that "students who experience these events tend to learn better than students who do not" (p. 131). Also, the expanded events of instruction model will allow us to utilize a simple, straightforward instructional format that might decrease learners' extraneous cognitive load (Sweller, 1988; qtd. in Larson & Lockee, 2014, p. 207).

Module One: Introducing the IBM Styleguide¹

This module will consist of a video tutorial and a summative assessment activity. More details about the specific instructional strategies are provided in the next section.

Introduction. To begin this module, the narrator of the video tutorial will provide an overview of the module content and describe how the style guide is used to standardize and ensure high documentation quality throughout the global IBM organization. Smith and Ragan (2005) suggest that learners are motivated when they understand how content is personally relevant to them (p. 133), so explaining how the style guide can improve documentation should appeal to the learners' intrinsic motivation to become better writers.

Body. The body of the module will contain three video lectures that will explore three key chapters from the style guide: language and grammar, computer interfaces, and writing for diverse audiences. First, the narrator will discuss IBM's guidelines for grammar and language. Then, the narrator will discuss IBM's guidelines for writing about computer interfaces, with particular emphasis on common interface elements that the learner will write about while working for the WebSphere Portal team. Next, the narrator will discuss IBM's global presence and how to write for linguistically and culturally diverse audiences. To supplement the discussion of these topics, several examples of documentation that adheres to the style guidelines will be included in the tutorial.

¹ Because IBM considers the content of its style guide "proprietary," we cannot include specific content from it in this Design Blueprint.

Conclusion. The module will conclude with a summarizing video that will highlight the main ideas and re-motivate the learner by reemphasizing the style guide's role in ensuring quality technical documentation.

Assessment. To apply and assess their understanding of the style guide, learners will complete an editing exercise in which learners are presented with written content that violates several IBM style guidelines and must edit the content so that it is compliant with the style guide.

Module Two: Introducing Oxygen XML Author

This module will consist of a video tutorial and a formative assessment.

Introduction. To begin this module, the narrator of the video tutorial will provide an overview of the module content and describe how information developers at IBM rely on Oxygen XML Author (and its plug-in program, Acrolinx) to complete their work on a daily basis. Here again, emphasizing how the topic of the module is personally relevant to the learners should foster intrinsic motivation (Smith and Ragan, 2005, p. 133).

Body. The body of the module will contain three video lectures that will explore three main ideas: an overview of the Oxygen user interface (UI), an explanation of how to install Oxygen, and an explanation of how to set up Oxygen once it is installed. First, the narrator will take the learner on a guided tour of the Oxygen interface, highlighting the features and tools that the learners are most likely to use for their work on the WebSphere Portal team. Then, the narrator will explain how to acquire an Oxygen product license through the appropriate IBM channels. Finally, the narrator will explain how to set up the program so it is optimized for work on the WebSphere Portal team. By introducing what the UI is like before introducing how to install and set up the program,

learners will understand how to navigate the UI *before* the program is even available to them, so that when they do install it, they are less likely to make mistakes by aimlessly clicking around.

Conclusion. To conclude the module, the narrator will summarize the main ideas and provide learners with a link to the IBM webpage on which they can request an Oxygen license. This way, learners will retain what they've learned and know how to take the next step to apply their learning.

Assessment. To assess their understanding of Oxygen, learners will complete a quiz that asks them to identify key features of the UI and to explain what Oxygen is and how it is used by information developers at IBM.

Module Three: Introducing DITA

This module includes a video tutorial and a series of formative and summative assessments represented by quizzes and application activities.

Introduction. This module will begin with an introduction video, in which the narrator will provide an overview of its content and explain how DITA, Oxygen, and the IBM Styleguide relate to one another. Because DITA is the markup language in which they will complete their daily work, learners will be intrinsically motivated to learn when they understand how the content of this module is relevant to them personally.

Body. The body of this module includes a series of video lectures supplemented by formative quizzes and application activities.

In the first tutorial video, the narrator will introduce DITA to the learner, explaining what it is, showing several examples of what content written in DITA looks like before

and after it is published, and demonstrating the process of writing in DITA in a sample topic. This video will be followed by a formative quiz.

In the second tutorial video, the narrator will guide the learner through the process of writing a task topic using DITA, highlighting the structure of a task topic and the tags that are most commonly used. This video will be followed by a formative application activity.

In the third tutorial video, the narrator will guide the learner through the process of writing a reference topic using DITA, highlighting the structure of a reference topic and the tags that are most commonly used. This video will be followed by a formative application activity.

In the fourth tutorial video, the narrator will guide the learner through the process of writing a concept topic using DITA, highlighting the structure of a concept topic and the tags that are most commonly used. This video will be followed by a formative application activity.

In the fifth tutorial video, the narrator will guide the learner through the process of creating a DITA map, highlighting the structure and hierarchy of DITA maps and the tags and attributes that are most commonly used. This video will be followed by a formative application activity.

Conclusion. The module will conclude with a final tutorial video in which the narrator will summarize the content of the five tutorial videos, reinforcing key concepts so that learners will remember and retain the material.

Assessment. This module will include both formative and summative assessments. The formative assessments will take the shape of brief quizzes and

application activities after each tutorial video. The activities will provide the learner with an incomplete DITA topic that the learner must finish using the appropriate structure and appropriate tags. These activities are similar to actual work that happens in the performance context and allow learners to “see how learning is progressing” (Smith & Ragan, 2005, p. 135) so that they can determine whether or not they need to revisit the tutorial video. After the final, concluding video that summarizes all of the content delivered in the module, the learner will complete a summative application activity that provides them with a block of unformatted content and asks them to create a brand new DITA topic with it. This activity is identical to work that happens in the performance context, so it is an appropriate and useful measure of the learner’s understanding.

Rationale

Smith and Ragan’s (2005) expanded events of instruction model seems as if it is designed to motivate learners and to scaffold instruction in a way that quickly facilitates knowledge transfer and independent work, thus it seems a natural choice for sequencing our instruction. Our learner analysis indicated that past co-ops did not feel ready for independent work after completing their training, and an overarching goal of this instructional solution is to leave learners feeling ready to work independently using Oxygen, DITA, and the IBM Styleguide.

By starting each module with an introduction, Smith and Ragan’s (2005) model renews our learners’ intrinsic motivation by reminding them of how the content is relevant to them as information developers and as IBMers. Similarly, by including examples and opportunities to practice in the body of each module, Smith and Ragan’s (2005) model provides learners with ample low-stakes opportunities to apply and

assess their own learning (p. 136). Finally, by ending each module with a dedicated conclusion, our learners are reminded of how the content is relevant to their work on the WebSphere Portal team and how their learning transfers to the performance context. Sequencing our instruction using Smith and Ragan's (2005) model also allows us to granulize our instruction so that learners can easily pause it and pick it up later, which makes it more accessible within the learner's busy schedule.

Instructional Strategies

The instructional product, a three-hour-long asynchronous online course organized in three modules, will contain two categories of training: video lecture and practice. The video lecture will focus on delivering the knowledge and connecting the knowledge to the performance context to engage and motivate the learners; while the practice will provide an opportunity for learners to evaluate their knowledge retention and skill level. The practice will be included in each module and will consist of quizzes and exercises within for formative and summative assessment.

We will use Udemy to both create and host the online course. Figures 1, 2, and 3 below illustrate the Udemy user experience.

The image shows the landing page for a Udemy course titled "Increase Trust & Flow - Accelerate Your Business Growth!". The page features a video player with a thumbnail of a hand pointing at a glowing yellow arrow. The course is rated 4.5 stars with 20 ratings and 6,328 students enrolled. It is instructed by Talent Dynamics, Janet Carter, Osmaan Sharif, and Rbm. The course is free, with a "Start Learning Now" button. A "More Options" dropdown is visible. The course includes 8 lectures, 1 hour of video, and is suitable for all skill levels. It is in English and includes lifetime access, a 30-day money back guarantee, and is available on iOS and Android. A "Wishlist" button is also present. The course description states: "Everybody has a fundamental right to experience flow & know how to create it." Below the description, it says: "Put simply, Flow is the Path of Least Resistance. You get to experience flow when you are playing to your natural strengths in the way that you do things. Flow comes from a sense of purpose and direction." A section titled "Students Who Viewed This Course Also Viewed" shows a recommendation for "Differentiate Your Business w/ Customer Experience Marketing".

Figure 2. Landing page for a Udemy-hosted course. The learner can access a course description, cost (if the course isn't free), and a link to the course itself.

The image shows the course content page for the same Udemy course. The page has a dark header with the course title and a "Continue Lecture 1" button. A "Learn what's new" button is also visible. Below the header, there is a progress bar indicating that the user has not started any of the 8 published items. The main content area is divided into sections: Overview, Course Content, Q&A, Bookmarks, Announcements, and Options. The "Course Content" section is active, showing a list of sections. The first section is "1. A Brief History & Course Overview", which is highlighted. Below it are sections 2 through 5: "2. Trust and Flow", "3. Understanding Value & Leverage", "4. The TD Square Part 1", and "5. The TD Square Part 2". A search bar is located at the top of the content area, and a "Current Section" dropdown is visible.

Figure 3. Course table of contents: Learners can access the first module of the course by clicking the continue button or they can skip ahead to future modules.

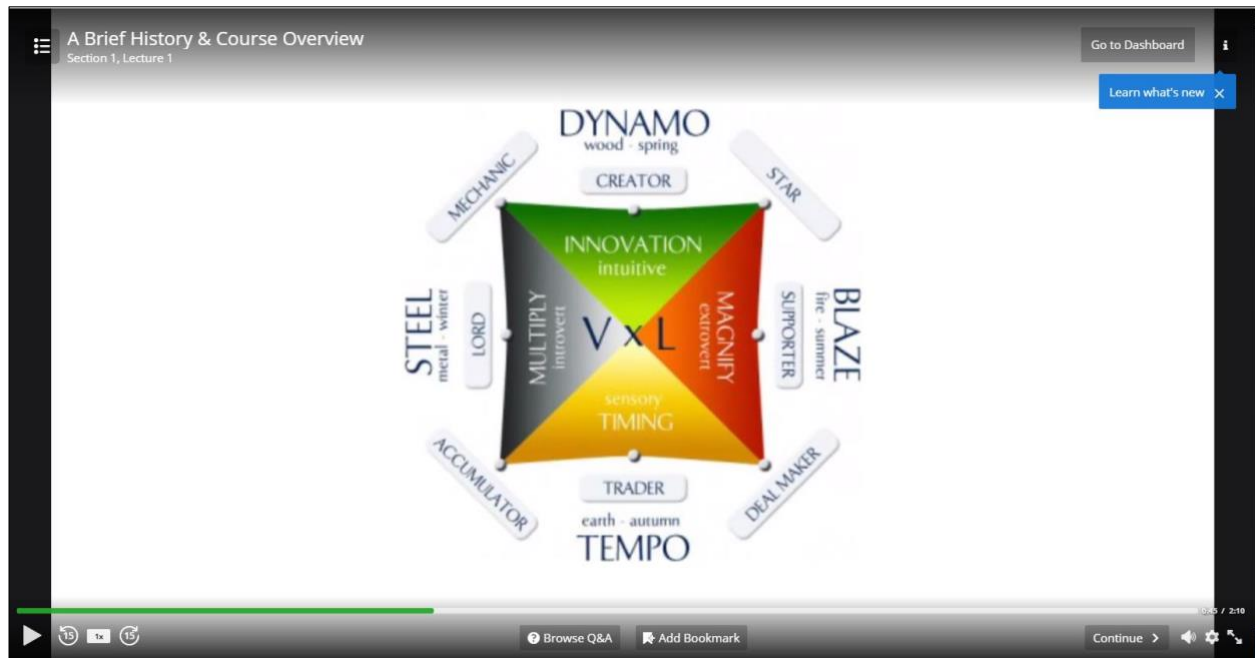


Figure 4. Course in progress: While the learner is using they course, they can access the list of course modules by clicking the icon in the upper left-hand corner, return to the dashboard by clicking the “Go to Dashboard” button on the right hand side, and create bookmarks/change the speed/brows the questions and answers at the bottom of the screen.

