DIAMOND
DATA INFORMED ACCESSIBILITY —
MAKING OPTIMAL NEEDS-BASED DECISIONS

Usability and Pilot Testing of the DIAMOND Online Professional Development Module

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Background

One of the main goals of the DIAMOND (Data Informed Accessibility – Making Optimal Needs-based Decisions) project has been to create an online professional development module to help educators to make decisions about accessibility features and accommodations for their students. By December 2018, a working version of this module had been completed. DIAMOND staff then began a series of tests to understand how this module could better meet the needs and preferences of educators. First, the University of Minnesota's User Experience Support Laboratory helped lead two separate usability tests with Minnesota educators. Second, DIAMOND staff conducted a pilot test with educators from several DIAMOND partner states. This report summarizes the findings of each of these tests and outlines the measures that DIAMOND staff have taken to respond to feedback.

December 2018 Usability Test

On December 7, 2018, six 30-minute evaluation sessions took place at the User Experience Support Laboratory at the University of Minnesota. The six participants were all pre-service teachers in University of Minnesota teacher education programs. The participants were asked to review only the first section of the module because of time constraints.

The project team observed the evaluation sessions from inside an observer room, separated from the evaluation room by a one-way mirror. Cameras and microphones in the evaluation room allowed the team members in the observer room to see the participants' facial expressions and to hear their comments as they thought aloud. Separate computer monitors enabled the team to view the participants' computer screen, as well as their mouse and keyboard actions. In addition, the usability team was able to see eye-tracking data in real time.

If there was time at the end of each evaluation session, participants used a desirability matrix to choose adjectives that described the module. The words that participants chose most often were "boring," "effective," and "vague," with two votes each (see Appendix A for more details). The participants also completed the System Usability Scale, which involved answering questions using a Likert scale. The average score was 61 on the scale, which ranges from a low of zero to a high of 100 (see Appendix B for details).

DIAMOND staff and User Experience Support Laboratory staff took notes during each evaluation session. After each session, the team reviewed the notes and recorded the problems that participants had with understanding or engagement. The team then reviewed the spreadsheet at a separate meeting and used a consensus approach to identify the most important issues to address and to set recommendations. These are outlined in Table 1.

Table 1. December 2018 Usability Test: Observed Issues and Recommended Next Steps

Observed Issues	Next Steps
The module felt like a boring test Participants felt like the modules were essentially a multiple-choice test, rather than scenarios for them to navigate. "Boring" and "vague" were the two of the most commonly chosen adjectives to describe the modules.	Reframe the module so that the user is in the position of a teacher who has to make decisions for a particular student. Model the tone of the module after Choose-Your-Own-Adventure books. Add "talking head" video narration.
The module lacked a sense of purpose Participants made comments such as, "I'm going along and doing this because they told me to, but I'm not sure why."	Shorten the introduction to focus only on the purpose and basic methods of the module: "In this choose-your-own-adventure style training, you will learn about accessibility features." Start and end each section with the section's objectives. Reinforce the learning objectives in the feedback to each answer choice. Stick with a consistent character throughout a module.
The navigation and terminology were unclear The terms "module," "tutorial," and "accessibility features" were confusing to participants. It was not apparent how to navigate between different modules or between different features of the module set. In the Profiles section, in particular, it was hard to tell which tab was selected. This resulted in participants missing important content.	Design an onboarding sequence that explains key terms and navigational features. Use highlighting, color, and accurate progress indicators to help users know where they "are" in the module. Include a "back to the story" button. Ensure that all fields and icons are labeled.
The imagery was problematic The use of stock photos contributed to the generic, boring feel of the module. The exclusive use of non-white characters gave participants the impression that accessibility is only a concern only for non-white students.	Replace stock photos of different people with consistent, integrated photos that are related to the content of each module. Use as wide a range of photos as possible. Consider reaching out to the Disabled Student Cultural Center at the University of Minnesota for guidance on imagery.

In the months following the December 2018 usability test, DIAMOND staff revised the module. Revisions were designed to be responsive to the recommendations derived from the December 2018 usability test. The revised module was subjected to a second usability test in February 2019.

February 2019 Usability Test

On February 11, 2019, DIAMOND staff observed five 40-minute evaluation sessions at the User Experience Support Laboratory at the University of Minnesota. The five participants were all former teachers, with experience levels ranging from three years of early childhood education to 10 years of middle school math. At the time of the February usability test, these participants were enrolled in graduate programs at the University of Minnesota. As in December, the participants were asked to review only the first section of the module because of time constraints.

The DIAMOND and User Experience Support Laboratory teams followed the same procedures that had been used during the December 2018 usability test. The top adjectives chosen with the desirability matrix were "easy to use" and "straightforward," with three votes each, and "clean," "familiar," and "informative," with two votes each (see Appendix C for more details). The average System Usability Scale score was 81 (see Appendix D for more details).

The top issues identified during the February usability test, as well the recommended next steps to address them, are presented in Table 2.

