



# External Training Needs Assessment

OCTOBER 2021

## Highlights

- How successful have MISO's efforts been in improving customer training?

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- How has the training landscape changed since 2018?

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- What opportunities still exist to meet customer needs and our customer's experience through education?



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## Executive Summary

### Overview of External Training Needs Assessment

The 2021 External Training Needs Assessment found that the external training program has improved in customer satisfaction and access since the first needs assessment in 2018. There are still opportunities to enhance the learner experience, to add requested learning offerings and to expand external training data capabilities. Additionally, the training landscape has drastically changed since 2018 and new methods around work and training have impacted customer expectations.

### Recommendations

#### Near-Term

- Journey map customer process accessing training
- Create a roadmap of prioritized course development
- Create and implement external training communication plan
- RCEP Continuing Education Hours Pilot
- Design and develop Subject Matter Expert Instructor Certification to certify subject matter experts to facilitate advanced courses
- Continue implementing interactive activities, realistic scenarios and knowledge tests in online courses, following adult learning and motivation best practices

#### Mid-Term

- Formalize external training request process for MISO initiatives and projects
- Redesign customer learning center for usability and design
- Build curriculums based on clusters of training modules and relevant learning paths
- Continue to evolve annual course review and maintenance process

#### Far-Term

- Increase Learner Management System (LMS) capability
- Determine resources and processes needed to offer and administer North American Electric Reliability Corporation (NERC) Continuing Education Hours (CEHs)
- Add accessibility features to current and future courses

#### Ongoing

- Continued Assessments/Improvements



## Introduction

### Purpose of External Training Needs Assessment

For more than 20 years, MISO has been known for its reliable delivery of low-cost energy through efficient, innovative operations and planning. MISO has a wide variety of customers and stakeholders who look to MISO to keep them informed on industry topics. MISO's external training program continues to grow in importance as business evolves. In 2018, the External Training Needs Assessment was created to inform the development of prioritized recommendations to MISO management on near-term, mid-term and long-term enhancements to transform the training program and better meet customer needs. The full 2018 External Training Needs Assessment can be viewed [here](#).

From 2018-2021, the External Training team has implemented the needs assessment recommendations. These changes include: transitioning the training to the Customer Learning Center, reorganizing modules based on topic and developing new eLearning materials including foundational Level 100 modules and online guides (MUI 2.0, Help Center and Generation Interconnection). Three years later, this assessment strives to answer the questions:

- How successful have MISO's efforts been in improving customer training?
- How has the training landscape changed since 2018?
- What opportunities still exist to meet customer needs and our customer's experience through education?

The 2021 External Training Needs Assessment is a comprehensive review of the current state of and future opportunities for the training MISO offers to its external customers. This assessment uses research, data collection and internal/external customer feedback to suggest prioritized recommendations on near-term, mid-term and long-term enhancements. The goal is to continue developing MISO as an industry leader in the quality and effectiveness of training MISO provides to its external customers.

### MISO External Training – Learner Base

Effective training design comes from understanding the learner. This is a particular challenge for MISO because of its wide variety of stakeholders. There are currently 119 member companies and 494 market-participant companies. MISO's Customer Relationship Management System currently shows 6,421 unique contacts and 1,363 businesses. There are also 39 MISO applications being tracked with 7,669 users set up for these apps. Roles of stakeholders who could use customer training include Transmission Owners, Operators, Market Participants, Members, members of educational institutions, engineers, or Entity leaders. Learners likely have different levels of experience in the energy industry and different goals for seeking training. MISO will continue to collect and verify data to better understand the learner. Targeting a variety of topics and levels of expertise will help ensure MISO is creating training for all stakeholders.

### Process/Methods

Planning for External Training Needs Assessment began in Quarter 1 of 2021. An initial project outline (**Appendix A**) and a presentation on the need for a comprehensive External Training Needs



Assessments were developed. This analysis was created with an agile-style methodology that focuses on rapid iteration and frequent evaluation (Torrance Learning, n. d.).

## Current State

More than 50 percent of the courses scheduled for redesign in the 2018 External Training Needs Assessment are complete. Additional trainings for projects and process changes also have been developed based on internal and external needs. These efforts have led to an increase in external training utilization and an increase in customer satisfaction.

### Modules Completed 2019-2021

Category	Modules Completed 2019-2021
<b>Markets</b>	<ul style="list-style-type: none"> <li>○ L100 Energy and Operating Reserves Markets</li> <li>○ L200 Energy and Operating Reserves Markets</li> <li>○ L100 Auction Revenue Rights (ARR) and Financial Transmission Rights (FTR)</li> <li>○ L200 ARR/FTR</li> <li>○ L100 Market Participant and Asset Registration</li> <li>○ L100 Transmission Settlements</li> <li>○ Market User Interface 2.0 Quick Start Guide               <ul style="list-style-type: none"> <li>▪ Knowledge Articles</li> </ul> </li> <li>○ Short-Term Reserve:               <ul style="list-style-type: none"> <li>▪ Short-Term Reserve: Registration Fast Facts</li> <li>▪ Short-Term Reserve: MUI API</li> <li>▪ Knowledge Articles</li> </ul> </li> </ul>
<b>Modeling</b>	<ul style="list-style-type: none"> <li>○ L100 Network and Commercial Model</li> </ul>
<b>Operations</b>	<ul style="list-style-type: none"> <li>○ L100 Real Time Operations</li> <li>○ Control Area Video Series:               <ul style="list-style-type: none"> <li>▪ Control Area (Public)</li> <li>▪ Frequency and Balancing (Public)</li> <li>▪ Amps, Watts and Volts (Public)</li> <li>▪ Ramp</li> </ul> </li> </ul>
<b>Transmission and Generation Planning and Resource Adequacy</b>	<ul style="list-style-type: none"> <li>○ L100 Generation Interconnection</li> <li>○ L100 MISO Planning Portal</li> <li>○ Demand Side Resource Interface (DSRI) Online Guide</li> <li>○ Generator Interconnection Agreement Training (2021 Update)</li> <li>○ Generator Interconnection Application Process Online User Guide (2021 Update)</li> <li>○ Generator Interconnection Online User Guide for Transmission Owner Reviewers (2021 Update)</li> <li>○ Generator Interconnection Pre-Queue Review (Internal Only Training) (2021 Update)</li> </ul>



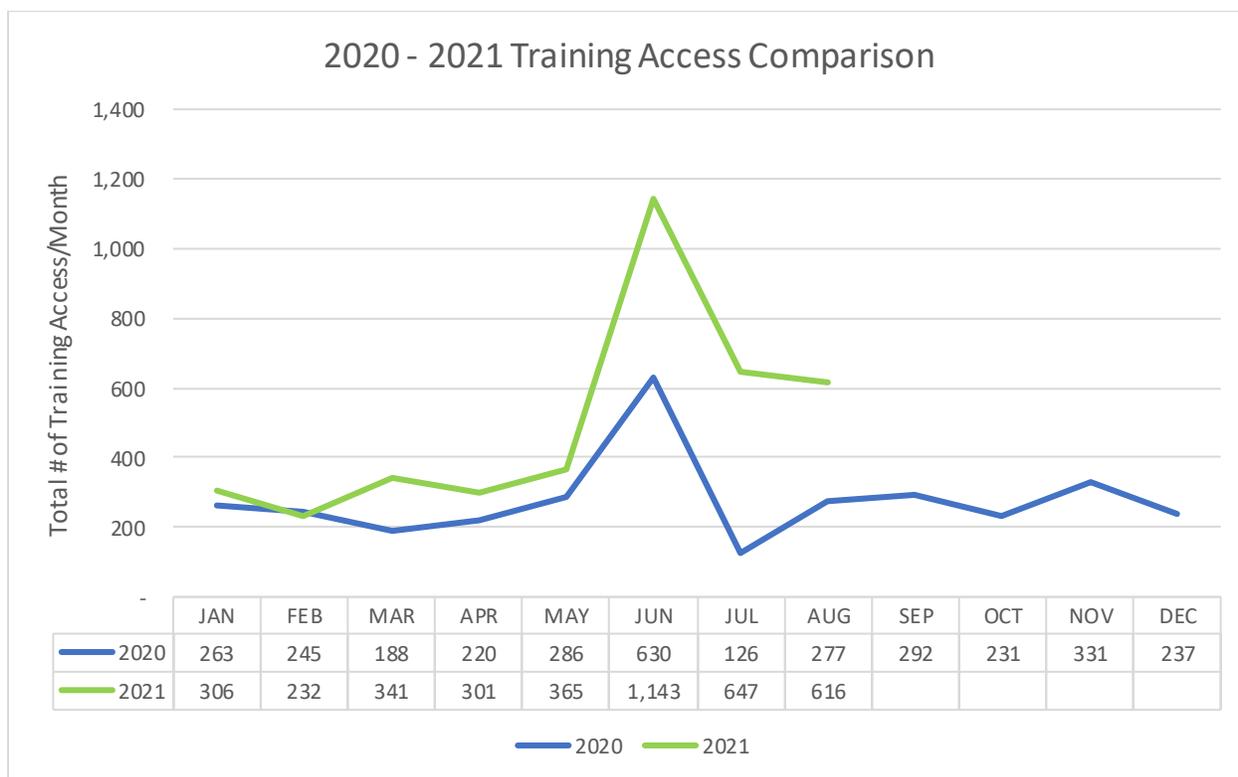
<b>Stakeholder Governance</b>	<ul style="list-style-type: none"> <li>○ L100 Stakeholder Process Tutorials</li> <li>○ L100 Intro to Stakeholder Participation</li> <li>○ L200 Intro to Stakeholder Governance</li> <li>○ L200 Advisory Committee Member Training</li> <li>○ L200 ADR Committee Member Training 2021</li> </ul>
<b>General Curriculum</b>	<ul style="list-style-type: none"> <li>○ MISO Help Center Online Guide</li> <li>○ Other promotional videos and online tools</li> </ul>

### Modules Coming Soon- 2021/2022

<b>Category</b>	<b>Modules Coming Soon</b>
<b>Markets</b>	<ul style="list-style-type: none"> <li>○ L200 ARR and FTR Transmission Service Examples</li> <li>○ L100 Transmission Pricing Attachment O</li> <li>○ L100 Market Settlements</li> <li>○ L200 Market Settlements</li> <li>○ L200 Network and Commercial Model</li> <li>○ L300 Commercial Model Asset Registration</li> <li>○ Electric Storage Resources (ESR)</li> </ul>
<b>Modeling</b>	<ul style="list-style-type: none"> <li>○ Model Manager Online User Guide</li> <li>○ L300 Transmission Planning Modeling</li> </ul>
<b>Operations</b>	<ul style="list-style-type: none"> <li>○ L200 Physical Scheduling</li> </ul>
<b>Transmission &amp; Generation Planning and Resource Adequacy</b>	<ul style="list-style-type: none"> <li>○ L100 Resource Adequacy</li> <li>○ Storage as a Transmission Only Asset Training</li> <li>○ L200 Transmission Settlements</li> <li>○ Dynamic Auction Creation (Resource Adequacy and Need)</li> </ul>
<b>Stakeholder Governance</b>	<ul style="list-style-type: none"> <li>○ L200 Entity Leadership</li> </ul>
<b>General Curriculum</b>	<ul style="list-style-type: none"> <li>○ L100 Foundational Overview of MISO and MISO Markets</li> <li>○ L100 Introduction to MISO and Markets</li> <li>○ L200 Day in the Life of a Market Participant</li> </ul>

### Training Utilization

The chart below demonstrates the increasing number of learners accessing the MISO external training courses. This is partially due to the improved and increased trainings offered as part of the work done from 2018-2021. There is also opportunity to increase utilization with the recommended communication plan.



## Survey Findings

**Users seem more satisfied with MISO training offerings than they were in 2018.**

- 17% increase from respondents that somewhat agree, agree, or strongly agree with “I am satisfied with the customer training currently provided by MISO”
- Increase in mean of responses from 4.33 to 4.92 (Likert Scale from 1-7 with 1 meaning Strongly Disagree and 7 meaning Strongly Agree)
- 55% of respondents somewhat agree, agree, or strongly agree with “In the last three years, I have noticed an improvement in the effectiveness and availability of training from MISO”
- Considerably fewer comments about out-of-date material or being completely unaware of customer training
- Overall tone of comments much more positive

## Recommended Module Topics from Survey Respondents

An asterisk represents a topic where a course is currently in the process of being competed. A number in parenthesis recommends the number of respondents requesting that topic.