As indicated in the previous section, the content of each module will follow the expanded events of instruction pattern defined by Smith & Ragan (2005).

Module One: Introducing the IBM Styleguide

This module partially addresses the second learning objective, which was defined in the following way: The learners will be able to apply IBM style to task, concept, and reference topics using Oxygen XML Author. This module will help the

learners to conceptualize the fundamental content regarding the IBM Styleguide, which is required to advance in the following modules that address the other three objectives.

This module will consist of a video tutorial and a summative assessment activity in the end. The video tutorial content will be divided into five short videos to granulize the content and accommodate the learner's temporal constraint. The learners will be able to pause their asynchronous online training session at any point and then easily come back to the point where they left off. The assessment activity will consist of an editing exercise that will be preceded by a video with the exercise instructions and followed by a video with the explanation of a completed exercise version, which will provide the learners with a limited feedback.

Module One Content Outline.

- Introduction
 - Video 1.1
- Body
 - Language and Grammar – Video 1.2
 - Writing about Computer Interfaces – Video 1.3
 - Writing for Linguistically and Culturally Diverse Audience – Video 1.4
- Conclusion
 - Video 1.5
- Assessment (Summative)
- Activity Instructions – Video 1.6
- Application Activity - Editing Exercise 1.1
- Completed Activity Review and Explanation – Video 1.7

Introduction. This module will start with an introductory video, in which the will provide an overview of the module content, describe the problem of standardizing and ensuring high documentation quality throughout the global IBM organization, and explain how the style guide is used to solve it. This will not only help to motivate the learners and present the relevance of the content for their performance context (Smith & Ragan, 2005), but also, such “problem-based learning” approach will help to “dust off” the learner’s existing knowledge and make them think actively about the content that will be presented in the following videos (Dirksen, 2012).

Body. The body of the module will consist of three videos that explore the key chapters from the IBM Styleguide covering language and grammar, computer interfaces, and writing for diverse audiences.

Language and Grammar – Video 1.2. The narrator will discuss IBM’s guidelines for grammar and language. The narration will use several scenarios with documentation examples and counterexamples that adhere to the style guidelines; this will show rather than tell the learners what those key language and grammar style requirements are. According to Dirksen (2012), this content presentation form will add “friction” and help the learners themselves make connections between the new facts, so that they are more likely to remember these concepts in the performance context.

Writing about Computer Interfaces – Video 1.3. The narrator will discuss IBM’s guidelines for writing about computer interfaces. The narration will use specific scenarios with documentation examples and counterexamples with particular emphasis on common interface elements of the WebSphere Portal, which will help make the connection to the specific performance context of the coops who will write about those

interface elements while working for the team. This video will use the same “friction” rationale (Dirksen, 2012) to present the content in a way that will add and help the learners themselves make connections between the new facts, so that they are more likely to remember these concepts in the performance context.

Writing for Linguistically and Culturally Diverse Audience – Video 1.4. The narrator will discuss IBM’s global presence and how to write for linguistically and culturally diverse audiences. The narration will use several scenarios with documentation examples and counterexamples that adhere to the style guidelines; this will show rather than tell the learners what those key language and grammar style requirements are. This video will use the same “friction” rationale (Dirksen, 2012) to present the content in a way that will add and help the learners themselves make connections between the new facts, so that they are more likely to remember these concepts in the performance context.

Conclusion. The module lecture will conclude with a video that summarizes the main ideas and re-motivates the learner by reemphasizing the style guide’s role in ensuring quality technical documentation.

Assessment. The assessment part of the module will include an application activity that will represent an actual task, not just “activities based on content” (Dirksen, 2012), for the learners to test their understanding and retention of the module content. The assessment part will have three components: activity instruction video, application activity, and activity review and explanation video.

Activity Instructions – Video 1.6. The application activity will be introduced in a short video that will explain the relevance of the task to the performance context and will

give a detailed instruction on how to complete the task and what the successful completion criteria are.

Application Activity - Editing Exercise 1.1. The application activity will be represented by a comprehensive editing exercise: The learners will be presented with written content that violates several IBM style guidelines and will need to edit the content so that it is compliant with the style guide; such task is often completed by IBM Information Developers in the performance context.

Completed Activity Review and Explanation – Video 1.7. As we established in our front-end analysis, due to the limited staff resources on the WebSphere Portal information development team, the key client requirement for this instructional product is to make the knowledge delivery and learning assessment fully independent and asynchronous. That is why the assessment section of this module will conclude with a final video in which the narrator will demonstrate a completed version of this task and will explain the justification for each editing decision. This video will provide the learners with limited feedback on their work and help them identify problems in their understanding without getting their colleagues or supervisors involved in the training process.

Module Two: Introducing Oxygen XML Author

This module partially addresses the following three learning objectives:

- Learners will be able to apply IBM style to task, concept, and reference topics using Oxygen XML Author.
- Learners will be able to write task, concept, and reference topics in DITA using Oxygen XML Author.

- Learners will be able to generate and interpret an Acrolinx report to revise task, concept, and reference topics in Oxygen XML Author.

The module will introduce Oxygen XML Author and Acrolinx, the key software tool and its plugin used in the performance context by IBM information developers. The module will be marked as optional to accommodate varying levels of technical skill and experience among the target learners; this way, the learners who have experience using the tools can skip it and advance to the following module.

This module will consist of a video tutorial and a formative assessment. The video tutorial content will be divided into five short videos to granulize the content and accommodate the learner's temporal constraint. The learners will be able to pause their asynchronous online training session at any point and then easily come back to the point where they left off. The formative assessment will consist of a multiple-choice quiz with questions regarding the key functions and the UI elements of Oxygen XML Author and Acrolinx.

Module Two Content Outline.

- Introduction
 - Video 2.1
- Body
 - Overview of the Oxygen and Acrolinx UI – Video 2.2
 - Installing Oxygen – Video 2.3
 - Setting up Oxygen – Video 2.4
- Conclusion
 - Video 2.5

- Assessment (Formative)
 - Quiz 2.1

Introduction. This module will start with an overview video, which the will introduce the module content, describe the problem of managing large amounts of technical content that the information developers at IBM face every day, and explain how Oxygen XML Author (and its plug-in program, Acrolinx) are used to solve it. This, again, will not only foster the learners' intrinsic motivation and present the relevance of the content for their performance context (Smith & Ragan, 2005), but also, such “problem-based learning” approach will help to “dust off” the learner’s existing knowledge and make them think actively about the content that will be presented in the following videos (Dirksen, 2012).

Body. The body of the module will consist of three videos that explore the module’s three main ideas: an overview of the Oxygen and Acrolinx UI, an explanation of how to install Oxygen, and an explanation of how to set up Oxygen once it is installed. By introducing what the UI is like before introducing how to install and set up the program, learners will understand how to navigate the UI before the program is even available to them, so that when they do install it, they are less likely to make mistakes by aimlessly clicking around.

Overview of the Oxygen and Acrolinx UI – Video 2.2. The narrator will take the learner on a guided tour of the Oxygen interface. The narration will use several scenarios with examples and counterexamples that highlight the features and tools that the learners are most likely to use for their work on the WebSphere Portal team; this will show rather than tell the learners what those key features and tools are. According to

Dirksen (2012), this content presentation form will create “friction” and help the learners themselves make connections between the new facts, so that they are more likely to remember these concepts in the performance context.

Installing Oxygen – Video 2.3 The narrator will explain how to acquire an Oxygen product license through the appropriate IBM channels. The narration will consist of a step-by-step procedural instruction accompanied with a screen capture of the whole process of accessing the appropriate channels and installing the software on an IBM computer.

Setting up Oxygen – Video 2.4. The narrator will explain how to set up the program so it is optimized for work on the WebSphere Portal team. Here, again, the narration will consist of a step-by-step procedural instruction accompanied with a screen capture of the process of setting up the tool for the IBM information development performance context.

Conclusion. The module lecture will conclude with a video that summarizes the main ideas and provides learners with a link to the IBM web page on which they can request an Oxygen license. This way, learners will retain what they’ve learned and know how to take the next step to apply their learning in the performance context of information development at IBM.

Assessment. To assess their understanding of Oxygen XML Author and Acrolinx, the learners will be presented with a multiple-choice quiz. The quiz will contain questions regarding the key features of the tool’s UI, the main functions of the tools, and their basic use cases within the context of information development at IBM.

Module Three: Introducing DITA

This module directly addresses all four learning objectives:

- Learners will be able to describe the purpose and basic functions of DITA
- Learners will be able to apply IBM style to task, concept, and reference topics using Oxygen XML Author
- Learners will be able to write task, concept, and reference topics in DITA using Oxygen XML Author
- Learners will be able to generate and interpret an Acrolinx report to revise task, concept, and reference topics in Oxygen XML Author

This module will be the heart of the course because it will introduce the learners to writing in DITA XML, which is an essential skill required to perform the job of an information developer on the WebSphere Portal team. The module will list a prerequisite, having Oxygen XML Author (with Acrolinx plugin) installed and understanding its basic functions and UI elements. This way, if learners have accidentally skipped the optional Module Two, they have an easy path to recover and go back to fulfill the requirements of this module.

The module will consist of a video tutorial and formative and summative assessment. The video tutorial content will be divided into seven short videos, each followed by a formative assessment in a form of a multi-choice quiz or an application activity, to granulize the content and accommodate the learner's temporal constraint. The learners will be able to pause their asynchronous online training session at any point and then easily come back to the point where they left off. The module will end with a summative assessment that will consist of a comprehensive editing exercise that

will be preceded by a video with instructions and followed by a video with an explanation of a completed exercise version.

Module Three Content Outline.

- Introduction
 - Video 3.1
- Body
 - DITA Overview – Video 3.2
 - Assessment (Formative) 3.1 – Quiz
 - Writing a Task Topic in DITA – Video 3.3
 - Assessment (Formative) 3.2 – Editing Exercise
 - Writing a Reference Topic in DITA – Video 3.4
 - Assessment (Formative) 3.3 – Editing Exercise
 - Writing a Concept Topic in DITA - Video 3.5
 - Assessment (Formative) 3.4 – Editing Exercise
 - Creating a DITA Map - Video 3.6
- Assessment (Formative) 3.5 – Editing Exercise
 - Conclusion
 - Video 3.7
- Assessment (Summative)
 - Activity Instructions – Video 3.8
 - Application Activity - Editing Exercise 3.6
 - Completed Activity Review and Explanation – Video 3.9

Introduction. This module will start with an introductory video, in which the narrator will provide an overview of its content and will describe the problem of managing large amounts of technical content that the information developers at IBM face every day, and explain how DITA, Oxygen XML Author, and the IBM Styleguide represent interrelated components of a solution to this problem. This, again, will not only foster the learners' intrinsic motivation and present the relevance of the content for their performance context (Smith & Ragan, 2005), but also, such "problem-based learning" approach will help to "dust off" the learner's existing knowledge and make them think actively about the content that will be presented in the following videos (Dirksen, 2012).

Body. The body of this module contains a series of tutorial videos supplemented by formative quizzes and application activities.

DITA Overview – Video 3.2. The narrator will introduce DITA to the learner. The narration will use several scenarios with examples and counterexamples that explain what it is, show sample content written in DITA highlighting the view before and after it is published, introduce the three topic types (task, reference, and concept), and demonstrate the process of writing a sample topic in DITA; this will show rather than tell the learners what DITA is. According to Dirksen (2012), this content presentation form will create "friction" and help the learners themselves make connections between the new facts, so that they are more likely to remember these concepts in the performance context.

Assessment (Formative) 3.1 – Quiz. The DITA Overview video will be followed by a short multiple-choice quiz to assess the learners' understanding of the key concepts introduced in the video lecture.

Writing a Task Topic in DITA – Video 3.3. The narrator will guide the learner through the process of writing a DITA task topic. The instruction will explain the definition of a task topic and its structure, by demonstrating a sample content of a DITA task topic and will introduce the tags that are most commonly used. Again, the focus of the video will be on showing rather than telling in order to create “friction” and help the learners themselves make connections between the new facts, so that they are more likely to remember these concepts in the performance context (Dirksen, 2012).