Category	Topics Recommended 2021 Training Needs Survey
<b>Markets</b>	<ul style="list-style-type: none"> <li>○ Locational Marginal Pricing (LMP), Capacity Markets, Energy Markets, Grid Operations</li> <li>○ Credit Exposure, Calculations/Reports, Collateral Management</li> <li>○ Transmission Settlements* (4)</li> <li>○ Market Basics* (3)</li> </ul>



	<ul style="list-style-type: none"> <li>○ Financial Schedules</li> <li>○ New Market Participant</li> <li>○ Settlements</li> <li>○ Demand Response Tools</li> <li>○ Distributed Energy Resources (DER)</li> <li>○ Reserve Source Point</li> </ul>
<b>Modeling</b>	<ul style="list-style-type: none"> <li>○ Promod</li> <li>○ PowerFlow</li> <li>○ Transmission Congestion and Constraints</li> <li>○ Quarterly Operating Limits Process and Modeling</li> <li>○ Modeling Methods</li> <li>○ Model Manager*</li> <li>○ MISO Commercial Model</li> </ul>
<b>Operations</b>	<ul style="list-style-type: none"> <li>○ Event Reporting (2)</li> <li>○ Cold Weather Events</li> <li>○ Renewables Operations (2)</li> <li>○ Energy Management System</li> <li>○ Aggregators, Microgrids, Distribution Companies</li> <li>○ System Operating Limit Mitigation</li> <li>○ Real-Time Dispatch Info</li> <li>○ Voltage Ampere Reactive (VAR) (Voltage Control)</li> <li>○ Generator Operator (GOP) vs Transmission Operator (TOP) VAR Expectations</li> <li>○ Day Ahead and Real Time Ops*</li> <li>○ Load Forecasting, Dispatchable Intermittent Resources (DIR) Forecasting</li> </ul>
<b>Transmission &amp; Generation Planning and Resource Adequacy</b>	<ul style="list-style-type: none"> <li>○ MISO Study Schedule and Process (2)</li> <li>○ Renewables Planning (2)</li> <li>○ Module E Capacity Tracking Tool (MECT) (2)</li> <li>○ Resource Adequacy* (2)</li> <li>○ Transmission Planning</li> <li>○ Generator Interconnection* (5)</li> <li>○ Load Modifying Resources (LMR)</li> <li>○ Capacity Shortages</li> </ul>
<b>Stakeholder Governance</b>	<ul style="list-style-type: none"> <li>○ Process Changes</li> <li>○ New to the Industry (2)</li> </ul>
<b>General Curriculum</b>	<ul style="list-style-type: none"> <li>○ New Business Practices Manual (BPM) Generator and Transmission, Local Balancing Authority (LBA) Operations</li> <li>○ Cybersecurity</li> <li>○ BPM and Tariff</li> <li>○ Tariff Administration</li> <li>○ Load Serving Entity (LSE) Regulatory Requirements</li> </ul>

## Ideal Future State 2024

MISO continues the efforts from 2018-2021 to provide accurate, engaging and accessible training modules that successfully serve the needs of its complex customer base. MISO expands its



training offerings with a focus on the individual learner experience. To do this, MISO has a data-based understanding of its customers and offers a large selection of trainings on topics that give customers the skills and knowledge necessary in their roles. Additionally, strong connections between various internal teams and External Training provide customer training supports the successful rollout of new projects and process changes. Finally, MISO has robust engagement and collaboration between Technical Training, Learning and Development and External Training, allowing for effective resource management and meeting all MISO internal and external training needs.

A positive, learner-centric approach allows users to easily navigate and use the LMS. There is direct communication between customers and MISO External Training team members to easily determine changing customer needs. MISO provides curriculums and suggestions to help learners determine which modules to take based on their interests and experience. Courses include interactive activities such as realistic scenarios and knowledge tests following adult learning and engagement best practices. In addition to self-paced, online introductory courses, MISO offers virtual and in-person instructor-led courses with Q&A sessions. The SME Instructor Certification course brings additional value to MISO by serving as a career-building opportunity and strengthening SMEs' ability to communicate with external parties. MISO's External Training Program maintains an ongoing focus on improvements and evaluation.

The next needs assessment will take place in 2024 to ensure that MISO's external training continues to meet customer needs and provides a premium External Training Program.

## Recommendations and Justifications

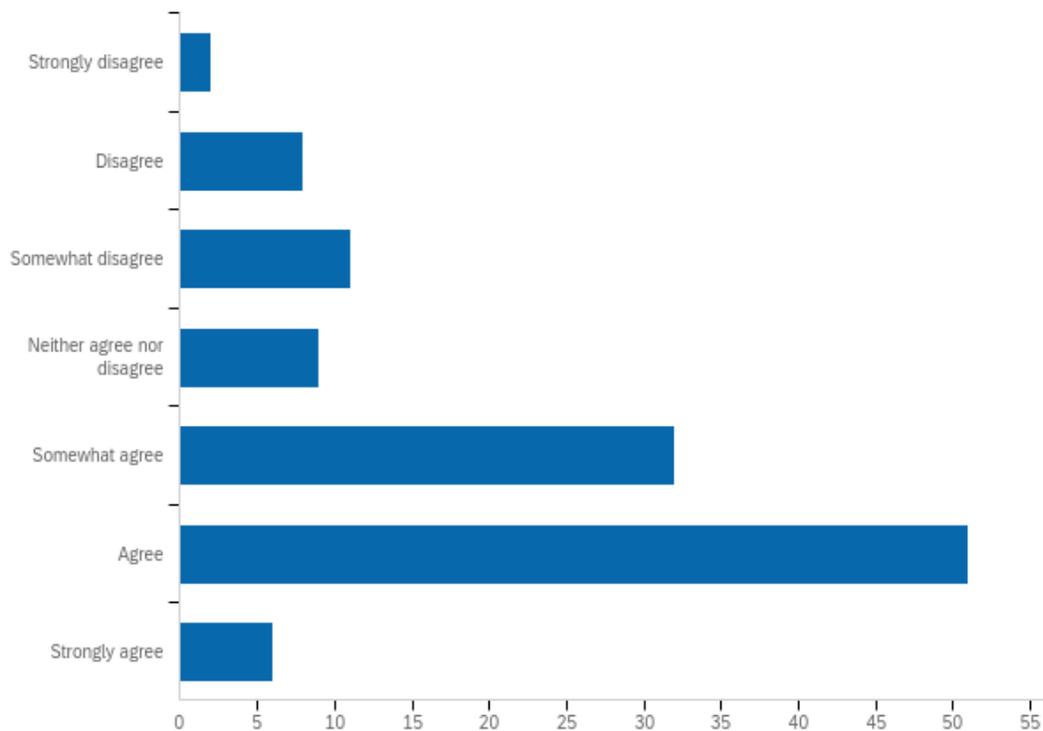
### Near-Term

- **Journey map customer process accessing training**
  - Follow the journey map process to understand how customers typically access training at MISO
  - Understand customer actions, thoughts, feelings, pain points and motivators
  - Conclude recommendations on customer communication, training module organization and LMS functionality

"I can't find what I need" was listed as a barrier to training access by 22 percent of respondents. Twenty-five percent of users either strongly disagree, disagree, somewhat disagree, or neither agree nor disagree with the statement, "I know where to access relevant training courses at MISO." During interviews, multiple customers explained they had trouble knowing where to go to get to training and need more direct communication on new courses and course updates. Additionally, there was negative feedback given on the usability of the LMS system. Journey mapping will gather data to help influence changes and recommendations to the customer communication process, course organization and LMS functions.



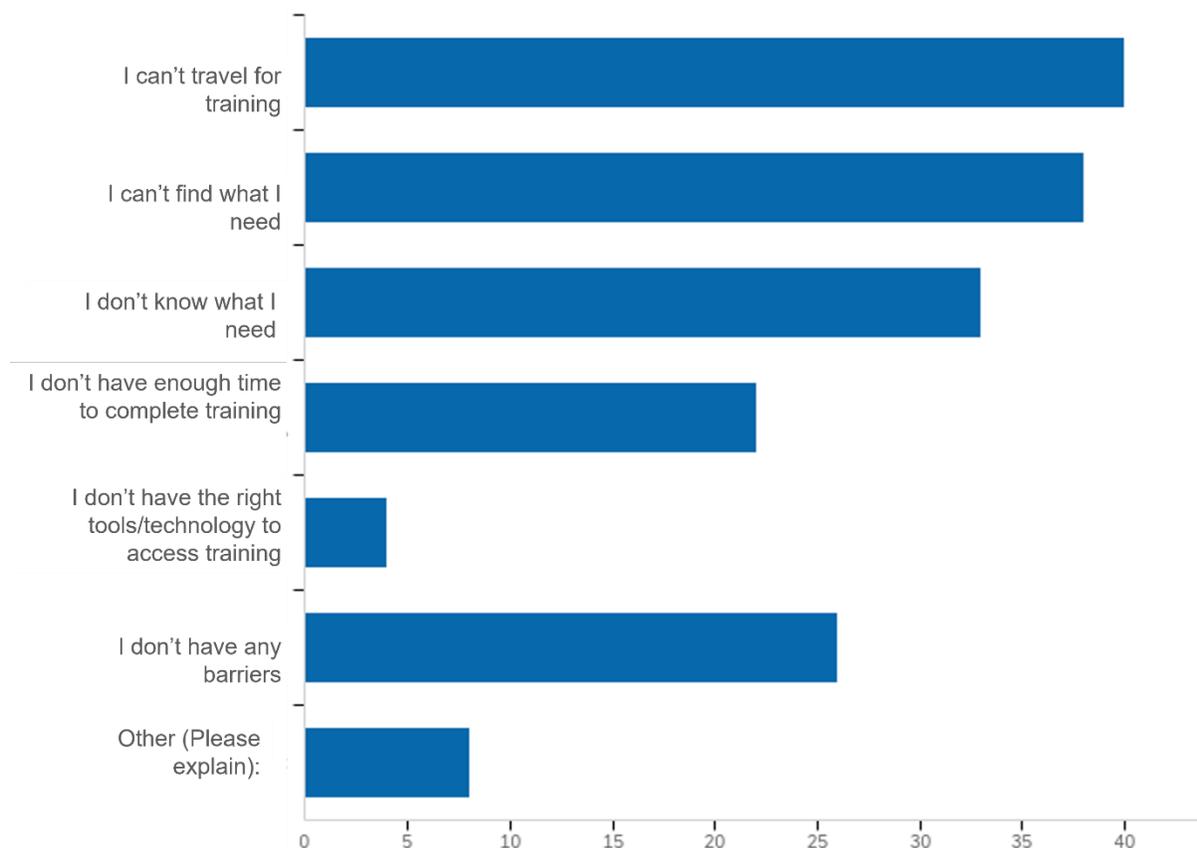
## Q7 - I know where to access relevant training courses from MISO.



#	Answer	%	Count
1	Strongly disagree	1.68%	2
2	Disagree	6.72%	8
3	Somewhat disagree	9.24%	11
4	Neither agree nor disagree	7.56%	9
5	Somewhat agree	26.89%	32
6	Agree	42.86%	51
7	Strongly agree	5.04%	6
	Total	100%	119



**Q15 - What are your biggest barriers to accessing training? Check all that apply:**



#	Answer	%	Count
1	I can't travel for training	23.39%	40
2	I can't find what I need	22.22%	38
3	I don't know what I need	19.30%	33
4	I don't have enough time to complete training	12.87%	22
5	I don't have the right tools/technology to access training	2.34%	4
6	I don't have any barriers	15.20%	26
7	Other (Please explain):	4.68%	8

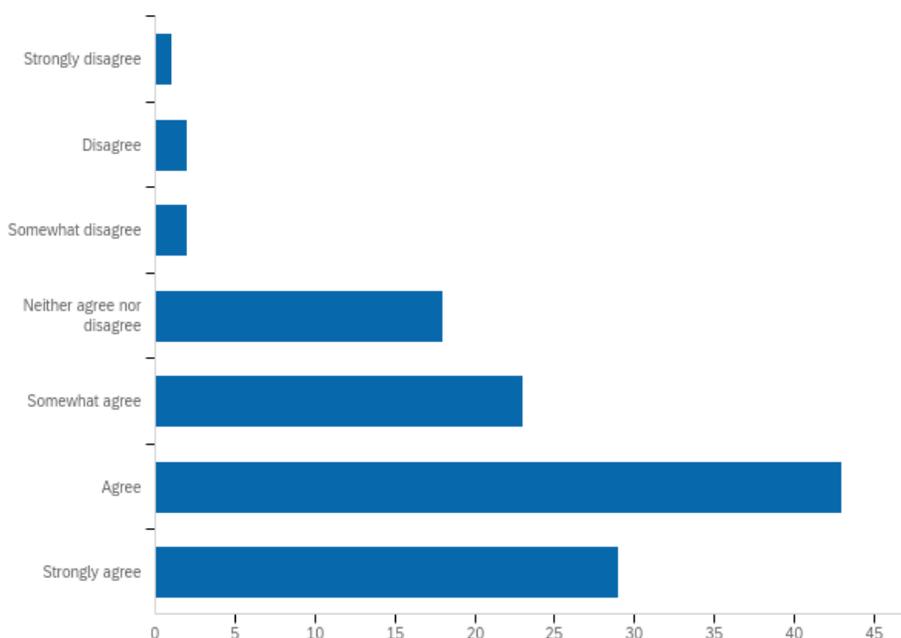
- **Create a roadmap of prioritized course development**
  - Review and align External Training vision strategy with training collaboration and MISO goals



- Rank and prioritize training topics based on external requests, internal needs and available resources
- Create the roadmap planning development of prioritized courses
- Develop plan for advanced topics and virtual instructor-led courses following the scheduled implementation of SME Instructor Certification Program

When asked for new course topic suggestions, survey respondents requested more than 40 different topics. Eighty-one percent of respondents either somewhat agree, agree, or strongly agree with the statement, “MISO needs more online, self-service training options.” MISO Subject Matter Experts also made recommendations on content to build on existing courses. Additionally, MISO project teams are planning multiple projects that will require customer training. Creating a roadmap based on priorities will develop an organized plan and help ensure effective use of resources. Courses will be prioritized based on several factors including urgency, frequency of request, alignment to MISO projects, journey maps, availability of SME, current usage and visibility.

## Q2 - MISO needs more online, self-service training options.



#	Answer	%	Count
1	Strongly disagree	0.85%	1
2	Disagree	1.69%	2
3	Somewhat disagree	1.69%	2



4	Neither agree nor disagree	15.25%	18
5	Somewhat agree	19.49%	23
6	Agree	36.44%	43
7	Strongly agree	24.58%	29
	Total	100%	118

- **Create and implement external training communication plan**

- Investigate the use of the MISO training page as a dynamic communication vehicle including blogs, testimonials and engaging articles updated regularly
- Create customer training newsletter that shares new modules, updates to trainings, calendar of training dates, and allows for customers to respond with questions or feedback
- Increase internal communication to grow the visibility of customer training
- Promote customer training site twice a year at liaison meetings to notify new participants how to reach training resources
- Create and publish guide of how training topic categories are related
- Create course curriculum catalogue for external training

Communication was one of the topics most frequently mentioned in survey responses. Out of the 65 respondents who provided free response answers, 28 requested improved communication about updated training content and a clear outline of what is available. This also was echoed during customer interviews. Ideas for the communication plan involve a variety of outlets to increase customer training visibility both internally and externally. Communication improvements could include investigating the use of the MISO training page as a dynamic communication center, creating a customer training newsletter, sharing customer training news internally, promoting customer training at liaison meetings, publishing a guide of training topic interconnection and creating a course curriculum catalogue.

- **Registered Continuing Education Program (RCEP) Continuing Education Hours Pilot**

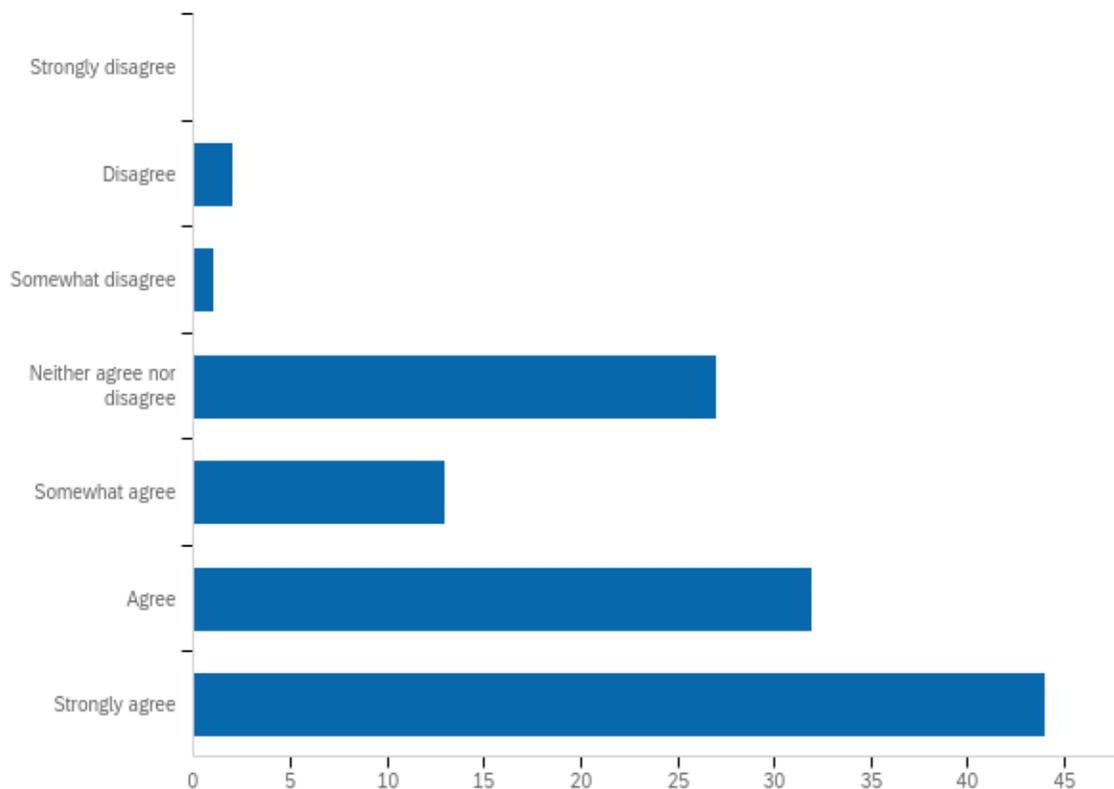
- Update four pilot courses with required content for RCEP
- Register courses with RCEP
- Communicate availability to customers
- Conduct data analysis and lessons learned
- Consider additional courses for continuing education hours

In both the 2018 and 2021 surveys, the majority of respondents requested the ability to receive continuing education hours (CEH) from MISO's training courses. In 2021, 75 percent of respondents somewhat agree, agree, or strongly agree with the statement, "I would like to receive CEHs upon completion of training." This was also echoed in 11 out of the 65 free response answers. Registered Continuing Education Program (RCEP) provides professional engineering continuing education hours. MISO received its RCEP CEH provider designation in 2021 and plans



to pilot four RCEP-certified courses in 2021. This will help MISO determine the feasibility of providing additional continuing education credits to its learners.

### Q5 - I would like to receive CEHs (continuing education hours) upon completion of training.



#	Answer	%	Count
1	Strongly disagree	0.00%	0
2	Disagree	1.68%	2
3	Somewhat disagree	0.84%	1
4	Neither agree nor disagree	22.69%	27
5	Somewhat agree	10.92%	13
6	Agree	26.89%	32
7	Strongly agree	36.97%	44
	Total	100%	119



- **Design and develop SME Instructor Certification Program to certify subject matter experts to facilitate advanced courses**
  - Obtain stakeholder input on program; whom to target, requirements, constraints, available incentives, timeline
  - Design and develop a training course following an agile instructional design model and using best practices from Ludwig & Owen-Boger's (2018) book, *Effective SMEs: A Trainer's Guide for Helping Subject Matter Experts Facilitate Learning*
  - Recruit initial volunteers to complete the program
  - Schedule training and coaching meetings
  - Coordinate with other training departments as needed

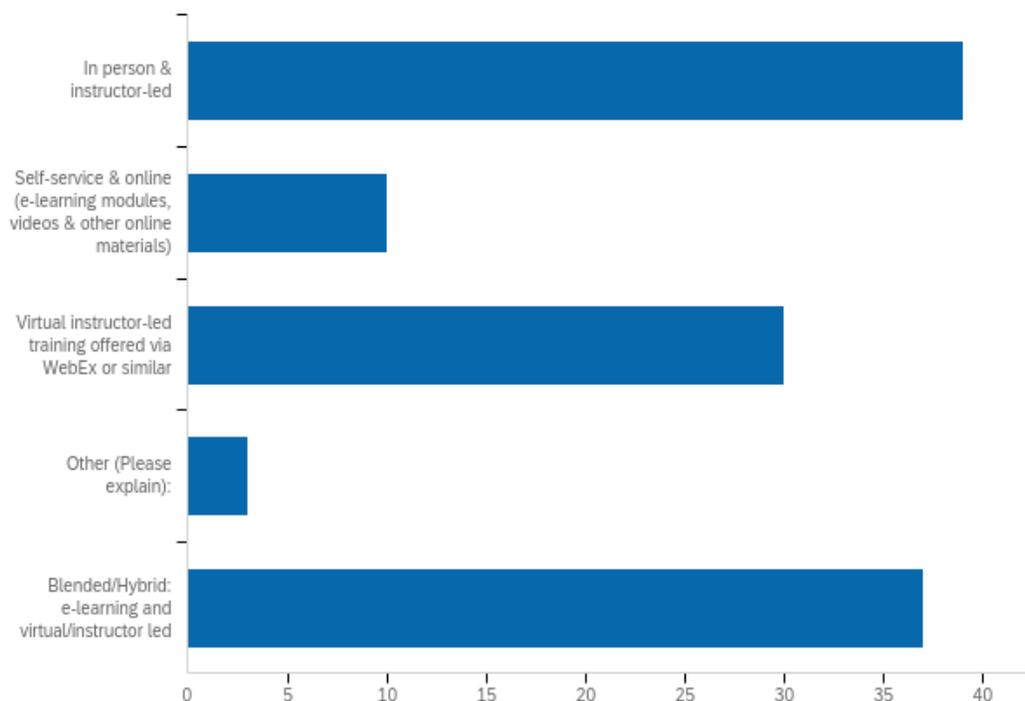
This was a recommendation from the 2018 assessment but was delayed due to COVID-19. In 2021, 89% of respondents prefer training on advanced or complex topics to include an instructor component (in-person and instructor led, virtual instructor led, or blended/hybrid).

SMEs are specialists in their associated topic. This knowledge does not also make them effective instructors: for this, a new skill set is required. Programs of a similar type are already implemented at California ISO and ISO-NE. A similar program at MISO for non-System Operator training would create a pool of SMEs who are able to:

- Convey information to customers in a clear and concise manner
- Provide in-person, instructor- or virtual-led trainings through the MISO Learning Management System on topics of greatest need/priority
- Record micro-training (short 2 – 10-minute videos) as content within MISO training courses or web pages
- Participate in online “Ask an Expert” segments or other social media initiatives
- Provide recommendations and advise the instructional designer on the development of instructional materials
- Communicate effectively with customers at meetings and MISO events



## Q12 - For training on advanced or complex topics, I prefer training to be:



#	Answer	%	Count
1	In person and instructor-led	32.77%	39
2	Self-service and online (e-learning modules, videos and other online materials)	8.40%	10
4	Virtual instructor-led training offered via WebEx or similar	25.21%	30
5	Other (Please explain):	2.52%	3
6	Blended/Hybrid: e-learning and virtual/instructor led	31.09%	37
	Total	100%	119

- **Continue implementing interactive activities, realistic scenarios and knowledge tests in online courses following adult learning and motivation best practices.**
  - Include engaging, high-quality graphics and videos to compliment instruction
  - Incorporate realistic scenarios where the learner must make decisions, synthesize knowledge and apply concepts
  - Evaluate learning and retention with knowledge checks
  - Encourage post-training retention with downloadable resources and links for guides and materials
  - Brainstorm how to add repeated exposure to increase knowledge retention



Survey feedback, interviews and adult eLearning best practices support incorporating user interaction, realistic problem-solving and evaluation activities into training modules. It is also evident that post-training materials and reinforcement activities are important to support knowledge retention. External Training should continue to provide downloadable resources and links for guides and materials, while also looking into how to actively reinforce knowledge and integrate training materials with day-to-day work. This is challenging due to the varied nature of the learner but could add value and efficiency if executed correctly.

## Mid-Term

- **Formalize external training request process for MISO initiatives and projects**
  - Meet with project management teams to brainstorm process for scheduling external training needs when submitting a project proposal
  - Develop necessary activities and materials to gather information on type of training needed, timeline, revision requirements and SME availability
  - Communicate and implement process

In 2019-2021 the External Training team completed several modules to assist with project and process change roll outs. This resulted in clear communication to customers and various internal and external benefits. Involving External Training during the planning phase of the project allows for the development of the best training solution and the ability to plan effective resource allocation. Including external training requirements in project proposals will ensure clear definition on training needs, timeline and required ongoing updates as soon as possible. ISO NE follows a similar process and has found it helps with effective planning and resource allocation.

- **Redesign customer learning center for usability and design**
  - Modernize design
  - Explore personalized learning paths
  - Include usability enhancements based on journey map findings

Both the survey and interviews revealed customer challenges around navigating the customer learning center to select training courses. In addition to increasing communication and journey mapping the customer training process, redesigning the customer learning center will improve the customer experience. Changes will include updating the center interface to a modern aesthetic, ensuring cohesive MISO branding and colors, implementing user experience best practices, removing any unnecessary options or links, checking for accessibility options and troubleshooting the Google Analytics dashboard to increase reporting capacity.

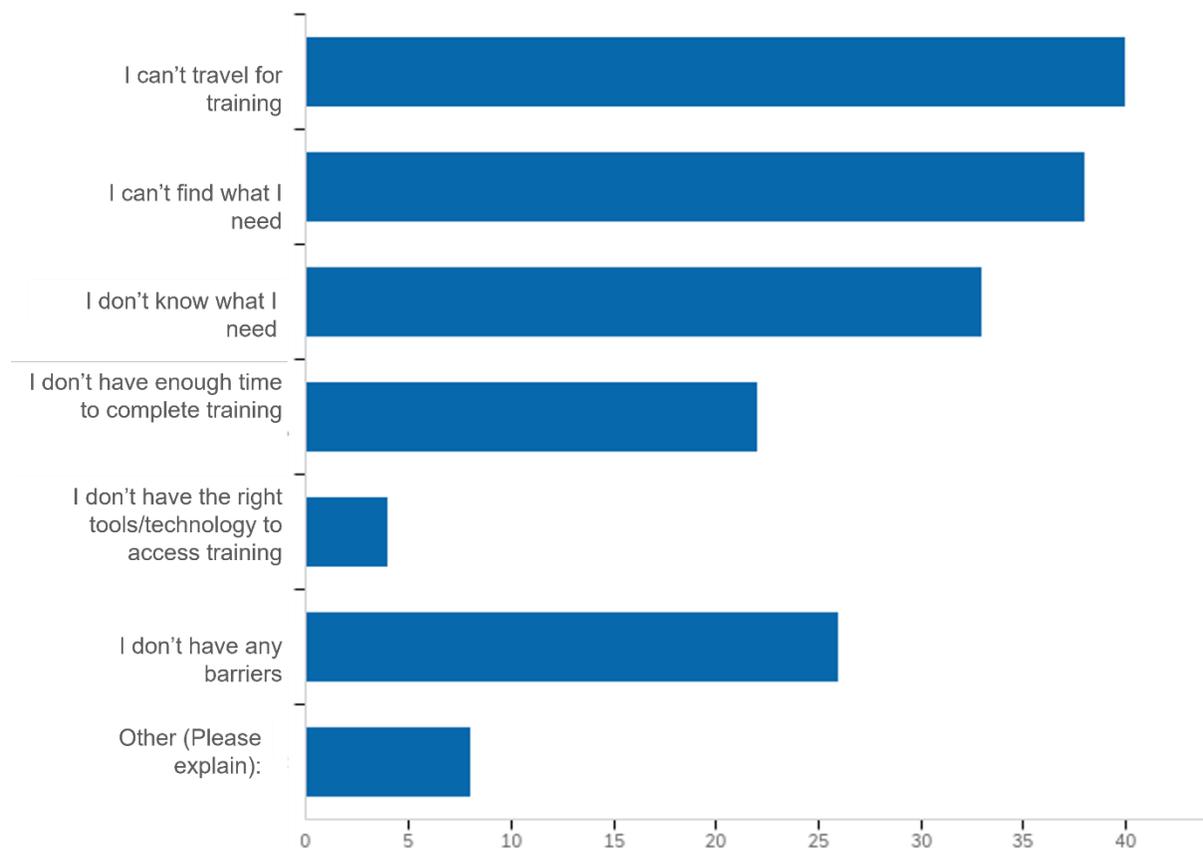
- **Build curriculums based on clusters of training modules and relevant learning paths**
  - Determine customer profiles of who might be likely to access our trainings and what they would be interested in; ideas include: new Market Participant, MISO employee, engineer, operator, governance



- Choose method of displaying curriculums based on available technology and journey mapping findings
- Build self-assessment and course recommendation tool
- Implement and advertise training curriculums

One of the trends found during the 2021 Customer Needs Assessment research was increased personalization of learning options. Learners are seeking customized learning paths that recommend courses to meet the learners' interests and training progress. These "Netflix-style" suggestions are becoming more possible with increased data and technology options for training courses and LMS platforms. They also are necessary for the current environment of rapid change, autonomous work schedules and upskilling/reskilling needs (CompTIA, 2021). The need for this is also supported by findings in the 2021 Customer Needs Assessment Survey as 19% of respondents selected "I don't know what I need" as a barrier to access training. This is an increase of 9% from the 2018 survey, potentially indicating a change in how learners expect to find new courses. Finally, based on the new theory around self-directed learning, custom learning paths also could increase engagement in learners and support information retention.