Assessment (Formative) 3.2 – Editing Exercise. The Writing a Task Topic in DITA video will be followed by a short application activity. The activity will present an incomplete DITA task topic content, which the learners will need to reorganize following the basic task topic structure and tagging the content appropriately. This editing exercise will help learners assess their understanding of the key concepts introduced in the video lecture.

Writing a Reference Topic in DITA – Video 3.4. The narrator will guide the learner through the process of writing a reference topic using DITA. The instruction will explain the definition of a reference topic and its structure, by demonstrating a sample content of a DITA reference topic and will introduce the tags that are most commonly used. Again, the focus of the video will be on showing rather than telling in order to create “friction” and help the learners themselves make connections between the new facts, so that they are more likely to remember these concepts in the performance context (Dirksen, 2012).

Assessment (Formative) 3.3 – Editing Exercise. The Writing a Reference Topic in DITA video will be followed by a short application activity. The activity will

present an incomplete DITA reference topic content, which the learners will need to reorganize following the basic task topic structure and tagging the content appropriately. This editing exercise will help learners assess their understanding of the key concepts introduced in the video lecture.

Writing a Concept Topic in DITA - Video 3.5. The narrator will guide the learner through the process of writing a concept topic using DITA. The instruction will explain the definition of a concept topic and its structure, by demonstrating a sample content of a DITA concept topic and will introduce the tags that are most commonly used. Again, the focus of the video will be on showing rather than telling in order to create “friction” and help the learners themselves make connections between the new facts, so that they are more likely to remember these concepts in the performance context (Dirksen, 2012).

Assessment (Formative) 3.4 – Editing Exercise. The Writing a Concept Topic in DITA video will be followed by a short application activity. The activity will present an incomplete DITA concept topic content, which the learners will need to reorganize following the basic concept topic structure and tagging the content appropriately. This editing exercise will help learners assess their understanding of the key concepts introduced in the video lecture.

Creating a DITA Map - Video 3.6. The narrator will guide the learner through the process of creating a DITA map. The instruction will explain DITA map’s purpose, structure, and hierarchy by demonstrating a sample DITA map and will introduce the tags and attributes that are most commonly used. Again, the focus of the video will be on showing rather than telling in order to create “friction” and help the learners

themselves make connections between the new facts, so that they are more likely to remember these concepts in the performance context (Dirksen, 2012).

Assessment (Formative) 3.5 – Editing Exercise. The Creating a DITA Map video will be followed by a short application activity. The activity will present an incomplete DITA map with incorrect structure; the learners will need to reorganize the content following the basic DITA map structure and tagging rules. This editing exercise will help learners assess their understanding of the key concepts introduced in the video lecture.

Conclusion. The module will conclude with a video that summarizes the main ideas of the DITA tutorial videos. This way, learners will retain what they've learned and know how to take the next step to apply their learning in the performance context of information development at IBM.

Assessment. Throughout the module, we have included multiple formative assessment activities, and, in the end, we will add an extra summative assessment. The final formative assessment will contain an application activity that will represent an actual task, not just “activities based on content” (Dirksen, 2012), for the learners to test their understanding and retention of the module content. Smith and Ragan (2005, p. 135) also emphasized the importance of designing assessment based on activities that are similar to actual work that happens in the performance context and allow learners to “see how learning is progressing,” so that they can determine whether or not they need to revisit the tutorial videos.

The formative assessment will have three components: activity instruction video, application activity, and activity review and explanation video.

Activity Instructions – Video 3.8. The application activity will be introduced in a short video that will explain the relevance of the task to the performance context and will give a detailed instruction on how to complete the task and what the successful completion criteria are.

Application Activity - Editing Exercise 3.6. The application activity will be represented by a comprehensive editing exercise: The learners will be presented with a block of unformatted content which they will use as a basis for creating a brand new DITA topic. This activity is identical to work that happens in the performance context, so it is an appropriate and useful measure of the learner's understanding.

Completed Activity Review and Explanation – Video 3.9. To accommodate the key client requirement for this instructional product, we will design a fully independent and asynchronous learning assessment structure. Hence, the assessment section of this module will conclude with a final video in which the narrator will demonstrate a completed version of the application activity and will explain the justification for each editing decision. This video will provide the learners with limited feedback on their work and help them identify problems in their understanding without getting their colleagues or supervisors involved in the training process.

Rationale. The key theoretical rationales used to design this instructional product are Smith and Ragan's (2005) expanded events of instruction model and Dirksen's (2012) strategies for skill development.

Applying the Smith and Ragan's instructional model will help us to motivate learners and to scaffold instruction in a way that quickly facilitates knowledge transfer and independent work, which is one of the key client requirements, as we have

established in the front-end analysis. Our client expects the co-ops to leave the training feeling ready to work independently using Oxygen, DITA, and the IBM Styleguide.

Therefore, by applying the Smith and Ragan's instructional model structure to each instructional module, we will achieve the following results:

- Use the Introduction to renew our learners' intrinsic motivation by emphasizing the relevance of the instructional content to the performance context of information development at IBM.
- Accommodate our learner's busy schedules by granulizing our instruction and presenting the Body content in several video lectures, so that learners can easily pause it and pick it up later.
- Provide our learners with opportunities to apply and evaluate their newly acquired skill and knowledge through series of formative and summative assessments, included in both Body and Assessment sections of each module.
- Use Conclusion to remind our learners how the content is relevant to their work on the WebSphere Portal team and how their learning transfers to the performance context.

Through a thorough literature review, we identified that Dirksen's (2012) theoretical framework will ideally compliment that of Smith and Ragan (2005) in helping us design an effective and user-friendly instructional product that will meet the learning goal. In the front-end analysis, we defined the learning goal for this project as the following: "The learner will be able to select and write, in compliance with the IBM style, the correct type of DITA topic using Oxygen XML Editor and Acrolinx." Hence, the main purpose of this instructional product is to help learners develop a skill. According to Dirksen (2012),

“There are two main components to developing a skill—practice and feedback.” To help our learners build their IBM Styleguide-compliant writing skills in DITA using Oxygen XML Author, we have provided multiple practice opportunities through series of formative and summative assessments in each module. Incorporating feedback on the learner’s writing skill practice has been more complicated. Due to a series of restrictions set by client’s requirements, such as developing a fully independent asynchronous online training module, we were facing a limited number of options for providing feedback. In an asynchronous online training context, writing skill cannot be evaluated with score, sound, or visual cue system, suggested by Dirksen (2012).

Instead, for each summative assessment, represented by a comprehensive editing exercise, we will provide a video introduction that will state the “explicit, standardized criteria” (Dirksen, 2012) for the activity evaluation and another video with a demonstration of a completed version of the application activity and a justification for each editing decision. The demonstration and justification video will provide the learners with limited feedback on their work and help them identify problems in their understanding without getting their colleagues or supervisors involved in the training process. This way, the course will help the learners achieve the learning objective of acquiring the skills in IBM Styleguide-compliant writing in DITA using Oxygen XML Author, and will meet the key client requirement of providing a fully independent and comprehensive learning environment.

Instructional Message Design

In this section, we present a sample video script for each module: Introducing the IBM Styleguide, Introducing Oxygen XML Author, and Introducing DITA.² Appendix D provides wireframe designs for the tutorial videos.

Module 1: Introducing the IBM Styleguide Video #1.2: Language and Grammar** <i>**ABRIDGED VERSION: Because IBM considers the contents of its style guide “proprietary,” we cannot provide specific information about Styleguide content in this script or in its corresponding storyboards. We are permitted only to provide a high-level outline of topics.</i>	
Narration	On-Screen Action
Style lies at the heart of good technical documentation. At IBM, style guidelines help to ensure that all of our documentation is united in its quality and its clarity. Style guidelines also help writers set an approachable, neutral tone that fosters good rapport with readers.	The title of the video is displayed.
<p>In this video, you’ll learn about the building blocks of style: language and grammar. Specifically, you’ll learn IBM style guidelines related to language and grammar, as well as IBM’s rationale for those guidelines. We’ll explore the following topics:</p> <ul style="list-style-type: none"> • Basic punctuation • Advanced punctuation • Verbs • Contractions • Nouns and pronouns • Capitalization 	<p>A bulleted list of the topics explored in the video is displayed (see Appendix D for a mockup of this screen):</p> <ul style="list-style-type: none"> • Basic punctuation • Advanced punctuation • Verbs • Contractions • Nouns and pronouns • Capitalization
Let’s start with basic punctuation, including commas, periods, colons, and semicolons. These punctuation marks are important because they	For each specific guideline discussed, an example from actual WebSphere Portal documentation will be displayed and highlighted with a visual callout.

² We formatted our video scripts as IBM formats theirs so that if the WebSphere Portal team, our client, asked to see our Design Blueprint, they would familiar with the script format.

communicate important information to readers, like when an idea ends or when two ideas are connected. In this way, punctuation is like metadata, telling readers <i>about</i> the ideas and the content.	
IBM style is characterized by brevity and simplicity, but sometimes, you might need to rely on more advanced punctuation, like hyphens, ellipses, dashes, and slashes, to create more sophisticated and nuanced sentences. Before we discuss the guidelines for using these advanced punctuation marks, take note of this best practice: when you feel inclined to use advanced punctuation, ask yourself, <i>Can I write this sentence in a simpler way?</i> IBM believes that a simpler sentence is better than a complicated sentence every time.	For each specific guideline discussed, an example from actual WebSphere Portal documentation will be displayed and highlighted with a visual callout.
Much of the content you will generate as an information developer will rely on verbs, because verbs convey actions, and our documentation guides readers through the actions they must take to use our products. Therefore, it is important to follow IBM style guidelines when using verbs to ensuring that they are used consistently and correctly.	For each specific guideline discussed, an example from actual WebSphere Portal documentation will be displayed and highlighted with a visual callout.
IBM adopts a more formal style, meaning that markers of informality – like contractions – are discouraged. However, you might choose to use contractions in some circumstances.	For each specific guideline discussed, an example from actual WebSphere Portal documentation will be displayed and highlighted with a visual callout.
When providing instruction about how to accomplish a task, it is vital that the reader understands what things or which people are involved. Therefore, it is imperative to use both nouns and pronouns clearly and consistently.	For each specific guideline discussed, an example from actual WebSphere Portal documentation will be displayed and highlighted with a visual callout.

As an IBM information developer, you will refer to IBM products in your documentation frequently. You will also refer to aspects of the WebSphere Portal user interface, or UI. Some of these are capitalized, and some are not. Understanding the logic behind IBM's capitalization guidelines will help you know when to capitalize without having to check with the Styleguide.	For each specific guideline discussed, an example from actual WebSphere Portal documentation will be displayed and highlighted with a visual callout.
These guidelines may seem overwhelming now, but as you apply them to your everyday work with the WebSphere Portal team, you will internalize them and use them without hesitation. You can clarify any questions or uncertainties by accessing the Styleguide on the IBM server at (link). As you write, remember that good style makes documentation clear and consistent – making style-related choices with that principle in mind will help you apply IBM style efficiently and effectively.	<p>A bulleted list of the topics explored in the video is displayed:</p> <ul style="list-style-type: none"> • Basic punctuation • Advanced punctuation • Verbs • Contractions • Nouns and pronouns • Capitalization <p>A link to the IBM Styleguide is displayed.</p>

Table 3. Sample word-for-word, action-by-action script for Module 1.

Module 2: Introducing Oxygen XML Author Video #2.1: Introduction	
Narration	On-Screen Action
Welcome to Module 2: Introducing Oxygen XML Author! In this module, you will learn about the key tools that information developers at IBM use to complete their daily work tasks. You will also learn how to acquire these tools through the internal IBM software resource network, how to install them, and how to set up and optimize your working environment to effectively complete the most common writing tasks for the WebSphere Portal product.	<p>Introduction screen lists the outline of the learner goals in Module 2 (see Appendix D for a mockup of this screen):</p> <ul style="list-style-type: none"> • Acquire Oxygen XML Author and Acrolinx through the internal IBM network; • Install the tools; • Set up and optimize the working environment.