### Q15 - What are your biggest barriers to accessing training? Check all that apply:





#	Answer	%	Count
1	I can't travel for training	23.39%	40
2	I can't find what I need	22.22%	38
3	I don't know what I need	19.30%	33
4	I don't have enough time to complete training	12.87%	22
5	I don't have the right tools/technology to access training	2.34%	4
6	I don't have any barriers	15.20%	26
7	Other (Please explain):	4.68%	8

- **Continue to evolve annual course review and maintenance process**
  - Review new resources and technologies to determine opportunities for automation
  - Update master plan of courses, update requirements, content owners and training owners

As echoed by the other RTO/ISOs, course maintenance is one of the biggest challenges for a training program with a variety of course options and content that changes over time. MISO's current manual process of reviewing and updating courses will have to evolve as the course selection grows. New technology and resources will be considered to develop an effective process to ensure ongoing accurate content.

## Far-Term

- **Increase Learner Management System (LMS) capability**
  - Implement single sign-on
  - Improve user experience based on journey mapping findings
  - Show personalized learning path: recommended courses, available courses and completed courses for each individual user
  - Access detailed reporting of user interactions and activities
  - Increase internal continuing education on LMS functions and customizability

Beyond the immediate plans to redesign the current Customer Learning Center, larger changes to the LMS are recommended to meet customer experience needs. Desired improvements include implementing a single sign-on, increasing data and reporting options, awarding badges and certifications and continuing development of personal learning paths showing completed and recommended courses. An analysis of current LMS capabilities and other LMS technologies will determine the best use of resources. Additionally, continuing education on the LMS technology will allow instructional



designers to maximize use of resources. External Training will collaborate on this effort with MISO Human Resources and Learning & Development as necessary.

- **Determine resources and processes needed to offer and administer North American Electric Reliability Corporation (NERC) Continuing Education Hours (CEHs)**
  - Understand existing technical training NERC CEH options
  - Review NERC manual to understand requirements
  - Discuss requirements and best practices with other RTO/ISOs
  - Conduct analysis of needs, available resources and barriers to provide NERC CEH hours for current and/or future courses

One item consistently requested in both the 2018 and 2021 assessments is NERC CEH credit from courses. Many operators wish to maintain NERC accreditation even after moving to different roles and both PJM and SPP offer NERC CEHs to external customers. Course approval for NERC CEHs and managing the administrative aspect of NERC CEHs is a complex, resource-intensive process. More investigation into the feasibility of offering NERC CEHs is necessary.

- **Add accessibility features to current and future courses**
  - Review internal and external guides on accessibility features
  - Conduct analysis of current versus ideal state of courses
  - Determine updates needed for current courses
  - Plan for how to update current courses
  - Create process to ensure accessibility in future courses

Section 508 of the Rehabilitation Act of 1973 was updated in 2017 requiring Federal agencies to meet information technology standards allowing accessibility for those with visual, hearing, speech, fine motor control, or strength impairments (U.S. General Services Administration, 2020). Many organizations are gaining understanding and awareness of how to incorporate these standards into their eLearning courses. Authoring tools and LMS technologies are starting to provide options assisting with these requirements (Rogers, 2018). Determining how to improve MISO's customer training accessibility will involve understanding accessibility standards, assessing gaps in current training, implementing new accessibility features and building a process to incorporate these going forward. This endeavor may require acquiring new technologies or skills.

## Ongoing

- **Continued Assessments/Improvements**
  - Ongoing assessment and prioritization of existing/emerging training needs
  - Continue Association of Talent Development membership and ISO-RTO Council participation
  - Continuing education around adult eLearning trends, best practices and emerging technologies
  - Attend industry learning conferences and seminars



The MISO External Training Program will continue to assess and prioritize existing training needs. It is also important for instructional designers to continuously learn adult eLearning trends, best practices and emerging technologies. This will be done through research, attending learning conferences and seminars, Association of Talent Development membership and ISO-RTO Council participation.

## External Outreach

### Other RTOs/ISOs

Meeting with other RTOs/ISOs was extremely beneficial to learn training best practices and see different types of programs and activities implemented. Many of the recommendations given in this report are in effect at other RTOs/ISOs, including a subject matter certification program, formalized project training process, course management plans and offering NERC CEHs. It is also useful to understand the organizational structure of other RTOs/ISOs and what their experiences have been with different technologies.

#### **ISONE**

ISO NE has three training groups with a high level of communication between them. ISO NE uses the same LMS that MISO currently uses and has a dedicated employee to make updates to it. ISO NE offers a large inventory of trainings, including multi-day introductory classes and over 15 instructor-led webinars. ISO NE also has a training program to teach SMEs how to facilitate courses.

ISO NE has an online training page that does not require an account to log in. It has a list of upcoming live courses (none currently offered) and E-learning opportunities that are scheduled, virtual webinars, webinar recordings and videos. The user can filter by date, document type and topic. There is also a training material section with PDFs and presentations.

#### **CAISO**

CAISO has three training groups who operate independently. Currently almost all Customer Readiness trainings are instructor-led and were switched over to virtual during COVID-19. SMEs usually do not facilitate training but can participate in question calls.

The CAISO Learning Center can be reached without an account and lists six learning tracks: Markets and Operations, Western Energy Imbalance Market, Settlements and Metering, Congestion Revenue Rights, Scheduling Coordinator and Reference. There is also a list for new modules and computer-based training. There is a course listing of computer-based with over 30 modules. There is also a calendar with upcoming scheduled live training events.

#### **IESO**

IESO has a technical training group that puts online training into place and offers NERC CEHs. There is a page on the IESO website for Marketplace Training where there are instructor-led courses, training materials (workbooks, training guides, presentations) and participant tool training.



## PJM

PJM has three training departments and within Statement Member Training are three different sections. PJM requires a certain level of training for members and provides NERC CEHs. There is a training liaison for each customer company and customers fill out an annual training needs survey. The PJM Learning Center can be accessed without an account (operators have a separate system with a required log in). The Learning Center has five sections: Electricity Basics, Who is PJM?, PJM Structure, Three Priorities and Energy Innovations. Each section features instructive articles with links to fact sheets and resources. The training site includes a complete course catalog that can be filtered by delivery method, target audience and NERC CEH approval. There are 127 total courses with 59 virtual, 36 online, 28 in-person, and four hybrid. There is also a link to a training events calendar.

## SPP

To get to the SPP Learning Center, users must create an account with their email, company and NERC certification number. SPP also uses the same LMS as MISO. The SPP Learning Center highlights both suggested and popular courses. There are currently 82 online classes, 12 events, 15 curriculums, 15 reference material files and three short videos. Examples of curriculums include Control Performance Standards, Integrated Market Overview, Operator Awareness, Overview of Z2 Crediting Process, Reserve Sharing System and Untangling the Knots: The Impact of the 2021 Winter Storm Event on Marketplace Processes and Settlements.

## Survey

The Training Needs Survey was created to reach a large number of customers, provide qualitative data on customer satisfaction and compare results to the 2018 Training Needs Survey data. The survey was created using Qualtrics and consisted of 12 quantitative questions and five qualitative questions. Eight questions were similar to questions from the 2018 survey. New questions asked about the effect of COVID-19 on training needs, if users noticed an improvement in training in the past three years and whether respondents were interested in blended/hybrid learning. The survey was published on May 28, 2021 and stayed open until June 11, 2021. The survey was promoted on the MISO ALL mailing list, MISO home page and the LMS. The survey received 119 individual responses, which is similar to the 113 responses in 2018. See **Appendix B** for the full survey, **Appendix C** for the complete data report and **pages 6-7** for the new training topic recommendations from the survey.

## Customer Interviews

MISO External Training met with customers from different companies and with different roles. They provided detailed information on what could improve MISO's external training. Even this small subset of the population demonstrated the variety of needs across customers. Profiles and overall recommendations of customers include:

- A customer who attends stakeholder meetings and has several years of experience in the energy industry. His main request was to have a way to search for quick answers and summaries without having to find and go through a training module or read the BPM. He also requested CEHs and thinks that alternating in-person and virtual instructor-led



courses would be valuable. He said that resource adequacy, value of lost load and emerging topics would be beneficial.

- A customer who manages operators. His major request was offering NERC CEHs even for employees who are no longer operators. He stressed the importance of self-paced flexible learning, having shorter sessions, sending out slides ahead of time, having someone available to answer questions and ensuring equal participation in group work.
- Another customer serves in stakeholder governance and would prefer to learn more about that topic through MISO. He discussed the benefits of certifications and evaluations to demonstrate that learners are competent in a certain area. He also described the importance of communication that alerts and prompts learners when trainings are available. He finds instructor-led or blended courses beneficial to have someone walk you through the concepts.
- The fourth customer was a transmission planner who uses modeling software and would like to take more specific trainings around that software. He likes online learning and virtual meetings. He would like to have a contact person to whom he could ask questions.

## eLearning Trends/Andragogical Considerations

### Personalized Learning

In the past, personalized learning has been a form of segmentation, but trends are now shifting towards individual learners developing custom paths based on personal goals (CompTIA, 2021). Self-determined learning is referred to as heutagogy and is considered the natural progression beyond principles of adult learning (andragogy), which, though more self-directed than pedagogy (learning for children), is still based around instructor-led teaching. This goes beyond the acquisition of skills to the learning experience and holistic development of the learner. Heutagogy supports flexibility, self-awareness, creativity, negotiation and questioning (Kenyon & Hase, 2000).

Organizations are looking to create continuous learning that aligns with a strategic initiative rather than just checking a box. This is partially due to a culture involving autonomy and rapid upskilling where a learner makes time when training is related to an upcoming opportunity (CompTIA, 2021). Distance learning supports heutagogy due to its use of technology, profile of a distance learner and learner autonomy (Kenyon & Hase, 2000).

Supportive technologies for personalized learning include:

- Adaptive technology that allows people to work at their own pace
- Learning record software that can track and create a variety of learning experiences
- Learning experience platforms that provide streaming channel style access to content
- Social learning platforms
- Platforms that allow for self service  
(CompTIA, 2021)

### Blended Learning

As seen in the 2021 Training Needs Survey, COVID-19 caused many people to witness the benefits and effectiveness of online learning. However, there must be a balance of delivery



methods to create holistic learning. Many people realized that “constant Zooming can be draining and disengaging” (Dineen, 2020); however, lack of contact with instructor or peers can leave learners “looking for more contact, not more content,” (CompTIA, 2021). Increasingly, corporate learning must be accessible throughout the day while work is being completed. Many learners seek to easily search for answers and knowledge within training to gain better skills and understanding of their work (Taylor & Schwartz, 2020).

## Microlearning

Microlearning consists of small, concise learning modules around 3-7 minutes long. This aligns with the time that working memory is engaged and could improve focus, engagement and customization while decreasing development time and resource costs. A study found that most employees work on tasks for 11 minutes at a time and within those 11 minutes engage in quick tasks for about three minutes each. Thus, microlearning is a better fit for the behavior patterns during the workday (Sh!ft, 2021).

Strategies of effective microlearning include:

- A single, clear business objective that fits into everyday workflow
- Engaging enough for employees to want to do it regularly
- Follows neuroscience of learning -- spaced repetition, retrieval practice and confidence-based assessment
- Uses available data to track meaningful metrics from microlearning
- Compliments existing training and resources
- Considers when and where this info will be consumed, which devices will be used and what resources are available

Trends driving microlearning include the accelerated pace of business, renewed focus on brain science, use of technology and increase of employee and customer expectations (Axonify, 2021).

Chat bots are a tool that can help implement microlearning. Chat bots are known to help find information, complete tasks and decrease time to learn new systems. Chat bots are found to be more engaging than other reinforcement tools, improve retention and application, increase accountability and provide useful data (Oesch, 2018).

## Subject Matter Expert Instructor Certification

The book *Effective SMEs: A Trainer's Guide for Helping Subject Matter Experts Facilitate Learning* by Ludwig and Owen-Boger (2018) details the importance and best practices for coaching an SME in how to effectively deliver learning content. Ludwig and Owen-Boger explain SMEs must understand that the power, evaluation and application of learning are different in a business setting than the academic setting they have experienced in the past. Training succeeds when it consists of conversations where there is an exchange of information, attitudes and beliefs between facilitator and learner. SMEs must understand that trainers and learners are equals with a shared purpose and that learners must understand the business objective for their training. Course designers must allow SMEs to become comfortable with the design and have the freedom to make it their own during delivery.