<p>Imagine the amount of content an information developer needs to manage for a mature 15-year-old product that has undergone over 10 releases and is available in five editions. That's WebSphere Portal, and it has a lot of associated content! For each new release and each separate edition of WebSphere Portal, how much of the content is unique?</p>	<p>Icons of various product documentation appear on the screen to highlight the amount of information associated with a mature software product.</p>
<p>You might be surprised to learn that a lot of the content is actually reused. Think about the legal disclaimers and the warranty information; that content rarely changes. So how can you reuse the content in an effective way? On a scale that large, copying and pasting would be too tedious.</p>	<p>Sample documents are displayed. Animation highlights the reused content. Animation highlights the challenge with a large question mark.</p>
<p>To make the challenge more vivid, imagine if a name of one feature changes, and now that one name needs to be replaced across all documentation for all WebSphere Portal releases and versions. Using the Find and replace feature in a text editor would take too long. So, to reuse the content effectively, we need a systematic way of dividing the content into small yet meaningful information units that can be easily manipulated. Can you think of a viable solution?</p>	<p>Sample documents are displayed. Animation highlights the change of one content element across all documents. Animation highlights the Find and replace feature as ineffective to resolve the problem of a feature name change across all product documents. Animation highlights the challenge with a large question mark.</p>
<p>Another common concern for an information developer is the variety of document output formats. What if you are responsible for documenting a particular WebSphere Portal edition, and you receive requests from different customers about their document format preferences: One requires an EPUB file, another client wants a printed manual, the third one wants an online help. How do you meet your customer needs without wasting time on writing three separate documents?</p>	<p>The screen displays a stick figure, representing an information developer assigned a large documentation task. Animation highlights customer requests for document output formats:</p> <ul style="list-style-type: none"> • EPUB • Printed manual • Online help. <p>Animation highlights the challenge with a large question mark.</p>

The information developers at IBM have found an answer to all these questions in using the Darwin Information Typing Architecture, or DITA. DITA is an XML specification used to streamline the process of designing, writing, managing, and publishing technical documentation in print and on the Web. You will learn more about DITA in the following module.	The screen displays the DITA logo with a brief textual definition (see Appendix D for a mockup of this screen).
Information developers at IBM write in DITA using special software tools: Oxygen XML Author and Acrolinx. Oxygen XML Author is a specialized text editor that provides information developers with a flexible single-source environment for structured markup. Oxygen XML Author enables you to manipulate your DITA content to produce various outputs: PDF, Microsoft Word, RTF, XHTML, WebHelp, and EPUB.	The screen displays the Oxygen XML Author logo with a brief textual definition (see Appendix D for a mockup of this screen). Animation highlights the document output formats that Oxygen can generate.
Acrolinx is an advanced linguistic analytics engine that scans your DITA content, highlights errors, verifies compliance with the IBM Styleguide, and produces a report. All IBM content is scanned with Acrolinx before being published; this is why knowing the key style guide requirements will save you a lot of time in rewriting. Acrolinx is not an independent tool; it is a plug-in for Oxygen XML Author.	The screen displays the Acrolinx logo with a brief textual definition (see Appendix D for a mockup of this screen). Animation highlights the importance of IBM Styleguide. Animation shows the relationship between Oxygen XML Author and Acrolinx.
If you are familiar with both tools and have them already installed on your machine, you can skip this module and proceed to Module 3: Introducing DITA.	The screen displays a direct link to Module 3: Introducing DITA.

Table 4. Sample word-by-word, action-by-action script for Module 2.

Module 3: Introducing DITA Video #3.3: Writing a Task Topic in DITA	
Narration	On-Screen Action

Now that you know what DITA is, it's time to learn how to use it to write task topics. As an information developer, you will use task topics more frequently than any other DITA topic. Task topics explain how to complete a task by providing step-by-step instruction, relevant contextual and prerequisite information, and sometimes also tips and best practices.	The title of the video is displayed.
In this video, you'll learn about the structure of task topics as well as the tags that are most frequently used in them, through an example about setting your out-of-office email notification. Let's get started.	A bulleted list of the two stated learning objectives for the video is displayed to provide a visual overview of the content (see Appendix D for a mockup of this screen).
Every task topic begins with a title. Use title tags to write your title.	<p>A blank task topic in Oxygen is displayed.</p> <p>A callout highlights the title tags at the top of the topic.</p>
The title tells the reader what the topic is about, so it is important to choose keywords that the reader is familiar with. It is also important to start the title with a verb in the progressive, or –ing, form. Tasks are actions, so starting task topic titles with verbs tells the reader what action they will take in following the steps outlined in the topic. For our example, the title “Setting your out-of-office email notification” is appropriate because it starts with a verb in the progressive form and it uses the keywords that the reader is likely to be familiar with.	<p>Within the title tags, the phrase “Setting your out of office email notification” is typed.</p> <p>The word “setting” is highlighted while the narrator explains why it is appropriate to use.</p> <p>The words “out-of-office” and “email notification” are highlighted while the narrator explains why they are appropriate keywords to use.</p>
The next piece of a task topic is the short description. Use “shortdesc” tags to write your short description.	A callout highlights the shortdesc tags beneath the title of the topic.
The short description tells the reader what the task accomplishes or why it is important. It should be no more than	Within the “shortdesc” tags, a sentence about the example task is typed.

two sentences. It is a good practice to use empowering language, like “you can,” in the short description to establish rapport with your reader.	The phrase “you can” is highlighted when the narrator mentions its importance (see Appendix D for a mockup of this screen).
The next element of a task topic is the context section. Use the “context” tags to write your context section.	A callout highlights the “context” tags in the body of the topic.
The purpose of the context section is just what it sounds like: to provide important contextual information about the task to the reader. For example, the reader might need to know something about the scope or ramifications of the task. The context section is an appropriate place to provide that information.	Within the “context” tags, a sentence about the context of the task is typed.
The next element of a task topic is the steps section. This is the heart of the task topic because it is where you tell the reader how to complete the task, step by step. Use the “steps” tag to add a step section. When you add a step section, a set of “step” tags automatically appears. To add more steps, you must add more “step” tags. A set of “cmd,” or “command,” tags automatically appear within the “step” tags to emphasize that you essentially writing a series of commands to your reader.	<p>A callout highlights the “steps” tags in the newly created step section of the topic.</p> <p>A callout highlights the “step” tags within the “steps” tags to show the hierarchy of the section.</p>
When writing steps, start each step with a verb. Remember, tasks are actions, and actions are verbs, so it is important to use verbs to describe what the reader needs to do.	<p>Within the first set of “step” tags, the first step of the task is typed.</p> <p>Three additional “step” tags are added and an additional step is typed into each.</p> <p>The first word of each steps – all verbs – are highlighted as the narrator discusses the importance of starting steps with verbs (see Appendix D for a mockup of this screen).</p>

<p>When you have described all of the steps the reader needs to do to complete the task, write a Results section using the “result” tags. Remember, because the results are not part of the steps, you cannot add the “results” tags to the steps section – they must go <i>after</i> the steps section.</p>	<p>A callout highlights the “results” tags at the bottom of the topic.</p> <p>When the narrator warns about the impossibility of adding “results” tags to the steps section, the video shows a results section being added to the steps section and the error warning Oxygen returns (see Appendix D for a mockup of this screen).</p>
<p>The results section is important because it tells the reader how to tell if the task has been completed successfully. This section should be brief – just a sentence or two that describes the outcome of the task so that the reader can affirm that they have done it correctly and can move on.</p>	<p>Within the “results” tags, a sentence about task results is typed.</p>
<p>A task topic can include other elements and tags, but it must always include the tags we just described: title, short description, context, steps, and results.</p>	<p>A bulleted list of the essential tags is displayed.</p>
<p>When you include the tags described in this video when you’re writing a task topic, you can be assured that you are providing your readers with the information they need to complete tasks efficiently and effectively.</p>	<p>A screenshot of a task topic in DITA transitions into a screenshot of the task topic published online as the reader would see it to show the reader what the finished product will look like to the reader. The screen fades out to end the video (see Appendix D for a mockup of this screen).</p>

Table 5. Sample word-by-word, action-by-action script for Module 3.

VI. Evaluation Plan

Formative Evaluation

Following the systematic approach in designing our instructional product, our team will conduct formative evaluation to improve interventions (Eseryel, 2002).

Formative evaluation will help us to “determine the weakness in the instruction so that revisions can be made to make them more effective and efficient” (Smith & Ragan, 2005, p. 327). We will structure our formative evaluation planning following the eight-step approach suggested by Gooler (as cited in Morrison et al., 2007). At this point in the instructional development process, we will use the data collected from two procedures recommended by Smith and Ragan (2005), an expert review and learner validation.

Purpose. The purpose of the evaluation is to identify weaknesses in the instructional materials, to ensure that the instructional materials are appropriate for the needs of the learner audience and that the chosen instructional strategies are consistent with the instructional theory. To verify and possibly extend the outlined purposes, we will consult with the stakeholders, as Morrison et al. (2007) recommended. Because our team consists of novice instructional designers and the task performance is critical, formative evaluation with “an economy of scale can contribute to the quality of the instruction” (Smith & Ragan, 2005, p. 327). Therefore, we will start the formative evaluation early in the design stage and conduct it iteratively following the ADDIE model.

Audience. The primary target audience for the formative evaluation results will be the key stakeholders (Morrison et al., 2007). Therefore, based on the previously

conducted analyses, the key stakeholders for these results will be the WebSphere Portal Information Development team at IBM, particularly the team's Information Development Manager and the Team Lead. The identified target audience will expect to learn from the report whether the instructional product developed by our team can solve their problem of preparing the newly hired co-ops to select and write, in compliance with the IBM style, the correct type of DITA topic using Oxygen XML Editor and Acrolinx. Therefore, addressing this problem, determined as the learning goal for this instructional product, will be the main focus of the report.

Issues. The main issues, or evaluation objectives, that need to be addressed by the formative evaluation concern the quality and appropriateness of the instructional materials and their subsequent assessments, consistency of the instructional strategy, learning gains, and learners' attitudes. Throughout the formative evaluation process, our team will focus on the identified objectives and will try to answer the following questions:

- Do subject-matter experts regard the instructional material as accurate and well designed?
- Does the instructional content present a consistent perspective?
- Do the assessments reflect reliable and valid measures of the instructional objectives?
- Are the pedagogical approach and instructional strategies consistent with current instructional theory?
- Is the instruction appropriate for the target learner audience?
- Do learners understand and follow the instruction?

- On average, how long does each lecture and its subsequent assessment take to complete?
- Which assessments do learners find most easy or difficult to complete? Are there any difficulties associated with the assessment format or instruction?
- Do learners perceive the supplemental materials (references and job aids) to be helpful?
- After completing the course, do students feel confident about developing content in DITA using Oxygen XML Editor and Acrolinx?

Resources. In order to address the evaluation objectives and answer the above-listed question, our team will need to access the following resources:

- Subject-matter experts - instructional designer peers who work on other projects and provide their feedback regarding the quality of the course and its instructional strategies.
- Arrangements to access the course online - additional user ID with access to the currently unpublished course draft on Udemy.
- Data collection and analysis instruments - approaches to gather and analyze data from the representatives of the target learner audience, such as survey, “read-think-aloud” technique, and interview questions.
- Representatives of the target learner audience - a newly hired co-op on the WebSphere Portal Information Development team.
- Physical facilities and equipment:
 - Laptop for the representative of the target learner audience to use during the pilot testing session.

- Conference room with Internet access to conduct the pilot testing session.

Evidence. In the course of the formative evaluation, in order to properly address the identified objectives, our team needs to carefully consider the sample size, objectivity of the information sources, realism of the testing context, degree of control in the testing context, need for formal statistical reporting, and reliability and validity of the subject-matter expert reviews (Morrison et al., 2007). We address each item in the following list:

- Representative sample size for the learner validation would be difficult to define because the number of co-ops joining the WebSphere Portal Information Development team varies depending on the project needs and allocated budget. In fact, at the time of conducting the pilot testing, the team was on a hiring freeze and had no co-ops coming in. Our team decided to overcome this limitation by conducting a one-on-one evaluation with a participant the closest to the target learner audience who met most of the descriptions listed in the learner analysis.
- Objectivity of the information sources is addressed by following two procedures of formative evaluation and revision: expert review and learner validation.
- The testing context for an asynchronous online course is quite realistic and provides minimal degree of control during the pilot testing session.
- Formal statistical reporting would be required to effectively convey the value of the instructional product to the stakeholders.
- Reliability of the subject-matter expert reviews is addressed by collecting feedback from four peer instructional designers.