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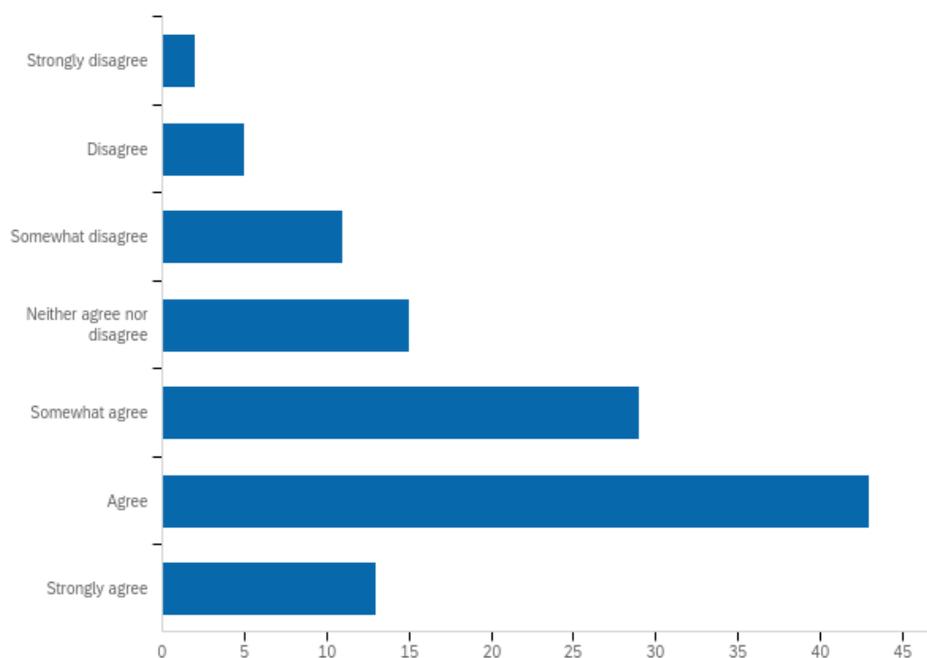


## Appendix- Customer Training Survey Results

2021 Training Needs Assessment

July 15, 2021, 8:58 am EDT

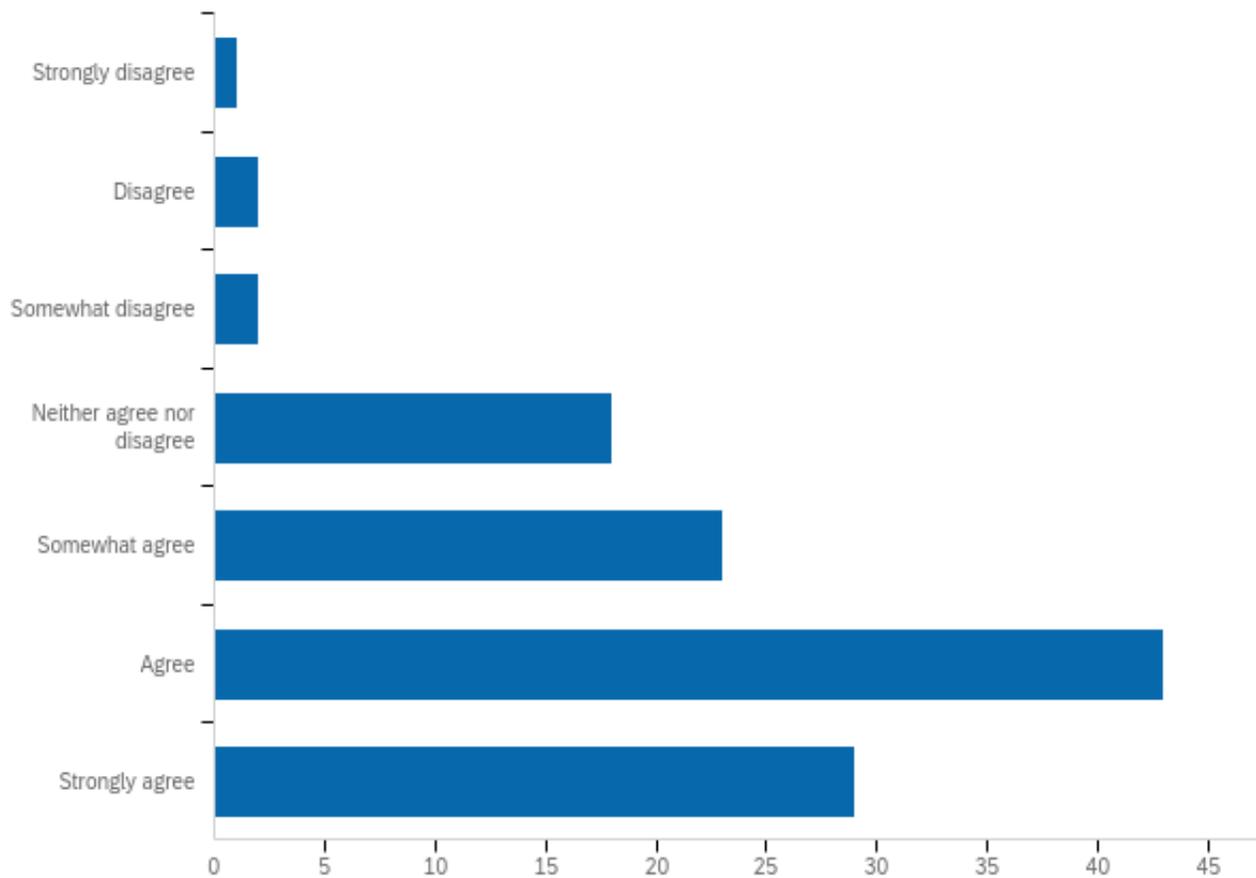
### Q1 - I am satisfied with the customer training currently provided by MISO.



#	Answer	%	Count
1	Strongly disagree	1.69%	2
2	Disagree	4.24%	5
3	Somewhat disagree	9.32%	11
4	Neither agree nor disagree	12.71%	15
5	Somewhat agree	24.58%	29
6	Agree	36.44%	43
7	Strongly agree	11.02%	13
	Total	100%	118



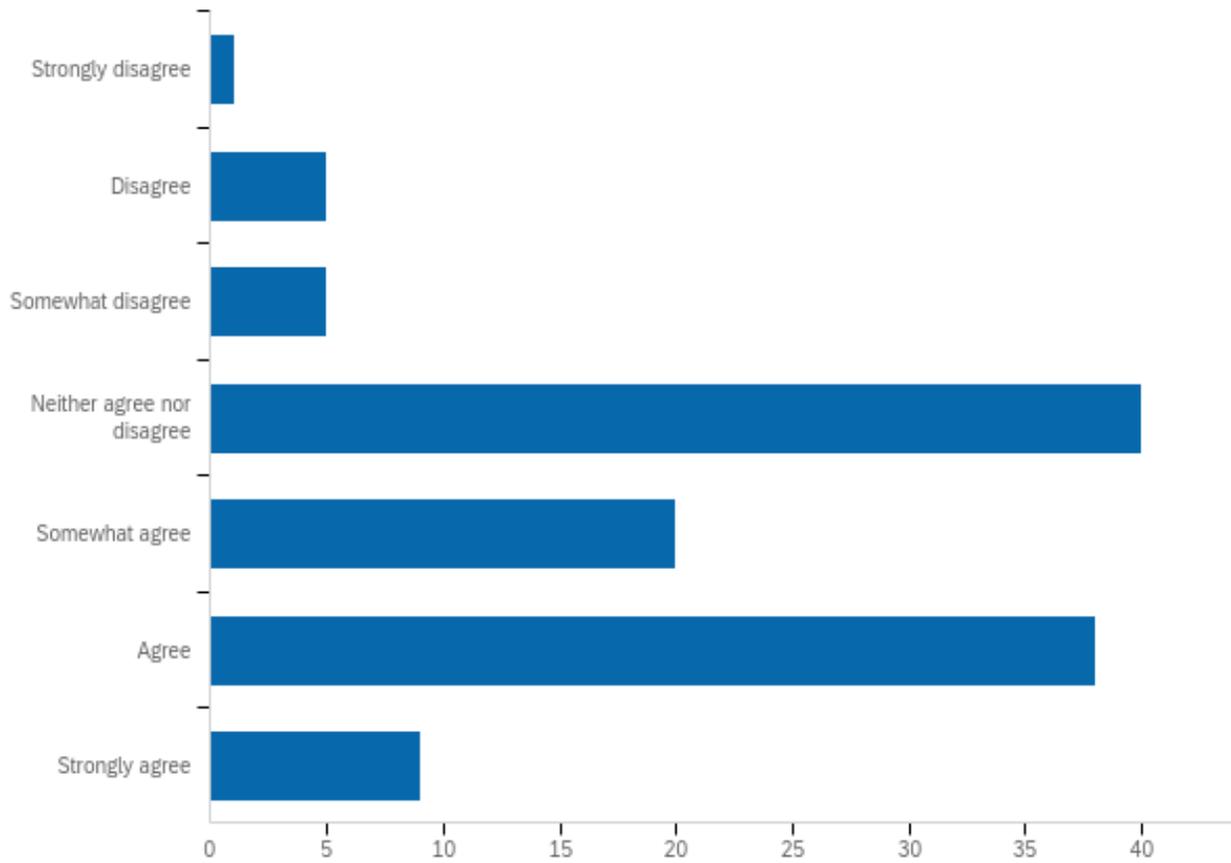
## Q2 - MISO needs more online, self-service training options.



#	Answer	%	Count
1	Strongly disagree	0.85%	1
2	Disagree	1.69%	2
3	Somewhat disagree	1.69%	2
4	Neither agree nor disagree	15.25%	18
5	Somewhat agree	19.49%	23
6	Agree	36.44%	43
7	Strongly agree	24.58%	29
	Total	100%	118



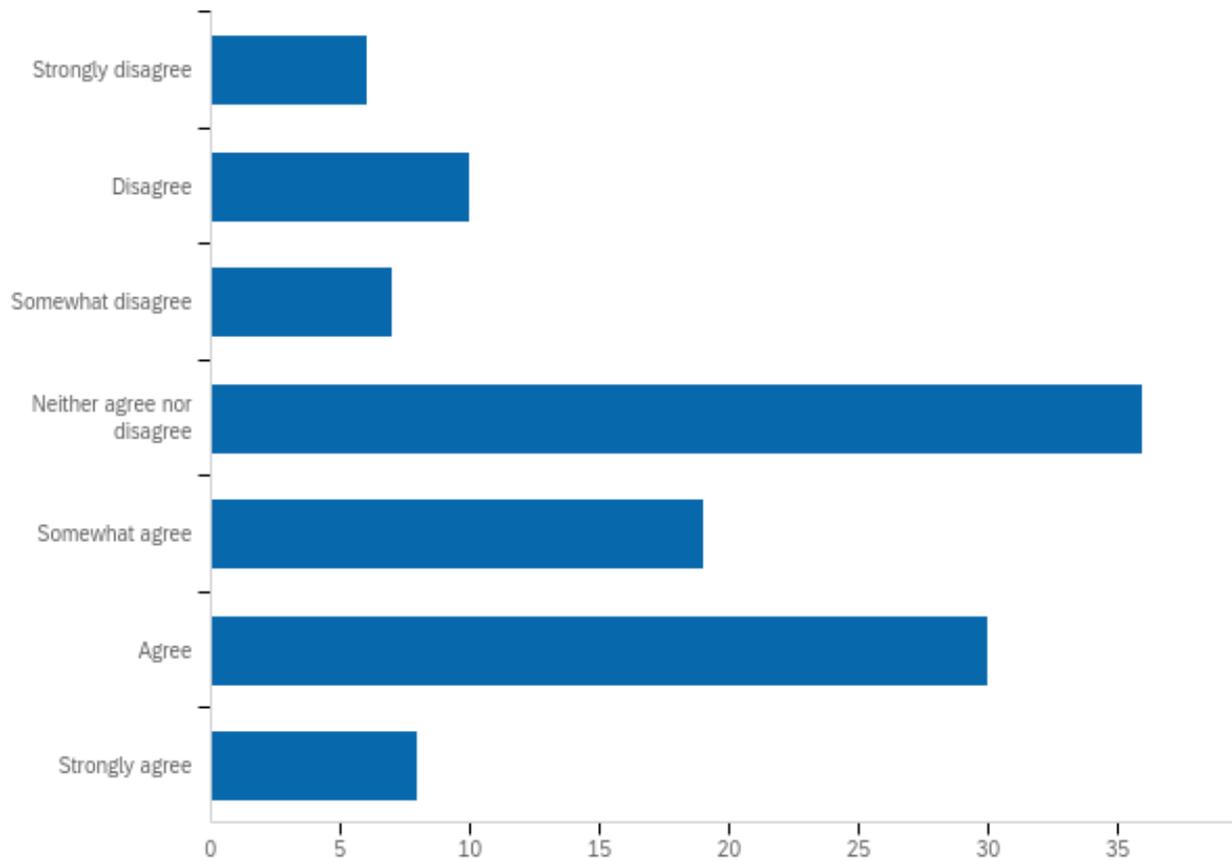
### Q3 - MISO needs more in-person, instructor-led training.



#	Answer	%	Count
1	Strongly disagree	0.85%	1
2	Disagree	4.24%	5
3	Somewhat disagree	4.24%	5
4	Neither agree nor disagree	33.90%	40
5	Somewhat agree	16.95%	20
6	Agree	32.20%	38
7	Strongly agree	7.63%	9
	Total	100%	118



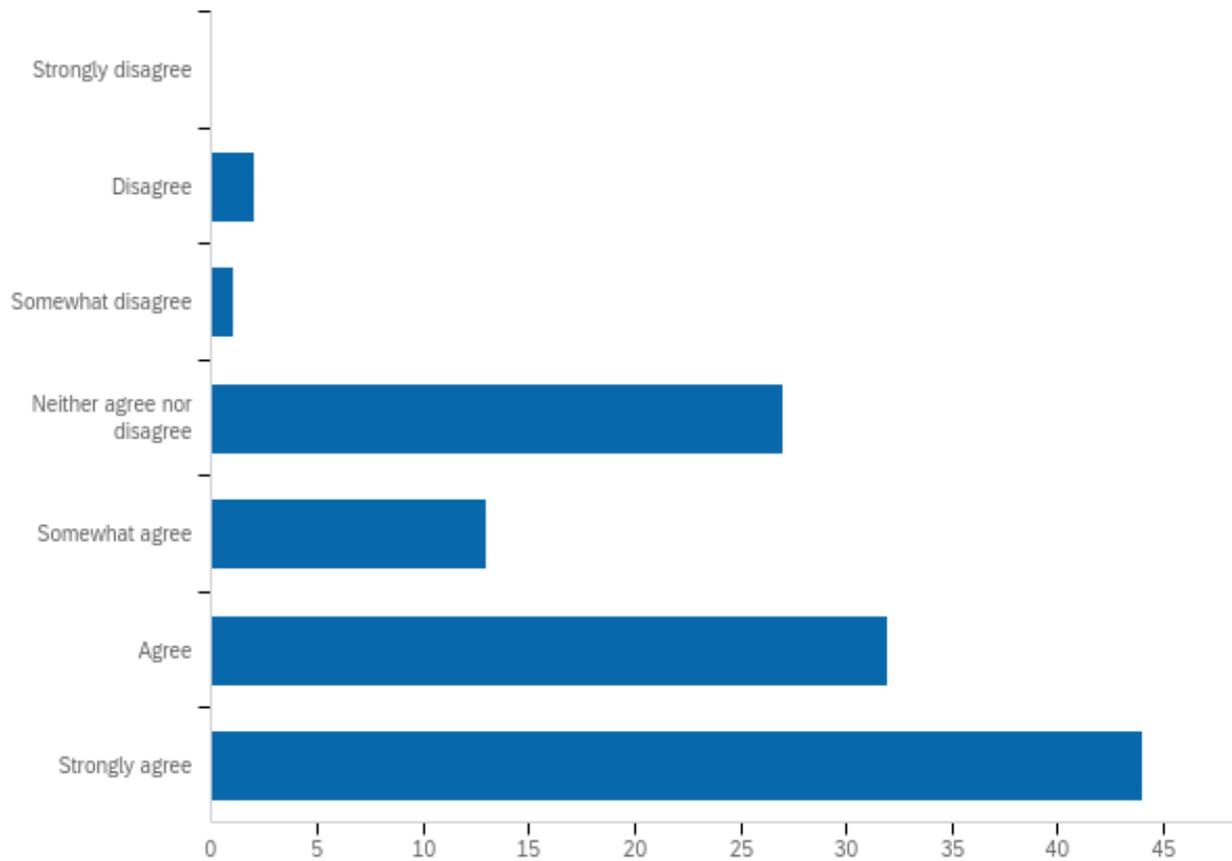
## Q4 - I would like to receive a certificate or badge upon completion of training.



#	Answer	%	Count
1	Strongly disagree	5.17%	6
2	Disagree	8.62%	10
3	Somewhat disagree	6.03%	7
4	Neither agree nor disagree	31.03%	36
5	Somewhat agree	16.38%	19
6	Agree	25.86%	30
7	Strongly agree	6.90%	8
	Total	100%	116



## Q5 - I would like to receive CEHs (continuing education hours) upon completion of training.



#	Answer	%	Count
1	Strongly disagree	0.00%	0
2	Disagree	1.68%	2
3	Somewhat disagree	0.84%	1
4	Neither agree nor disagree	22.69%	27
5	Somewhat agree	10.92%	13
6	Agree	26.89%	32
7	Strongly agree	36.97%	44
	Total	100%	119



## Q6 - What can MISO do to improve your experience using the training modules?

Year to date training summary report (Once a month)

---

Making finding and logging in to the modules much easier

---

Send emails directly to members who want to be notified of certain trainings or document updates so they are aware they need to continue their training.

---

We are MP, so we can only really attend the Summer Capacity Drills. I think you do a two-day training. We can attend and see the simulations due to not being live data, otherwise it is not very much fun to attend and we can attend as GOP/MP.

---

Offer training from how MISO works to how MISO deals with capacity shortages etc.

---

Just continue to present training, MISO does a good job at this

---

Provide more focused training, in my case transmission line design, PSSE courses etc.

---

A minor point but worth mentioning... in the LMS Customer Training dropdowns - using pastels in the banners and text is hard on these old eyes (aesthetically pleasing but hard to read late in the day)!

---

Clear outline of training available to me

---

Some training seems to go to fast. In the more complicated topics, maybe allow more time.

---

Perform an Outreach to Operating members for simple awareness.

---

Things to help retain / apply knowledge ... post training assessment, ongoing resources helpful

---

Nothing needed

---

Some Simulation examples

---

We need some instructor lead training for Settlements 101, 201 and 301 courses. It has been years and we have had turnover. At MPs, new people need to get up to speed on the training and a dedicated class helps provide that structure to get the training done.

---

Do not use the LMS system with multiple passwords, certs, etc. It is too complicated.

---

Be pro-active in sending out training material.

---

Respond to my emails looking for more guidance.

---

Search ability for what topic is needed for understanding

---

More customer-based training centered around BPM & Tariff

---

Would prefer training modules to be accessible from the website directly rather than logging into a separate system.... also allow the modules to be searchable from the main MISO website.

---

Make available training options more visible

---

MISO LMS could be more user friendly

---



---

Add MISO procedures with NERC Standards so you can award NERC CEHs

---

Possibly improve what is available for new stakeholders, how to access and find... a lot seems to be on a need to know basis, but I probably have not explored as thoroughly as I could yet, either. I saw another RTO had an easier to find link for new stakeholders regarding rules and expectations for meetings and general information about the RTO. Didn't go through it, but if MISO has the same, it's not as easy to find vs. word of mouth on an as-needed basis/chance from others in my company.

---

Make training opportunities more user friendly on the miso website. I'm not even sure I can find them or get them to work. The last time I tried, I received an error.

---

Have one username and password that encompasses the normal MISO webpages AND the LMS

---

Copy what NWPP and SPP are doing regarding on-line CEH's

---

I think providing training for various tasks would be helpful using a screen share or screen shots. This would feel like on the job training walking you through a process. It would be good to have someone narrate the process and help avoid common mistakes or speak about items that aren't obvious; processes like Portal uses, MECT activities.

---

MISO should provide more training on new processes or changes coming to MISO. A majority of training offered by MISO is outdated based on current operations.

---

MISO currently does not have any course in the LMS that earns CEH. That will create interest among operators to use MISO LMS more.

---

LMS is a pain.

---

I think the improvements MISO is making are ongoing and I'm satisfied with the direction.

---

Provide NERC CEH's

---

Provide more examples and scenarios

---

Easier to find, more MISO-specific topics, better interface/graphics/videos

---

Better search features

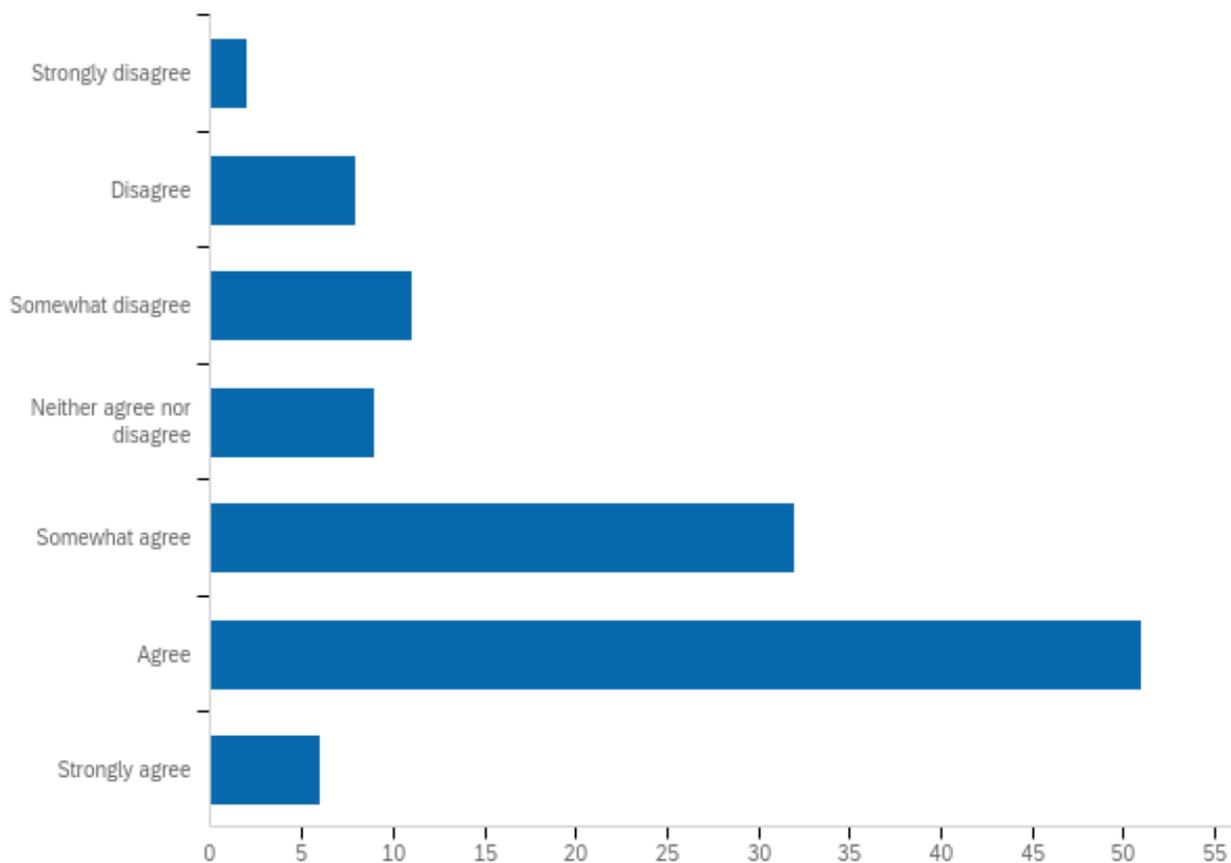
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Provide more material that has CEH awarded for the training online preferable.

---



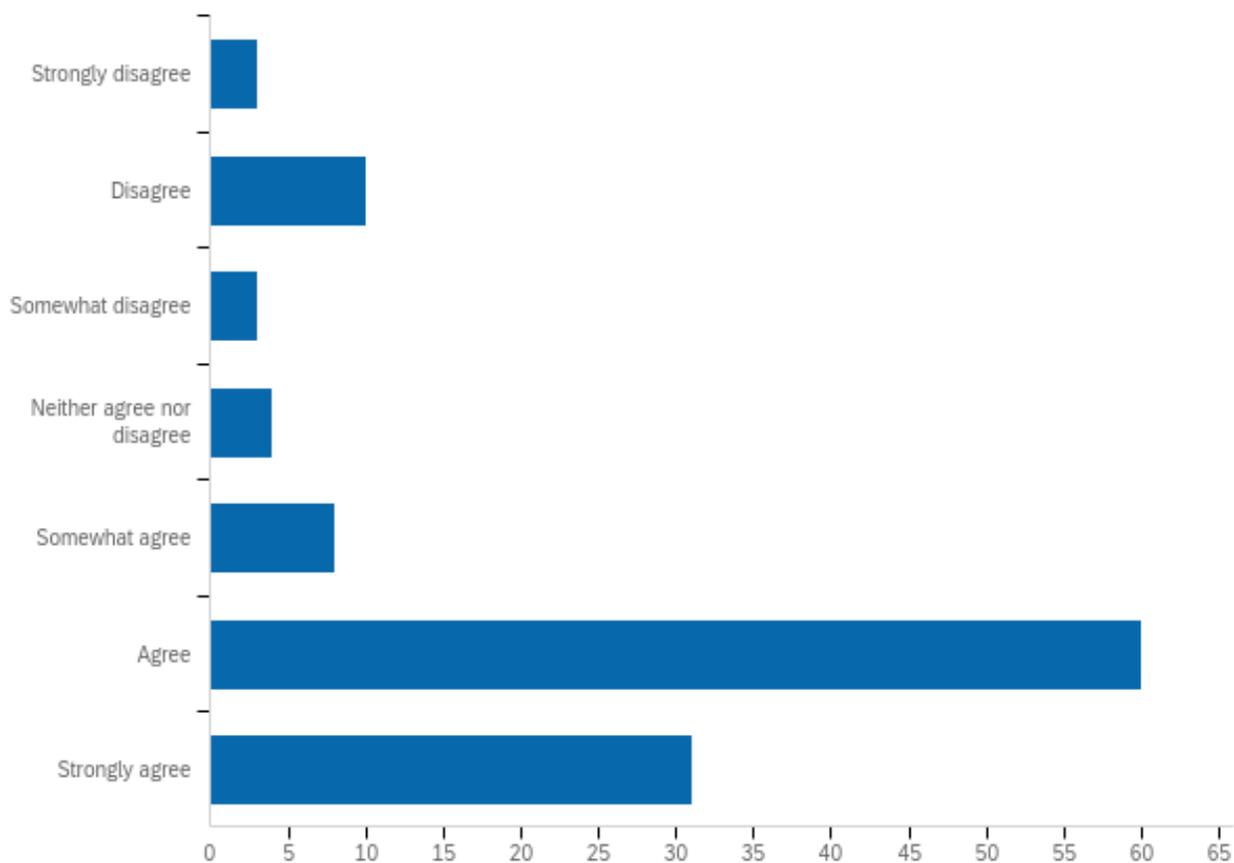
## Q7 - I know where to access relevant training courses from MISO.