Data-gathering techniques. Our team will need to address the identified evaluation objectives with precise yet feasible methods (Morrison et al., 2007). To find the balance between the two, we will employ an expert review and learner validation.

Expert review. We will involve peer instructional designers working in other instructional projects and ask for their feedback regarding the quality and appropriateness of the instructional materials and their subsequent assessments and consistency of the instructional strategy. The obtained feedback will represent validity in terms of the implemented pedagogical approach and instructional strategies; however, this feedback will not represent validity in terms of the content accuracy. Therefore, additionally, we will need to gather reviews of the content subject-matter experts, such as the WebSphere Portal Information Development team members.

Following recommendations of Smith & Ragan (2005), our team will consider feedback from the expert reviews in terms of their expertise. We will divide the experts' comments into three categories: revisions that should be made immediately, questions for which data should be collected during subsequent phases, and suggestions that should be ignored.

Learner validation. A pilot-test with learners who represent the target audience will help us collect data on the quality and appropriateness of the instructional materials and their subsequent assessments, learning gains, and learners' attitudes.

Due to the lack of access to the target learner audience, our team decided to conduct a one-on-one evaluation with participants the closest to the target learner audience who meets most of the descriptions listed in the learner analysis. The participant eligible for the one-on-one evaluation would have completed a graduate

degree in technical communication, would have sharp writing skills, would be interested in learning more about software technical writing, and would have no previous experience using Oxygen XML Editor.

To address the concern with validity of the data gathered through learner validation, our team will employ multiple measures to provision relevant information, such as surveys, “read-think-aloud” technique, and interview (Morrison et al., 2007). The pre-test survey will provide data regarding the learner’s level of knowledge of the course content, intrinsic or extrinsic motivation type, and expectations from the course. The post-test survey will help us gather data on effectiveness of the course and the learner’s attitude towards the course. In the one-on-one evaluation session, we will employ the “read-think-aloud” technique (Smith & Wedman, 1988, as cited in Smith & Ragan, 2005) to get clues about any misconceptions or difficulties encountered by the learner. We will also conduct an interview querying the learner about any problems observed in the course of the pilot testing session. The full list of the survey and interview questions is listed in Appendix E.

Analysis. The data collected throughout this formative evaluation will be both qualitative and quantitative. We will analyze the qualitative data by reviewing notes from the learner validation sessions to identify major categories and themes, which we will then individually prioritize, code, and cross-check our coded data to ensure reliability of the findings. We will present the analyzed qualitative data by outlining the main identified themes and quoting the most representative comments. Due to a small sample size, we will analyze the qualitative data with descriptive statistics, such as

percentages, means, and medians, and several graphs to reflect the estimated and actual time spent on lecture or assessment.

Reporting. After analyzing the formative evaluation data, our team will deliver our findings to the WebSphere Portal Information Development team in a form of a formal written report. As we mentioned in the context analysis, our stakeholders have very busy schedules, and a verbal report could be hard to accommodate for their schedules. Therefore, a written report will meet their needs for asynchronous access to the key information. The key information the report will highlight is the qualitative and quantitative findings and their analyses, as well as the recommendations for changes to be made to improve the instructional product. As suggested by Morrison et al. (2007), our report will have the following traditional structure:

- I. Executive summary
- II. Purposes of evaluation
 - A. Evaluation objectives
 - B. Description of the target course
- III. Methodology
 - A. Participants
 - B. Instruments
- IV. Results
 - A. Findings
 - B. Analyses
- V. Conclusions and recommendations.

Stages of Formative Evaluation

Following the ADDIE model for instructional design, our team will conduct formative evaluation iteratively and in stages. The table below displays the three-stage model suggested by Dick and Carey (as cited in Morrison et al., 2007) applied to the learner validation of this instructional product.

Table 6. Three-stage formative evaluation model adopted from Dick and Carey (1991).

Stage	Instructional Phase	Purpose	Learners	Main Measures
One-on-one evaluation	Development	Collect descriptive information about clarity, impact, and feasibility	Individuals	Observation, attitude survey, and interview
Small-group evaluation	Preliminary/ draft version	Identify strengths and weaknesses	Small groups (8-20)	Observation, attitude survey, and performance
Field trial	Completed	Assess actual implementation	Co-ops starting their onboarding at IBM	Performance and attitude survey

Initial Formative Evaluation Results

In accordance with the ADDIE model for instructional design, our team has already conducted the initial formative evaluation through the expert review and learner validation.

For the expert review, we provided our peer instructional designers with access to the web-prototype and asked for their feedback regarding the quality and

appropriateness of the instructional materials and their subsequent assessments and consistency of the instructional strategy. We gathered their comments³ and divided them into three categories, as suggested by Smith & Ragan (2005). The categorized results are illustrated in the table below.

Table 7. Expert review results in categories adopted from Smith & Ragan (2005).

Revisions that should be made <i>immediately</i>	Questions for which data should be collected during subsequent phases	Suggestions that should be ignored
Improve the audio quality in video lecture 3.3	Add a transcript for each video lecture to accommodate alternative learning preferences	Lack of feedback for incorrect quiz answers (this is a limitation of the Udemty system and cannot be changed by an instructional designer)

For the learner validation, due to the lack of access to the target learner audience, our team conduct a one-on-one evaluation with a participant who was the closest representative of the target learner audience. The participant selected for the one-on-one evaluation had completed a graduate degree in technical communication, had sharp writing skills, was interested in learning more about software technical writing, and had no previous experience using Oxygen XML Editor. During the one-on-one evaluation session, we gathered data using surveys, “read-think-aloud” technique, and interview. A detailed report of the one-on-one evaluation (pilot testing) session is provided in Appendix E.

³ At the time when this report was written, we had received feedback from four experts.

Summative Evaluation

Following the systematic approach in designing our instructional product, after the materials are implemented into the instructional context, our team will conduct summative evaluation to make a judgment about worth and effectiveness of the intervention (Eseryel, 2002). We will make a criterion-referenced judgment of effectiveness using the summative evaluation to answer the following question: “Does the instruction adequately solve the ‘problem’ that was identified in the needs assessment and that resulted in the development of the instructional materials?” (Smith & Ragan, 2005, p. 342). To find unbiased and objective answers to this question, we will plan the summative evaluation focusing on the procedures recommended by Morrison et al. (2007), such as effectiveness, efficiency, and cost of the program, attitudes and reactions of learners and stakeholders to the program, and the long-term benefits of the program.

Effectiveness of the program. Our team will evaluate the effectiveness of the instructional program focusing on the following question: "To what degree did students accomplish the learning objectives prescribed for each unit of the course?" (Morrison et al., 2007, p. 328). To address this question, we will gather data using learner observation, similarly to the formative evaluation; in addition, we will collect the program assessment data (quiz results and editing exercise feedback) and post-instruction on-the-job performance data to see whether the learning objectives will have been met. We will gather this data from both learners and stakeholders to get a more objective perspective. Once we gather the data, we will analyze and report it using the same techniques as in the formative evaluation.

Efficiency of the program. Our team will collect quantitative data while evaluating the efficiency of the asynchronous online training program. We will focus on the time spent by learners to achieve the learning objectives and compare it to the average time previously spent by the Information Development co-ops to achieve the same objectives in the context of independent learning without a training in place. In addition, we will emphasize the self-paced learning activities provided by our asynchronous online course and calculate the efficiency index for the course, as suggested by Morrison et al. (2007). We will ask the learners to keep a time log for their time spent following instructional lectures and completing assessment activities to achieve the learning objectives; then, we will calculate a ratio of the number of objectives a learner achieves compared with the time it takes a learner to achieve them; and, finally, we will average the ratio for every learner and every module to get the overall course efficiency index. Both the training time comparison and the course efficiency index will be included in the formal written report of the summative evaluation.

Cost of the program. Assessing the cost of the instructional program, our team will try to answer the following question: "What does it cost to develop and operate a specific program for the number of learner served?" (Morrison et al., 2007, p. 333). Therefore, we will need to gather quantitative data based on the calculations of the developmental and operational costs and to estimated number of learners the developed program will serve. To calculate the developmental costs, we will take into account the startup costs of the design and development time, materials and supplies, equipment, and other indirect and miscellaneous costs. To calculate the operational costs, we will consider the learner costs, course maintenance costs, and the costs for

evaluation and update of the course materials. We will also estimate the number of learners to whom the program in its current state will serve; this number will help us calculate the instructional cost index, which is based on the program's cost per learner. The instructional cost index will objectively indicate whether the program is cost effective.

Attitudes and reactions to the program. Smith and Ragan (2005) state that even though the learners' attitudes and reactions are not clearly related to the goals of the program or to the problem identified in the needs assessment, it is critical to evaluate and factor them "into the decision as to whether the instruction solves the problem identified in the needs assessment" (p. 348). To assess the learners' attitudes and reactions to the program will use Flagg's indices of appeal, which include attention, likableness, interest, relevance, familiarity, credibility, acceptability, and excitement (as cited in Smith & Ragan, 2005). We will assess these factors through the same methods applied in the formative evaluation, such as interviews, questionnaires, and observation.

Long-term benefits. The long-term benefits of this instructional intervention will result from achieving the learning goal identified in the context analysis; that is, that the learner will be able to select and write, in compliance with the IBM style, the correct type of DITA topic using Oxygen XML Editor and Acrolinx. Consequently, the long-term benefits would include increased profit and savings for IBM that would result from the co-ops' productivity increase and change of attitude (as mentioned in the needs analysis, before the program implementation, five surveyed former co-ops had reported feeling overwhelmed during their training).

Even though these benefits cannot be achieved immediately after the training, they can be traced over time. We will measure these benefits using qualitative and quantitative data from pre- and post-instruction surveys and interviews with the co-ops and their team leads conducted within the scope of the summative evaluation. We will use this data to identify the attitudes and transfer of learning into the performance context, and then we will calculate IBM's resulting savings and increased profit based on the data from the needs and learner analyses combined with the co-ops per-hour salary rate. The obtained numbers will be presented in the formal written summative evaluation report.

Table 8. Assessment plans.

Learning Goal: The learner will be able to select and write, in compliance with IBM style, the correct type of DITA topic using Oxygen XML Editor and Acrolinx.			
Objectives	Instructional Strategies	Assessment Approaches or Technique	Examples of the Assessment Items
Learners will be able to describe the purpose and basic functions of DITA	Learners will watch a video lecture that discusses what DITA is, how it is used, and why it is important for information developers.	<p>Formative Learners will complete a quick self-check matching the DITA function to its definition.</p> <p>Summative Learners will complete a multiple choice, scored quiz testing their knowledge of DITA at the end of the lesson.</p>	Multiple-choice quiz following the completion of the video lecture. See Appendix F for sample questions.
Learners will be able to apply IBM style to task, concept, and reference topics using Oxygen XML Author	Learners will read relevant chapters from the IBM Styleguide. Then, learners will watch video lectures that discuss some of the most important aspects of IBM style.	<p>Formative Learners will complete a short exercise on writing a topic in Oxygen XML Author utilizing the IBM Styleguide.</p> <p>Summative At the end of the video series, learners will complete a longer, scored writing sample using Oxygen XML Author. The writing sample will be evaluated for compliance with the IBM Styleguide.</p>	Application activity following the completion of video lectures. See Appendix G for sample activity instructions and prompts.
Learners will be able to write	Learners will watch video lectures that discuss how	Formative Learners will be asked	Application activity

task, concept, and reference topics in DITA using Oxygen XML Author	each topic type is structured and how to create each topic type.	to match sample topics with their appropriate label (task, concept, and reference). Summative Learners will be asked to complete a task, concept, and reference topic in DITA using Oxygen XML Author. A senior writer will then evaluate these for compliance.	following the completion of video lectures. See Appendix H for sample activity instructions and prompts.
Learners will be able to generate and interpret an Acrolinx report to revise task, concept, and reference topics in Oxygen XML Author	Learners will watch video lectures that discuss what Acrolinx is, why it is important for information developers, how to use it in conjunction with Oxygen XML Author, and how to read and interpret an Acrolinx report.	Formative Learners will complete an exercise putting the steps to generate and interpret an Acrolinx report in order. Summative Learners will generate and interpret an Acrolinx report and will use their findings to revise a concept and reference topic. A senior writer will evaluate their approach.	Application activity following completion of video lecture. See Appendix I for sample instructions and material.