#	Answer	%	Count
1	Strongly disagree	1.68%	2
2	Disagree	6.72%	8
3	Somewhat disagree	9.24%	11
4	Neither agree nor disagree	7.56%	9
5	Somewhat agree	26.89%	32
6	Agree	42.86%	51
7	Strongly agree	5.04%	6
	Total	100%	119



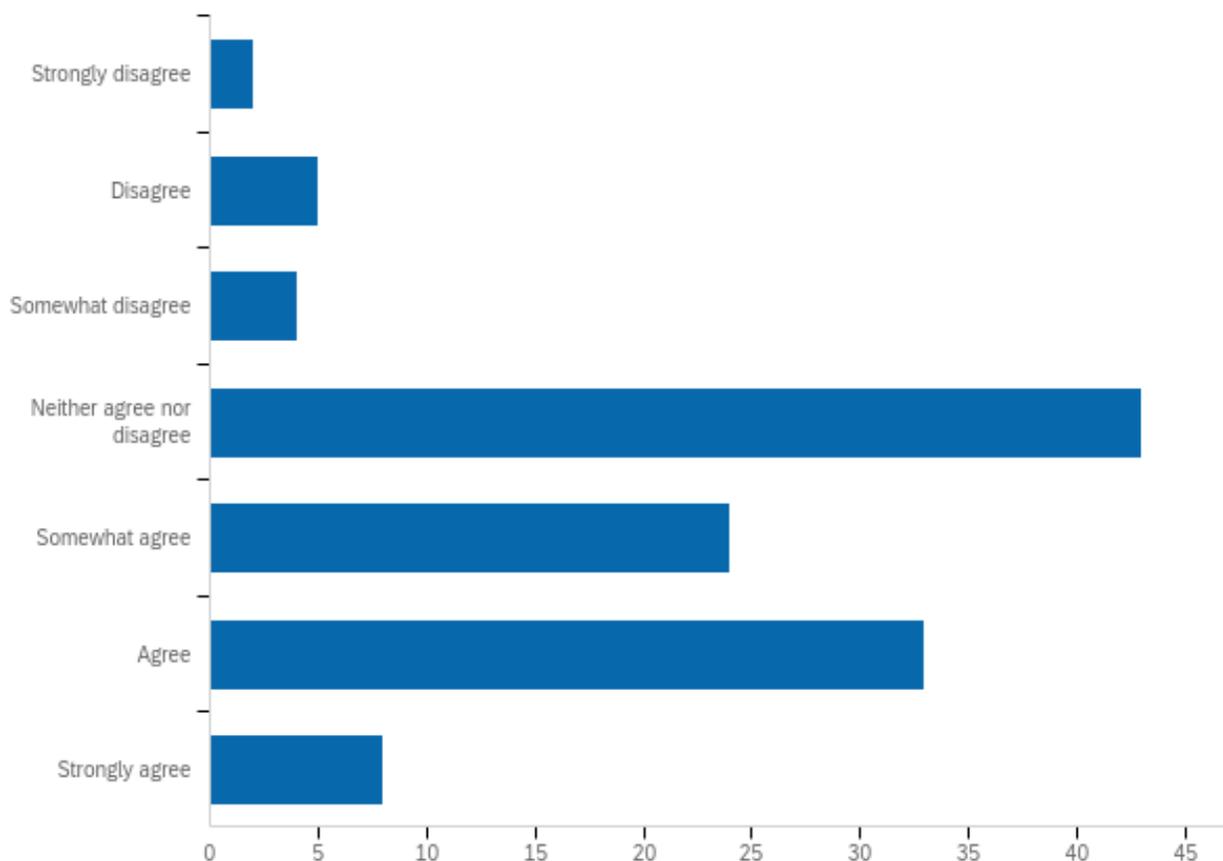
## Q8 - I have accessed customer training from the MISO Learning Management System (LMS) within the last year.



#	Answer	%	Count
1	Strongly disagree	2.52%	3
2	Disagree	8.40%	10
3	Somewhat disagree	2.52%	3
4	Neither agree nor disagree	3.36%	4
5	Somewhat agree	6.72%	8
6	Agree	50.42%	60
7	Strongly agree	26.05%	31
	Total	100%	119



### Q9 - In the last three years I have noticed an improvement in the effectiveness and availability of training from MISO.



#	Answer	%	Count
1	Strongly disagree	1.68%	2
2	Disagree	4.20%	5
3	Somewhat disagree	3.36%	4
4	Neither agree nor disagree	36.13%	43
5	Somewhat agree	20.17%	24
6	Agree	27.73%	33
7	Strongly agree	6.72%	8
	Total	100%	119



## Q10 - What can MISO do to create more awareness and increase accessibility to training for you?

Subscribe to email reminders on upcoming trainings (may already be there)

---

Simple procedure for finding and logging in

---

MISO should establish a training schedule for most desired topics by members and release dates for the online trainings. The course list does not need to be extravagant, perhaps 1 - 10 per year and even alternate the topics every other year if MISO has limited staffing or resource concerns.

---

You limit the number of attendees and send MISO folks that limit the amount open to your customers. Your training offerings are usually from a 3<sup>rd</sup> party. I guess it is nice to have options, but still don't know why the seats are only 20+/- on the in person stuff.

---

Offer training to applicable MPs via appropriate meetings, emails, etc.

---

Send out emails for lists

---

Provide more focused training, in my case transmission line design, PSSE courses etc.

---

Sending more communication on what training is available

---

More topics and interactive presentations instead of PDFs

---

Great question and hard to answer. Might help to have the Training link directly on the MISO home page rather than within Stakeholder engagement. For someone just assigned to a MISO related role within their organization, they might not associate training with 'engagement' as that has a governance connotation.

---

Suggesting that MISO offer CBTs for CEHs, and provide additional in-person instructor-led training courses

---

Outline training options available to me

---

I would "archive" old trainings to ensure access only to latest versions (employee Learning Center)

---

Interactive coursework

---

Training modules are not easily accessible. The one you find is just the PDF file. Video training seems non-existent; if they exist they aren't easy to find

---

Notification of training available, new training added

---

Provide an interactive person or bot who can answer simple questions about market operations, not just point Market Participants to documents

---

I honestly need a very basic primer on RTO markets, process, etc. If that exists, it has not been clear enough to know.

---

Remote sessions

---

Know interests and provide link to them.

---

Emails like this one

---



I'm not sure if this already exists, but if it doesn't, create a training course list of all available courses including brief description of course content.

---

I think MISO does a decent job of alerting members of training opportunities.

---

TBD - I'm only a little over 4 months in. I am sure I will learn more over time and as need requires/time allows.

---

Send weekly or bi-weekly training spotlight emails to MISO members featuring a specific training module

---

More emails/notifications

---

The online training has been improved, but I think instructor led courses are imperative to allow for question-and-answer sessions and receive immediate feedback.

---

Email sent to make aware of new training available

---

Email, MISO webpage front page link, better organization

---

Email course catalogue occasionally and notify when new courses are posted

---

Email customers/members about availability

---

Perhaps emails can be sent for new upcoming training events.

---

Maybe once a month distribute an email of the training schedule and any new training modules posted.

---

Put the available course list on the main MISO webpage

---

Periodic updates when new content is available in the MISO LMS to the right people at member companies. Right now, that distribution does not reach everybody.

---

I think there needs to be announcements/short presentations at high level Stakeholder meetings for new topics/levels of training as they come available. (steering/AC/MSR/RSC, etc.)

---

Provide access to recorded live training sessions

---

I think the training portal is quickly becoming a great place, but I think better visibility from misoenergy.org might be better for other team members at my utility. I know where to go quickly now, but I've heard from many people that they were unable to find it.

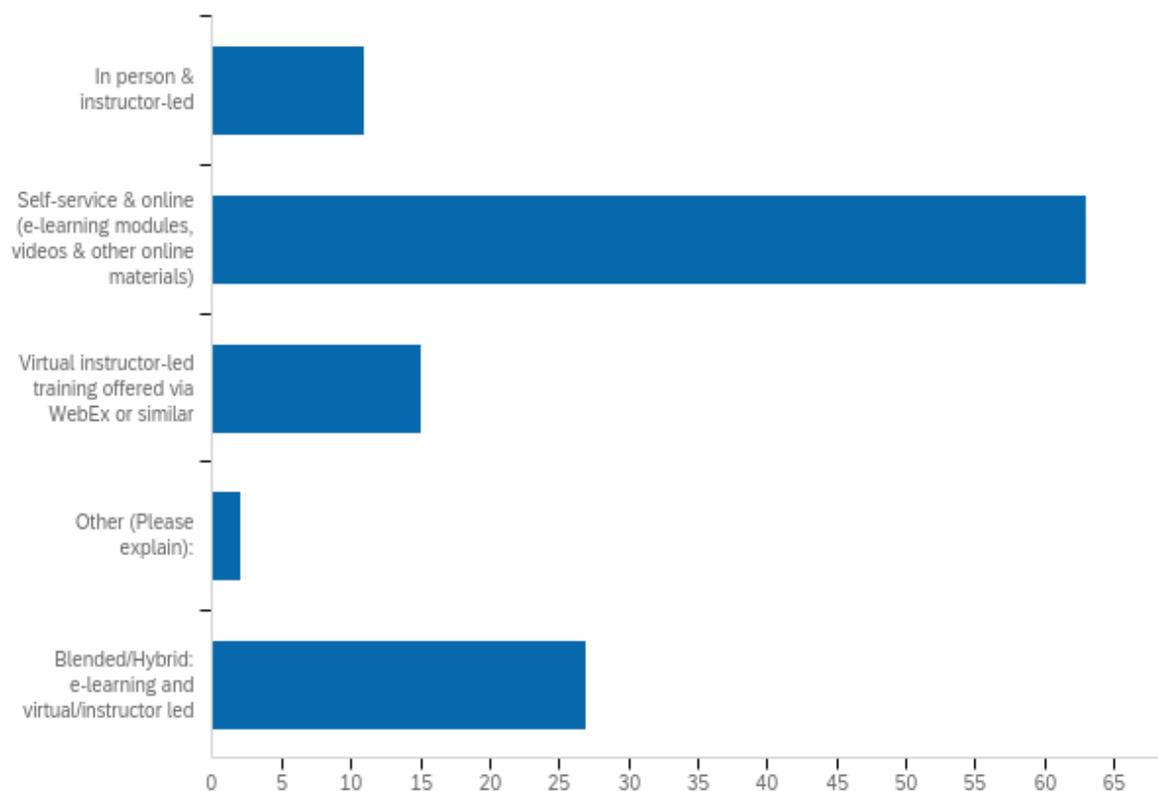
---

Provide more coursework that awards CEH hours online

---



## Q11 - For training on basic/introductory concepts, I prefer training to be:



#	Answer	%	Count
1	In person & instructor-led	9.32%	11
2	Self-service & online (e-learning modules, videos & other online materials)	53.39%	63
4	Virtual instructor-led training offered via WebEx or similar	12.71%	15
5	Other (Please explain):	1.69%	2
6	Blended/Hybrid: e-learning and virtual/instructor led	22.88%	27
	Total	100%	118

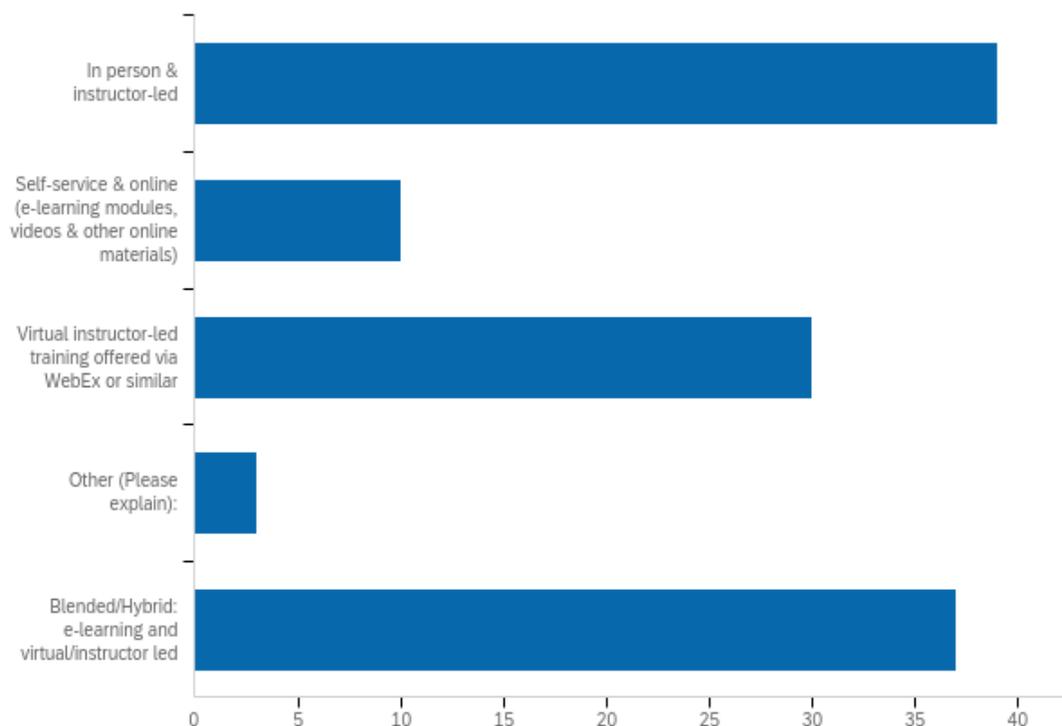
### Q10 (Please explain):

one on one interactive Q/A

I'm training flexible. Each option has plusses and minuses. Self-service and online can be around my schedule and need vs. as MISO schedules. Having perhaps weekly/monthly open office hours could be an easy balance to self-service pre-recorded standard information.



## Q12 - For training on advanced or complex topics, I prefer training to be:



#	Answer	%	Count
1	In person & instructor-led	32.77%	39
2	Self-service & online (e-learning modules, videos & other online materials)	8.40%	10
4	Virtual instructor-led training offered via WebEx or similar	25.21%	30
5	Other (Please explain):	2.52%	3
6	Blended/Hybrid: e-learning and virtual/instructor led	31.09%	37
	Total	100%	119

Other (Please explain):

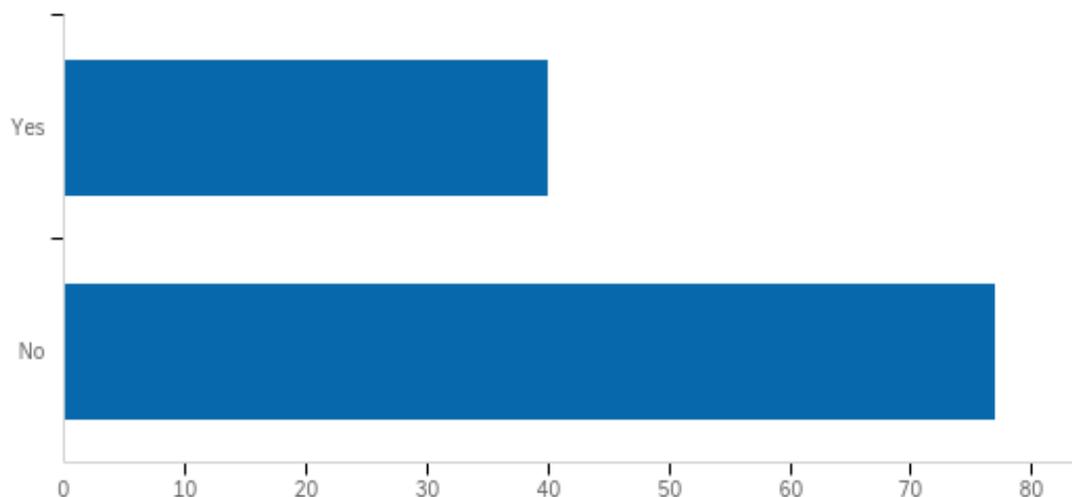
One on one instructor Q/A

Same as for basic concepts, each option has merit. If non-standard information, instructor-led with option for questions is helpful. If standard/mostly can be covered with pre-recorded/repeated information not likely to change for months/years, again, pre-recorded with periodic office hours might be a suitable combination.

Depends on the quality of delivery



## Q13 - Have your training needs or preferences changed due to COVID-19?



#	Answer	%	Count
1	Yes	34.19%	40
2	No	65.81%	77
	Total	100%	117

## Q13 - How have your training needs or preferences changed?

Use of virtual ILT

No in-person training, so all has been virtual for a year plus.

I prefer regardless with self-service but due to covid I think self - service has become more accepted.

Prior to COVID 19 my company rarely utilized WebEx so my experience with online web meetings has greatly improved along with my exposure to them.

Additional training opportunities, especially for CEHs, are needed due to COVID -19 restrictions with our company training room capacities. It is now taking additional time to deliver training to our System Operators. The ability to participate in drills remotely is of great value to our company.

Found out that virtual instructor -led online training works. However, do miss the nightly gatherings at in person sessions

Prefer on-line and self-directed

I am more willing to rely on online trainings and less willing to travel for training unless it is very experience-driven

Distance learning on my individual computer

Now need more online training



Receiving travel funding may now change since virtual training that was not previously available is now available and acceptable for CEHs

Do more remote training since it is easier and cheaper

Virtual is more acceptable

Virtual has allowed for more flexibility

No in person training allowed.

I prefer in person but have come to terms that virtual sessions can be impactful as well.

Need for more online training

No travel allowed. Travel for vaccinated employees now allowed. Been through several online trainings and would prefer those for lots of topics with in-person training only for the most advanced

Prefer more online/hybrid options

Much higher demand for virtual training

I am more susceptible to WebEx training

Much more of the training is done online or research

More online training needed due to less travel

More online and virtual training

Remote access training due to covid restrictions

Online training has become a larger part of training needs

Online vs. in person

Due to the COVID-19 restrictions, I now prefer virtual training and live Q&A discussions with MISO experts.

Due to intra-company travel bans, I will more likely need to do training online instead of traveling on site.

### **Q14 - Please list any specific topics below that you would like training on.**

Load Forecasting, DIR Forecasting, RSP, Settlement Charges - Examples of what triggers a specific charge type

At least annual 'New (to MISO footprint) Operator Training. Other MISO Tools. Virtual ILT. As the process continues, training on topics like DERs (with CEHs) would be helpful.

Day ahead and Real- Time operations

(1) details on the power flow (Planning) analytical process for (a) feasibility and (b) Impact studies; (2) Interconnection application process



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Resource Adequacy, Understanding MISO-Billing, Regulatory Requirements for LSEs

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Voltage control and specifics on what is really in the GOP vs the TOP buckets and what is really expected for guidance on the VAR standards

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MISO Model Manager, MISO Commercial Model, Generator Interconnection Processes

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Transmission line design, PSSE courses etc.

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Considering all the DSM changes coming, it would be useful to have an 'end -to-end' demand response curriculum building upon what is now in the markets section. At present there is no way to learn how to use DR tools in the MCS without attending summer readiness training for ECC operations (the new DSRI rollout being an exception). The DR settlements tool doesn't have training that I can find. If someone is totally new to DR, there is no path to learn what is required other than plowing through BPMs and Tariff language with the hope you have interpreted the information correctly (other than the initial level 100 DR as a resource course - if you know where to find it).

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Our company favors the Market Capacity Emergency Drill and Fall Power System Restoration Drill

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Renewables reporting and rt dispatch info

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Market Operations LMR's what are they, how are they activated, how long does it take for response? System Operating Limit Mitigation

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Interconnection queues and cost allocations

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Aggregators, Microgrids, Distribution Companies

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Transmission Tariff and Protocols administration for the TO's and MISO

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More training outside of just training on the business practice manuals. Training on proper modeling methods would be helpful for new transmission planning staff.

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DA and RT markets

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Basic introduction to RTO markets, wholesale pricing and trading, how to participate, etc.

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FinScheds, Generation Interconnection Queue, MECT,

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More information on the grid changing from coal and natural gas to more solar and wind. How will this impact grid stability?

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PROMOD related modeling done by MISO and PowerFlow modeling as done by MISO. Evaluation of transmission congestion and constraints. How to find information needed on MISO web site needed to do transmission congestion analysis. More detailed training on Quarterly Operating Limits process and modeling.

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Basic processes for the non-engineer such as how the generation queue works and how the market works. There are in-depth materials but the basics are missing.

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Cybersecurity

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NERC and MISO Event reporting Disaster drill (other than Hurricane)

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IC network upgrade reimbursement; what qualifies, differences between zones/TOs, timing for reimbursement payout. TO network upgrade reimbursement; reimbursement payout/options



I think there's information out there on many things I'm interested in; just have to make time to go through and listen/watch or absorb enough through attending stakeholder meetings and reviewing BPM/Tariff language and gathering historical information through my company and other stakeholders over time.

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Transmission Settlements process

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Beginner topics, New to Industry topics

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Transmission planning, generator interconnection, EMS, other similar topics

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BPM modules that address Generator and Transmission Operations. LBA Operations

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MECT and Resource Adequacy

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Power System Dynamics, Impact on operation because increase renewables.

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Information pertaining to recent events with gas supply and cold weather events.

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Credit Exposure Calculations/Reports -Collateral management

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LMPs, capacity markets, energy markets, grid operations

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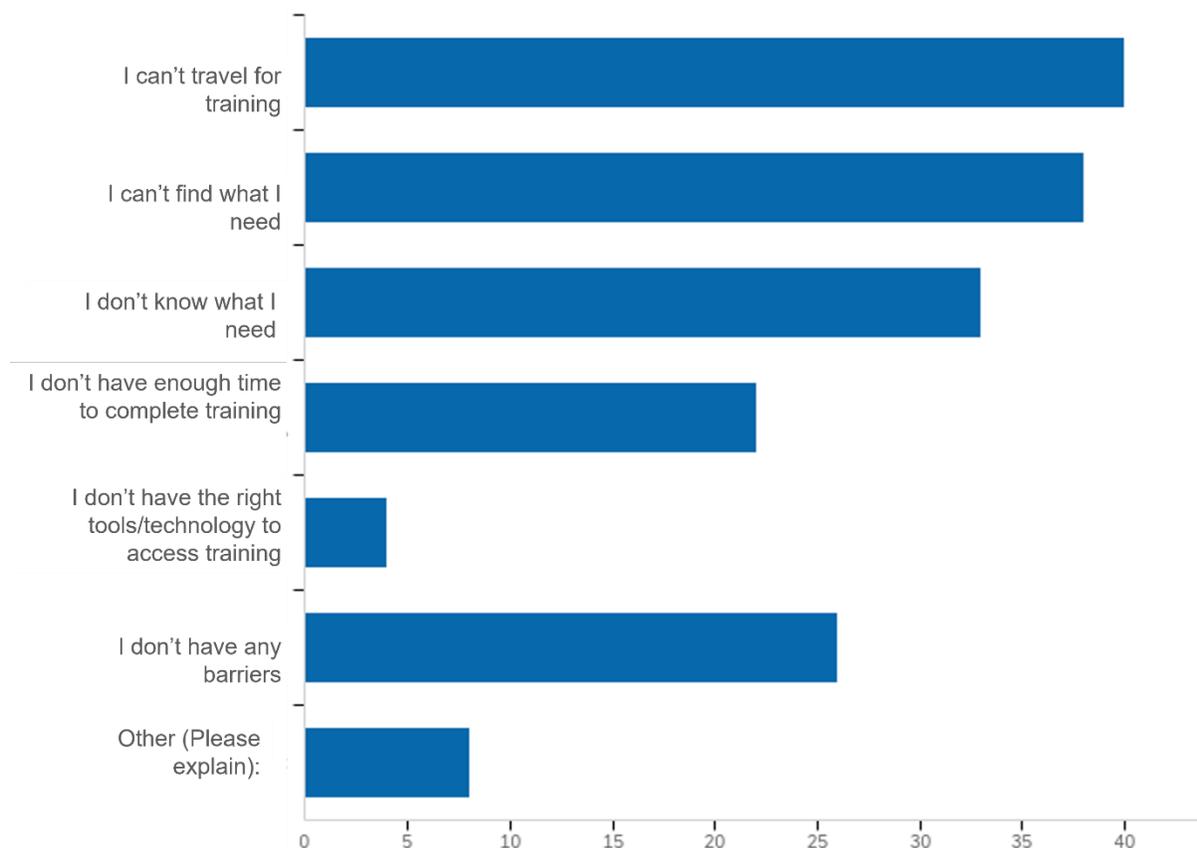
Training on the MISO study schedule so that I can properly plan for the submittals. I'm a new engineer so I'm coming up to speed on these things but, and this is nothing on MISO - i think I have found the data when I go looking for it - but something utility specific with the MISO requests, the study requests, and the timing of the processes like CSA, MTEP, DPP, things like that, would be great! We have a small team here and the email request method seems to be working well but that's just my input.

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Transmission Operator training



**Q15 - What are your biggest barriers to accessing training? Check all that apply:**



#	Answer	%	Count
1	I can't travel for training	23.39%	40
2	I can't find what I need	22.22%	38
3	I don't know what I need	19.30%	33
4	I don't have enough time to complete training	12.87%	22
5	I don't have the right tools/technology to access training	2.34%	4
6	I don't have any barriers	15.20%	26
7	Other (Please explain):	4.68%	8
	Total	100%	171



## Q15 Other (Please explain):

I'm not always sure what processes have changed enough to warrant additional training. Perhaps some kind of update statement would be appropriate??

Prior experience, don't need to access training as frequently

Cost (in-person training)

I have tried to access several trainings that are out of date / no longer available. What is the curriculum that is recommended and up to date?

New operator trainee

So far so good overall, but again, I'm getting a lot of training at the moment as I'm getting up to speed and researching/learning along the way.

Reminders and awareness; MISO training isn't really publicized

Time to complete the training

## Q16 - Is there anything else you'd like us to know about your training needs? Please provide recommendations on how we can make improvements.

Travel for training has been cut to almost \$0. Online and Virtual ILT has become the new norm for continuing education and CEHs.

Would be very helpful to have access as a Consultant to power flow .raw cases without needing to get via a Member; same for electronic transmission (system) map

MISO training seems very much optional, when it should rather be very much required with certifications issued with even testing if it makes sense on complicated topics. A more informed network of utility professionals only strengthens the MISO-network.

Although this is totally beyond MISO's control, many 'invoices' are assigned to roles without mentoring or guidance within their organizations and are thus left on their own to discover what is needed and how to learn it (even though they don't know what they don't know). If your staff could keep that in mind when approaching topics, it might help you to build on what is such a great start. I greatly appreciated onsite in-person training that MISO sponsored back in the 2016-17 time frame and still go back to the materials (even though they may be obsolete). I think I am the only staffer left who participated in those sessions - so turnover is a real issue. And, that type of investment for MISO may no longer be feasible. So, a self-paced curriculum on specific areas may be the path forward. Thanks for all your effort!

I like the 100 / 200 / 300 levels ... this provides reinforcement of basic concepts while advancing in more "bite-sized" pieces. I think more awareness should be given to employees about all the work done on customer training so everyone can benefit.

Less PowerPoint slides that are missing the commentary from an instructor and more instructor-based training. Virtual training and recordings of any webinar-based training are good as many organizations may not have the depth to send personnel at specific dates and times.



Market participants should be assigned a training customer service agent, just like they are assigned a regular customer service agent.

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It would be good to have the MISO RCs in the training especially for Q&A.

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So far so good. Hopefully I will have more information/insights to share around this time next year.

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Please look at PJM training since they have been really doing a great job at providing an online training system with simulators that work well and provide excellent knowledge transfer.