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Appendix A: Needs Analysis Survey Results

1. I felt my training was adequate to get me started on the team.	
Strongly agree	0%
Agree	60%
Disagree	20%
Strongly disagree	20%

2. I felt overwhelmed while I was being trained.	
Strongly agree	0%
Agree	100%
Disagree	0%
Strongly disagree	0%

3. I felt overwhelmed by... (check all that apply)	
The tools I had to learn	3
The speed of the training	0
The structure of the training	3
The resources I was given	3

4. When training ended, I felt prepared to work independently.	
True	0%
False	100%

5. I felt my training was well organized.	
Strongly agree	0%
Agree	0%
Disagree	60%
Strongly disagree	40%

6. I had adequate hands-on learning experiences with the team's tools while I was training.	
Strongly agree	0%
Agree	60%
Disagree	40%
Strongly disagree	0%

7. When training ended, I felt I could complete my work efficiently using the team's tools.	
Strongly agree	20%
Agree	40%
Disagree	40%
Strongly disagree	0%

8. Which tool was most difficult to learn?	
RTC	60%
Oxygen/DITA	40%

Appendix B: Learner Analysis Survey Questions

Section 1. ECI 716: Learner Analysis Survey

Thank you for your willingness to share information about yourself, your learning preferences, and your experiences training at IBM! Your responses will help us build a better training experience for co-ops on the WebSphere Portal information development team.

Please answer all questions as truthfully and completely as possible. Your responses will be kept confidential and will be used only to make and justify decisions about the training solution that we are developing.

Section 2. About You

These questions will help us get to know more about who WebSphere Portal Information Development co-ops are.

1. What is your age?
 - ☐ 20-29
 - ☐ 30-39
 - ☐ 40-49
 - ☐ 50-59
2. What is your current level of education?
 - ☐ High school diploma or equivalent
 - ☐ Some Bachelor's work
 - ☐ Bachelor's degree
 - ☐ Some Master's work
 - ☐ Master's degree
 - ☐ Some PhD work
 - ☐ PhD degree
3. If you have completed some Bachelor's work or have completed a Bachelor's degree, what is/was your major?
 - ☐ *Short answer text*
4. If you have completed some Master's work or have completed a Master's degree, what is/was your major?
 - ☐ *Short answer text*
5. If you have completed some PhD work or have completed a PhD degree, what is/was your major?
 - ☐ *Short answer text*
6. Is English your first language?
 - ☐ Yes
 - ☐ No

7. If you speak more than one language, what other language(s) do you speak?
- *Short answer text*
-

Section 3. About Your Learning Preferences

These questions will help us get to know more about how WebSphere Portal Information Development co-ops prefer to learn.

8. Do you prefer to work on projects individually (by yourself) or collaboratively (with others)?
- Individually (by yourself)
 - Collaboratively (with others)
9. How do you like to learn new concepts and skills? Check all that apply.
- Through one-on-one in-person training
 - By reading documentation and training guides
 - By watching instructional videos
 - By referring to online tutorial resources, such as Udemy.com or Lynda.com
 - By referring to and/or participating in online forums
 - Other
10. When you are working on a task, how long can you typically focus before you need or want to take a break?
- *Short answer text*
11. Briefly describe a positive learning experience. What do you think made it a positive one?
- *Short answer text*
12. Briefly describe a negative learning experience. What do you think made it a negative one?
- *Short answer text*
-

Section 4. About Your Training at IBM

These questions will help us get to know more about your experiences coming on board with the team and being trained on the tools and programs you use to complete your daily work.

13. What you started your co-op at IBM, how much experience did you have with writing software documentation?

	1	2	3	4	5	
No experience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extensive experience

14. What you started your co-op at IBM, how much experience did you have with using XML to write documentation?

	1	2	3	4	5	
No experience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extensive experience

15. What you started your co-op at IBM, how much experience did you have with using Oxygen XML Editor to write documentation?

	1	2	3	4	5	
No experience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extensive experience

16. What you started your co-op at IBM, how much experience did you have with using a style guide?

	1	2	3	4	5	
No experience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extensive experience

17. When you started your co-op at IBM, were you hoping to ultimately join the organization as a staff Information Developer?

- ☐ Yes
- ☐ No

18. How confident did you feel while you were training at the beginning of your co-op?

	1	2	3	4	5	
No experience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extensive experience

19. Do you feel that your co-op training fully prepared you to become an effective co-op?

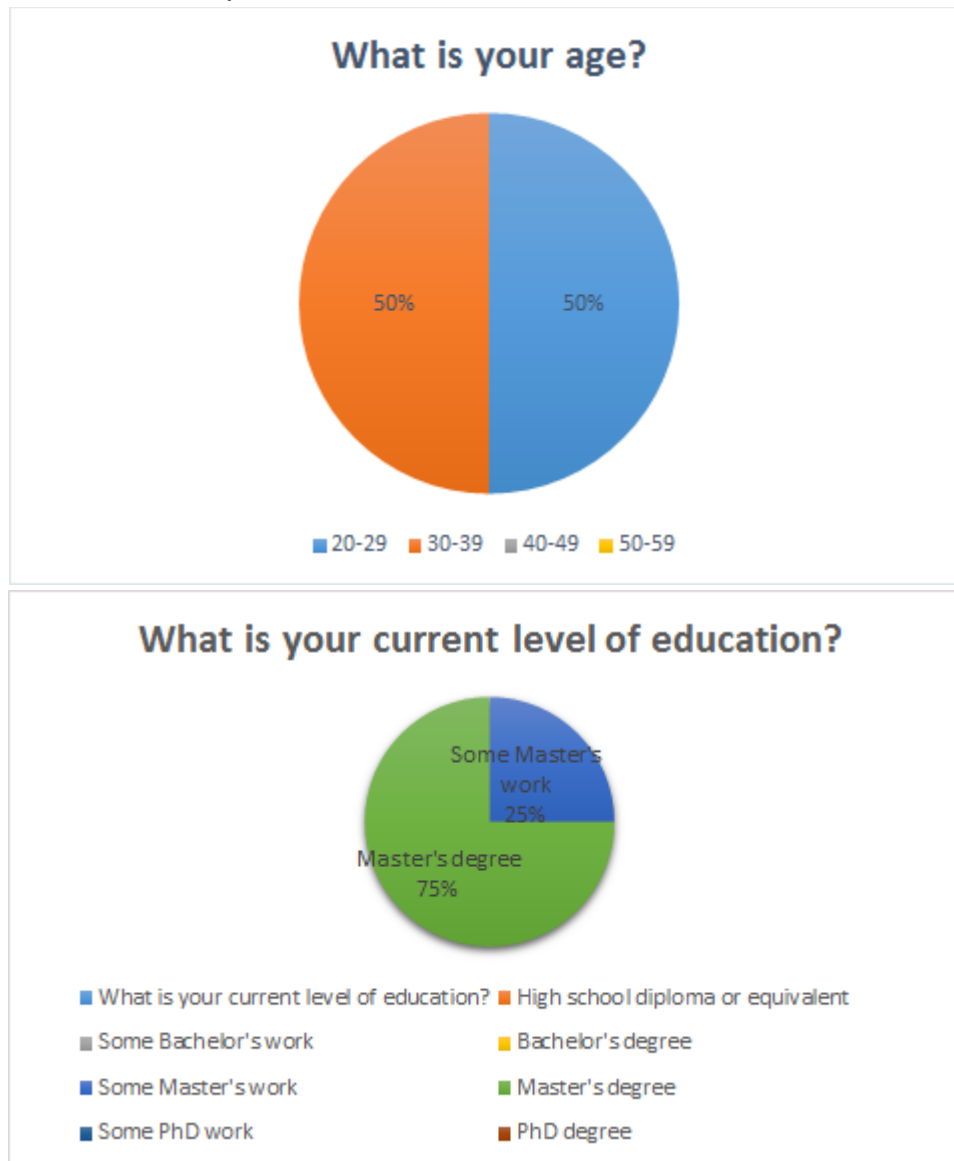
- ☐ Yes
- ☐ No

20. Do you feel that your co-op experience fully prepared you to become an effective Information Developer?

- ☐ Yes
- ☐ No

Appendix C: Learner Analysis Survey Results

Note: Total number of responses = 4



If you have completed some Bachelor's work or have completed a Bachelor's degree, what is/was your major?

English: Professional Writing
English Language
Philosophy
English for Secondary Education

If you have completed some Master's work or have completed a Master's degree, what is/was your major?

Technical Communication
Technical Communication
Technical Communication
Technical Communication

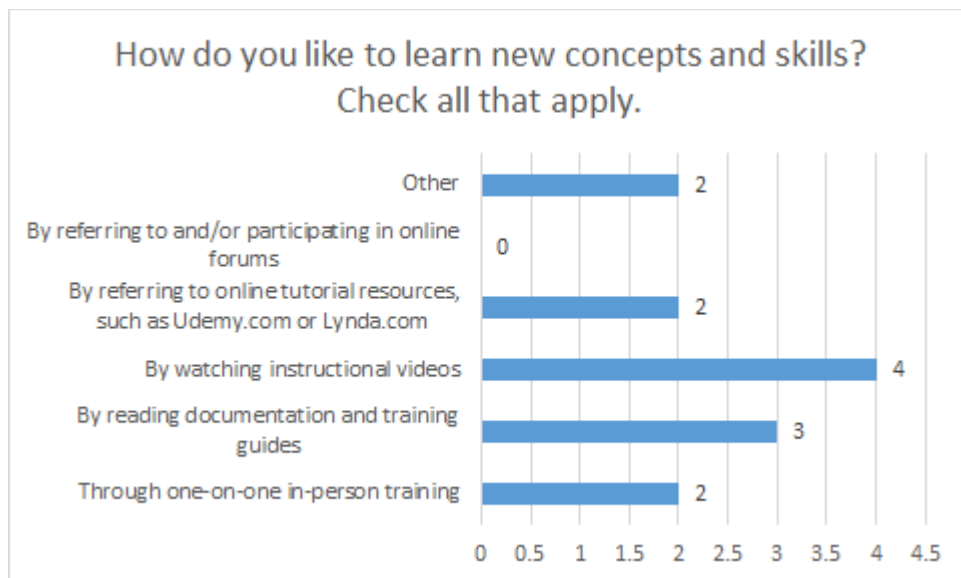
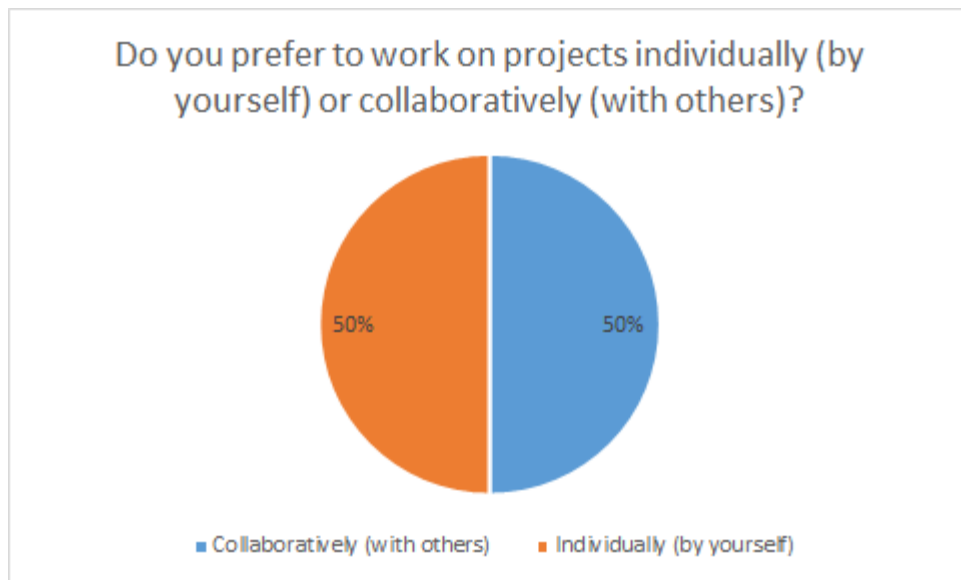
If you have completed some PhD work or have completed a PhD degree, what is/was your major?

No responses for this question



If you speak more than one language, what other language(s) do you speak?

Spanish
Spanish
Tamil



The additional answers to this question, the entries for the “Other” option, included the following:

By Trial and error -- working
Stackexchange

When you are working on a task, how long can you typically focus before you need or want to take a break?

hour to hour and a half
45 min
1 hour
30 minutes

Briefly describe a positive learning experience. What do you think made it a positive one?

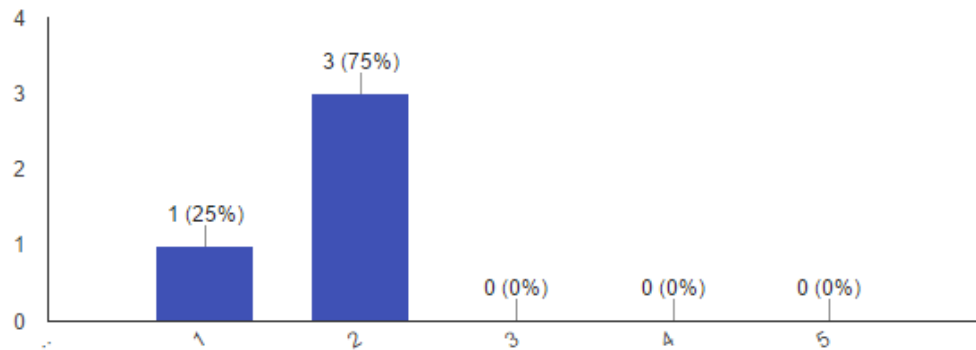
My most impactful learning experience was receiving feedback on my work and getting the chance to correct it. I was able to learn about my mistakes or decisions, why they were right or wrong, and how to correct them.
Learning to use tools like Photoshop. The ability to recover from mistakes.
There were breadcrumbs along the way to show me that I was on the right path.
Lots of opportunities to test what I was learning along the way so I knew if I had to go back and re-read.

Briefly describe a negative learning experience. What do you think made it a negative one?

Being given just text to read and then being expected to apply the learned skill with accuracy and precision. Hands-on activity after the reading would have helped that experience.
Setting up RTC. Too complicated and not intuitive and dependent on various other factors.
There was no end goal.
No feedback along the way -- by the time I got to the end, I was lost and didn't even know where or when I'd gotten lost.

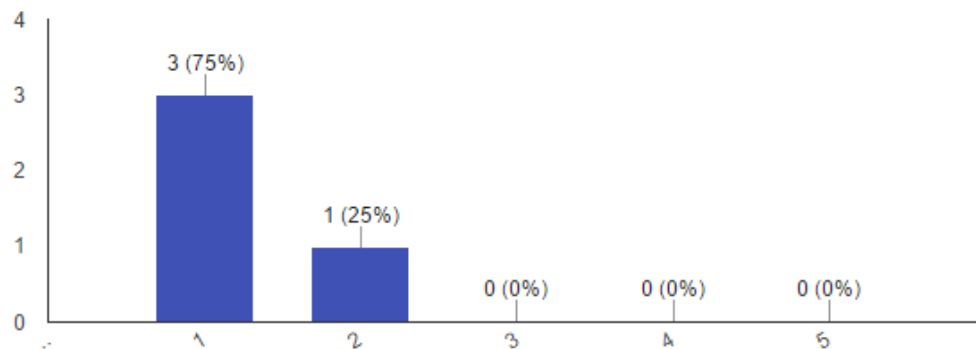
What you started your co-op at IBM, how much experience did you have with writing software documentation?

(4 responses)



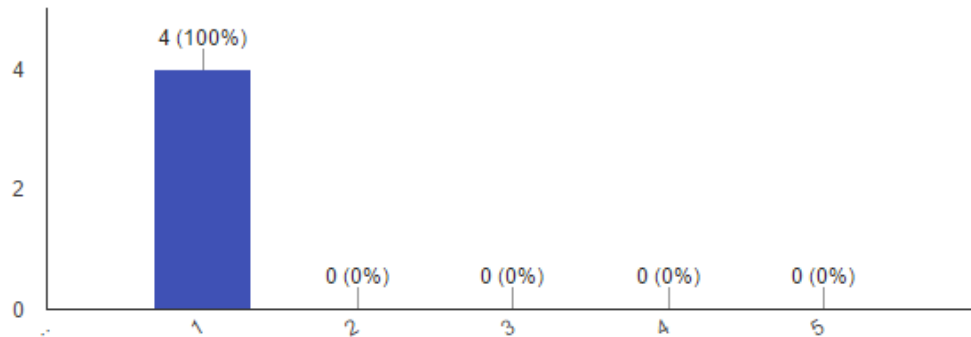
What you started your co-op at IBM, how much experience did you have with using XML to write documentation?

(4 responses)



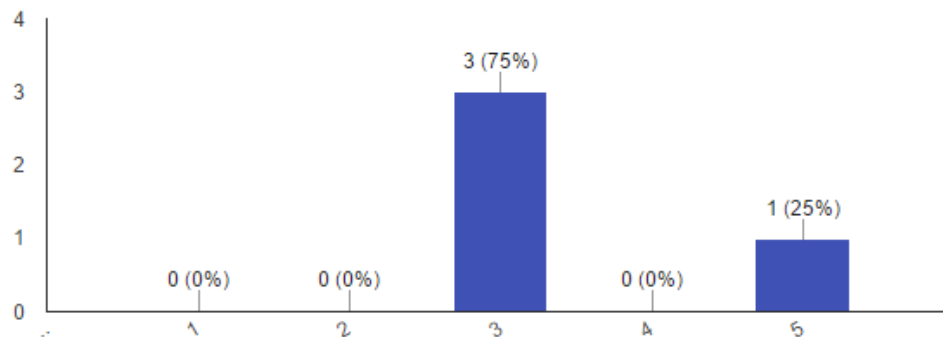
What you started your co-op at IBM, how much experience did you have with using Oxygen XML Editor to write documentation?

(4 responses)



What you started your co-op at IBM, how much experience did you have with using a style guide?

(4 responses)

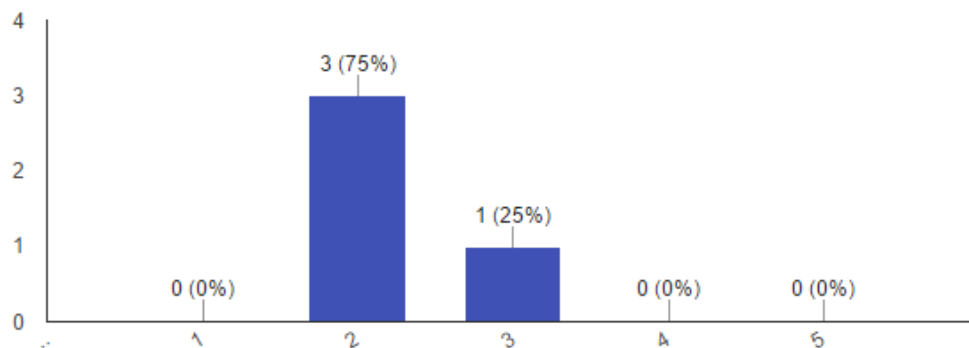


When you started your co-op at IBM, were you hoping to ultimately join the organization as a staff Information Developer?



How confident did you feel while you were training at the beginning of your co-op?

(4 responses)



Do you feel that your co-op training fully prepared you to become an effective co-op?



Do you feel that your co-op experience fully prepared you to become an effective Information Developer?



Appendix D: Design Wireframes

Key elements of IBM style

- Basic punctuation
- Advanced punctuation
- Verbs
- Contractions
- Nouns and pronouns
- Capitalization

Module 2: Introducing Oxygen XML Author

- ✓ Acquire Oxygen XML Author and Acrolinx
- ✓ Install the tools
- ✓ Set up and optimize the working environment

 WebSphere Portal

**Darwin
Information
Typing
Architecture**



XML specification

- ✓ Designing
- ✓ Writing
- ✓ Managing
- ✓ Publishing



Oxygen XML Author

- ✓ Specialized text editor
- ✓ Flexible single-source environment for structured markup

Input: DITA

Output: PDF, Microsoft Word, RTF, XHTML, WebHelp, and EPUB

acrolinx

Linguistic analytics engine

- ✓ Scans DITA content,
- ✓ Highlights errors
- ✓ Verifies compliance with the IBM Styleguide
- ✓ Produces a report

Objectives

- Understand task topic structure
- Identify commonly used task topic tags

task id="task nkz pmx kv"

title

Setting your out-of-office email notification

title

shortdesc

You can easily inform your colleagues and contacts that you are out of the office and unable to respond to email by setting an out-of-office notification that is automatically sent to anyone who emails you while you are away.

shortdesc

taskbody

taskbody

taskbody

task

task id="task nkz pmx kv"

title

Setting your out-of-office email notification

title

shortdesc

You can easily inform your colleagues and contacts that you are out of the office and unable to respond to email by setting an out-of-office notification that is automatically sent to anyone who emails you while you are away.

shortdesc

taskbody

context

About this task: You control the span of time for which the out-of-office notification is active. It can be extended or canceled at any time.

context

steps id="steps sww 5qx kv"

step

1.

cmd

Click on

uicontrol

Preferences

uicontrol

cmd

step

step

2.

cmd

Select

menucascade

uicontrol

Notifications

uicontrol

→

uicontrol

Out of Office

uicontrol

menucascade

cmd

step

step

3.

cmd

Customize your out-of-office message and select the start and end dates.

cmd

step

step

4.

cmd

Click

uicontrol

Save

uicontrol

cmd

step

steps

taskbody

task

task id="task nkz pmx kv"

title

Setting your out-of-office email notification

shortdesc

You can easily inform your colleagues and contacts that you are out of the office and unable to respond to email by setting an out-of-office notification that is automatically sent to anyone who emails you while you are away.

taskbody

context

About this task: You control the span of time for which the out-of-office notification is active. It can be extended or canceled at any time.

steps id="steps sww 5qx kv"

step

1.

cmd

Click on

uicontrol

Preferences

uicontrol

cmd

step

step

2.

cmd

Select

menucascade

uicontrol

Notifications

uicontrol

→

uicontrol

Out of Office

uicontrol

menucascade

cmd

step

step

3.

cmd

Customize your out-of-office message and select the start and end dates.

cmd

step

step

4.

cmd

Click

uicontrol

Save

uicontrol

cmd

step

steps

taskbody

task

Validation Problem

The inserted content is not valid at the current position.

Insert the content:

.. inside the closest 'taskbody' element, to the right of the current position

🔍 at current position, even if invalid

Options

Cancel

OK

Setting your out-of-office email notification

You can easily inform your colleagues and contacts that you are out of the office and unable to respond to email by setting an out-of-office notification that is automatically sent to anyone who emails you while you are away.

About this task: You control the span of time for which the out-of-office notification is active. It can be extended or canceled at any time.

1. Click on **Preferences**.
2. Select **Notifications**→ **Out of Office**.
3. Customize your out-of-office message and select the start and end dates.
4. Click **Save**.

Results: Your out-of-office notification will be sent to anyone who sends you an email during the span of your absence.

Appendix E: Pilot Testing Evaluation Report

Part I. Introduction

Brief Description of Web-Based Instruction

The purpose of this WBI is to help new interns and employees on the WebSphere Portal Information Development team at IBM learn three tools that are integral to their everyday work: the IBM Style Guide, Oxygen XML Author and DITA, and Acrolinx. Because new interns and employees on the Portal team are expected to use these tools independently soon after joining the team, the WBI is designed to provide hands-on learning opportunities at each step of the learning process.

The WBI itself consists of three modules (each focused on one of the main three tools of the job). Each module consists of lessons, which each contain a video lecture and a quiz or activity so that the learner can check their own understanding and apply their new skills.

Stakeholders

There are two sets of stakeholders for this WBI. The first set is the primary stakeholders, who include the course designers as well as the Portal team lead. This group of stakeholders makes decisions about how the course was designed as well as how it will be used in the future. The second set is the secondary stakeholders, who include the interns and new employees of the Portal team, as well the Portal organization as a whole (product developers, designers, testers, managers, etc.). This group of stakeholders will have opinions about the usefulness and effectiveness of the course, and those opinions should be collected and considered as the WBI is used and updated in the future.

Focus of Evaluation/What Was Evaluated

The evaluation focused on two aspects of the WBI: content/instruction and interaction. Specifically, it was concerned with the clarity of the content and instruction as well as the usefulness and intuitiveness of the interactive, hands-on components of the WBI.

To assess the goodness of fit of the content/instruction and interaction of the WBI with the learners' past experiences, the following questions were asked prior to the pilot test:

- What has been your experience with DITA?
- Describe your experiences with XML and other markup languages.
- Have you taken online courses before? If yes, which ones? What did you like or dislike about them?
- Why are you interested in learning DITA?
- What kind of knowledge and skills are you expecting to get out of this course?

Throughout the pilot test, the learner used a think aloud protocol to describe his thoughts and reactions pertaining to each piece of the WBI. When the pilot test was complete, the following questions were asked to collect final thoughts and impressions about the content/instruction and interaction of the WBI:

- Do you think this course has helped you gain the knowledge and skills you expected? Why or why not?
- What did you like about this course?
- What did you dislike about this course?

Who Conducted the Evaluation

Two of the three WBI designers, Kateryna Bieliaieva and Rachel Amity, conducted this evaluation. Because they were the two members of the team who had previously worked at IBM and consequently best understood how the tools taught in the WBI worked, it was determined that they would be the best people to conduct the evaluation.

Part II. Methods and Procedures

What Evaluation Methods or Tools/Instruments Were Used

To evaluate the effectiveness of our WBI, we enlisted the help of a recent MSTC (Master's of Science in Technical Communication) graduate who is interested in learning DITA and in working for IBM someday. Ideally, we would have evaluated our WBI with real new interns and employees of the WebSphere Portal team, but because new interns do not start until after the end of the Spring semester, they were unavailable to us. A recent MSTC graduate whose skills and motivations are similar to an IBM intern's skills and motivations was as close to our target audience as we could come.

We relied on questionnaires and a think aloud protocol to gather insights during our evaluation. Specifically, we administered pre- and post-test questionnaires designed to gather insight about the content/instruction and the interaction of the WBI, and we recorded the learner's thoughts and actions as he worked through the WBI. The pre-test questionnaire included the following questions:

- What has been your experience with DITA?
- Describe your experiences with XML and other markup languages.

- Have you taken online courses before? If yes, which ones? What did you like or dislike about them?
- Why are you interested in learning DITA?
- What kind of knowledge and skills are you expecting to get out of this course?

The post-test questionnaire included the following questions:

- Do you think this course has helped you gain the knowledge and skills you expected? Why or why not?
- What did you like about this course?
- What did you dislike about this course?

How was Collected Data Analyzed

Because we used two main instruments in our evaluation, we analyzed our data in two ways.

We analyzed the learner's responses to the questionnaires by comparing his answers prior to completing the pilot test to his answers after completing the pilot test to determine whether his expectations were met and whether the qualities he said he liked about online learning were qualities he said he liked about our WBI.

Then, we analyzed the learner's narration from the think aloud protocol by matching it to time-on-task and task completion. In this way, we were able to qualitatively and quantitatively analyze the WBI by determining how long it took the learner to complete each lesson (if he could finish the lesson at all) and how the learner felt about each lesson along the way.

When and How was the Evaluation Conducted

Our evaluation was conducted in a graduate study room in the Hill Library on Wednesday, April 13, 2016, in the afternoon. It consisted of a pilot test that asked the learner to complete four lessons in the third module of the WBI, which focused on Oxygen XML Author and DITA XML. Collectively, the four lessons exposed the learner to all of the different types of materials and resources we developed for the WBI: video lectures, quizzes, activities, and job aides. We began the pilot test by asking the learner to complete a pre-test questionnaire designed to gather information about his past experiences with DITA and online learning.

When the learner completed the questionnaire, we provided him with a laptop that was logged into Udemy (the WBI's platform) as well as a list of the lessons we wanted him to complete. We explained the process of the think aloud protocol, asking him to narrate his thoughts and actions aloud and explaining that we would ask clarifying questions if needed. Kateryna was responsible for asking clarifying questions during the protocol, while Rachel was responsible for taking notes on the learner's words and actions. Kateryna and Rachel sat behind each of the learner's shoulders so that they were out of his line of sight, but could observe the actions he took.

When the learner completed the WBI, he was asked a set of post-test questions designed to gather insight about the content/instruction and the interaction of the WBI.

Part III. Findings

Our findings are a combination of quantitative information about whether the learner completed the lessons and how long it took him to do so as well as qualitative insight about how the learner felt about the lessons at each step. Our findings are

summarized in Table 1 below (note: because we gathered nearly an hour's worth of data, not all information is included in the table).

Table 4: Results of pilot test.

Lesson	Completed?	Time-on-task (minutes)	Learner Comments	Designer Comments
Launching the module on Udemy	Yes	5	"I'm not sure where to go to get started."	Clicks around a lot before figuring out how to start the video lecture for Lesson 3.1.
3.1: Introduction	Yes	1	"That's cool that the next video starts automatically."	
3.2: DITA Overview	Yes	18	<p>"This seems pretty straightforward and easy to use."</p> <p>"I'm learning stuff already! DITA is a language of XML, not the other way around!"</p> <p>"It would be helpful to include what DITA stands for and what it means."</p> <p>"I want to know how DITA is used across platforms and what the benefit of it is."</p>	<p>Takes notes in a notebook while watching lecture.</p> <p>On quiz, reads each choice aloud under breath before selecting answer.</p>
3.5: Concept Topics	Yes	35	"The DITA tag list is useful,	Hesitates when presented with the

			<p>especially if you already know what HTML is. It won't seem as alien."</p> <p>"Guess I'll look at the instructions first."</p> <p>"I'm confused. Am I copying and pasting? Or am I typing it? What am I doing? [clicks around] I'm still not sure what to do."</p> <p>"Let's see what this does... to be honest, I have no idea what I'm trying to do."</p> <p>"I didn't understand that this [the content in the exercise] was wrong."</p> <p>"Frankly, the image does throw me off a lot. There's no image tag, so I have no idea. I would've eventually figured it out, but it would've taken me awhile."</p> <p>"But I wouldn't have guess about the errors."</p>	<p>attached files – not sure where to start.</p> <p>Quickly figures out how to open linked DITA files from the exercise.</p> <p>Flips between attached DITA files several times while trying to figure out what to do.</p> <p>Takes about five minutes before giving up and asking for help.</p> <p>Seems clear about what to do after Kateryna steps in to clarify the objective of the exercise.</p> <p>The word "organize" seems to throw him off – he repeats it when he reads the instructions – maybe "structure" would be clearer?</p> <p>We include an image in our exercise, but do not discuss images in our video lectures – he has no idea what to do because we never told him.</p> <p>Instead of showing finished product in DITA, maybe show it in Word? His problems seem to</p>
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				stem from not understanding DITA well enough yet.
3.7: Conclusions	No	N/A		Did not get to test this lesson – ran out of time.

Part IV. Recommendations

Although our pilot test was cut short by lack of time, it yielded several important recommendations. Our learner provided recommendations about the structure of our exercises, the process of getting started on Udemy, and the content of the Overview video.

Our learner gave us several small recommendations related to the exercise we asked him to complete after the video lecture on concept topics. He suggested that our instructions could be clearer if we provided more details about what to do. He also suggested using a word other than “organize” to describe what he was supposed to do, because he did not understand that “organize” implied that the sample content included organizational errors. To make our expectations clearer, he suggested that we provide sample content in a Word document instead of a DITA file because he was not yet completely comfortable with DITA, and just trying to read and interpret the sample DITA content was cognitively taxing. Finally, he suggested using clearer file names for the exercise files because he was not sure which file to start with.

Another aspect of the WBI that was difficult for our learner was figuring out to get started after logging into Udemy. He clicked around for five minutes before fully understanding the Udemy interface and how to navigate it. Therefore, he suggested

somehow providing clear instructions before learners even log onto Udemy so they know exactly where to click and how to get started.

A final recommendation our learner provided was to expand the content of the DITA Overview video lecture so that it gives a more holistic overview of what DITA is and why it is advantageous for information developers. He explained that he wanted to understand DITA at a deeper level so he could use and leverage it more effectively on the job. Specifically, he wanted to know more about DITA's capabilities and how it compared to other markup languages. Providing this kind of detail would likely appeal to our learners as a read-to-learn audience who is intrinsically motivated.

Appendix F: Sample Assessment, Quiz

Check Your Understanding

Based on what you just learned about DITA, choose the best answer to each of the following questions.

1. What are the three main topic types in DITA?
 - a. Reference, troubleshooting, concept
 - b. Task, concept, reference
 - c. Task, concept, reference
 - d. Concept, task, composite
2. Which is NOT a reason why DITA is useful to information developers?
 - a. It is visually appealing.
 - b. It ensures consistency.
 - c. It allows for reuse.
 - d. It is functional across all platforms.
3. What do tags do?
 - a. Add visual interest to a topic.
 - b. Classify words, sentences, paragraphs, and topics.
 - c. Create hyperlinks between the topic and webpages.
 - d. Add different font styles to text

Appendix G: Sample Assessment, Editing Exercise 1.1

Editing Exercise 1.1

Follow these instructions to complete Editing Exercise 1.1. This exercise will help you apply the concepts presented in the “Introducing the IBM Styleguide” module.

1. Open the *editing_exercise_1.1-content.dita* file. This file contains a DITA task topic that violates several IBM style guidelines.
2. Read the content carefully and identify the content that needs to be revised as well as what guidelines are violated.
3. Revise any content that violates the style guidelines so that it adheres to the style guidelines. For each revision you make, add a comment using the `<comment>` tags that briefly identifies the style guideline that was violated.
4. When you finish revising the content, open the *editing_exercise-1.1-solution.dita* file and compare your revised topic with the suggested solution.

Appendix H: Sample Assessment, Editing Exercise 3.4

Editing Exercise 3.4

Follow these instructions to complete Editing Exercise 3.4. This exercise will help you apply the concepts presented in the “Writing a DITA Concept Topic” video lecture.

1. Open the *editing_exercise_3.4-content.dita* file. This file contains the content that you need to structure in the basic DITA concept topic format.
2. Read the content carefully and identify the relationships between its components.
3. Open the *editing_exercise_3.4-sample_structure.dita* file and use its structure outline as a reference to organize the exercise’s content.
4. Put the content from the *content.dita* file in its appropriate place in the *sample_structure.dita* file.
5. When you finish organizing and tagging the content, open the *editing_exercise-3.4-solution.dita* file and compare your completed concept topic when the suggested solution.

Appendix I: Sample Assessment, Editing Exercise 3.7

Editing Exercise 3.7

Follow these instructions to complete Editing Exercise 3.7. This exercise will help you apply what you now know about generating an Acrolinx report

1. Open a blank DITA task topic template.
2. Write a task topic that describes, in the correct order, the steps you need to take to generate an Acrolinx report.
3. Use the steps you just write about to run an Acrolinx report on your newly written topic. Revise any errors.
4. When you finish writing your topic, open the editing_exercise-3.7-solution.dita file. Compare your topic with the suggested solution. Although your wording may differ from the sample, the number and order of steps in your topic and the solution topic should be the same.