Table 2. February 2019 Usability Test: Observed Issues and Recommended Next Steps

Observed Issues	Next Steps
There was confusion about the student profile section Participants read the student profile section thoroughly, but were not sure why they needed to do so at that point.	Shorten the student profile to include only what is necessary. Explain that the student profile section is to be used as a resource throughout all four modules, whenever participants feel it is needed. Point out the navigation links to and from the module.
There was a perceived lack of nuance around terminology and Question 3 in the first section of the module Participants were put off by the fact that there was no option that included speaking with the student. They repeatedly brought up a controversy about whether reading a student's file too early would bias teachers' decisions. Finally, some of the participants based their statements around	Clarify that the scenario starts before the start of the school year, so having a conversation with the student is not feasible at this point. Explicitly address the topic of bias in meeting new students, using evidence-based best practices. Ensure that the photos used to represent students are completely consistent with the information presented in the text about students.

conclusions they drew from the picture of the student, rather than from the text. Participants also repeatedly brought up their unfamiliarity with the term "accessibility features." They suggested terms like "differentiation" and "accommodation" instead. These issues may contribute to a lack of credibility for these e-learning modules.	Re-evaluate the pros and cons of the term "accessibility features" in light of the pushback the term has encountered.

Using the recommendations from the February 2019 usability test as a guide, the DIAMOND team revised the module again. The revised module was then subjected to a pilot test.

April 2019 Pilot Test

In April 2019, after making changes to respond to the feedback from the usability tests, DIAMOND staff conducted a pilot test with teachers from the DIAMOND partner states. All nine partner states were asked to provide names and contact information for one or two teachers who would be interested in completing and reviewing the module. DIAMOND staff received five contacts, four of whom completed the pilot.

The educators who completed the pilot were from Michigan, Ohio, and West Virginia. Three worked in special education, and one worked in EL education. These pilot testers were provided with a link to the module and a document with a series of 11 questions to answer. Their synthesized responses are presented here (see Appendix E for the full responses).

1. What (if anything) is out of date in the content?

Three of the four pilot testers said that there was nothing out of date in the module. One pilot tester stated that the videos looked old.

2. What (if anything) is confusing about the content?

Three of the four pilot testers stated that nothing was confusing about the content. Two of the testers also responded to this question by saying that the content was "informative" and that they appreciated "the short, clear, and concise information" in the videos. One participant wanted more instructions at the beginning of the module explaining to users that they would choose answers as they went along, that information is presented in video format, and that there are four sections in the module.

3. How does the content flow?

All of the pilot testers agreed that the content flowed well. Two of them commented that the progression of information, from collecting information to implementing accessibility features, was logical. One said that the flow was especially good given that this is a complicated topic. Another suggested that some users would not read or watch the resources provided because it would be easy to guess the correct answers.

4. How accurate and realistic is the content?

Three of the pilot testers wrote about parts of the content that seemed realistic. They specifically liked the student profile. They also appreciated that the module showed that sometimes teachers do not know the protocol for deciding on accessibility features and do not have time to consult and collaborate with one another.

One pilot tester wanted the module to include more ways of getting information about students since students' cumulative files are sometimes lacking. This tester also wanted to make sure that there would be another profile of a student who is not an EL and who does not have an IEP because "every teacher would experience this type of student every year."

5. How does this module engage you in critical and abstract thinking?

Three of the four pilot testers wrote that the module pushed them to think. They liked that it provoked them to consider universal features, data collection on accessibility features at the district level, and the needs of their current students. There were several suggestions to encourage deeper thinking: one was to include more than three answer choices, another was to make the videos required, and the last was to include a list of accessibility features.

6. What knowledge did you need to be better prepared for this module?

One tester said that not much prior knowledge was needed. Two said that their experience with students with disabilities and ELs helped them in the module. One of these reviewers also said that educators without this experience would not know too much about accommodations and testing, but it was unclear whether she was suggesting that this module needed to provide more background. The last pilot tester said that a brief, general overview on accessibility features might be helpful to build schema at the beginning of the module.

7. What (if any) technical issues did you experience?

All of the pilot testers brought up a different technical issue that they experienced. One said that a specific video ("What Resources Are Available to Me as I Make Assessment Accessibility Decisions?") did not work. Another stated that she was unable to return the module after clicking on the Videos tab. Another tester said that it was confusing that, for the Student Profile, Helpful

Links, Glossary, and Videos tabs, the current tab needed to be closed before she opened another one. The final tester indicated that the module closed on its own after she completed the fourth section and that a Google text-to-speech extension did not work for the module.

8. What do you like about this module?

Three pilot testers liked the videos. They specifically mentioned that the videos were clear and concise and that the scenarios they presented were current. Another aspect of the module that one tester found useful was the feedback and chance to watch the relevant video that users receive when they choose a wrong answer. One tester appreciated that there was a "wide range of specific examples." Another tester liked that it was broken into "four manageable parts" and that "real, classroom-based scenarios connected to state assessments made the learning more meaningful."

9. What can we do better in this module?

One tester said that she could not think of any improvements. Two pilot testers wanted to see the module include another student profile that was not of an EL. There were two opposing suggestions made for the videos: one tester suggested that they be required so that module users could not skip over them; another tester said that the videos should be recreated. One tester suggested that the scenarios include audio or video and that the questions have more than three answers to require deeper thought.

10. Would you recommend this module? Why or why not?

Three of the testers said that they would recommend the module. One stated that it provides "information that all teachers need to be familiar with and comfortable incorporating into their instructional practices," while another said that it could address the problem that "teachers feel that only students who have an IEP are permitted to use these features when in reality it can be very helpful to all students."

The fourth tester said that she might recommend the module for "specific people with clear purposes" if "digital [presentation] was the only option." Otherwise, she said, it would be better to communicate this content in person.

11. What other comments do you have?

One reviewer stated that she liked the short length, direct language, and varied narrators of the videos, as well as the fact that the video suggested talking with the student. One reiterated her opinion that the videos should be required and said that some of the images in the scenarios were negative and unappealing. Another also said that the gray background and images – along with the music, sound effects, and overall quality in the videos – could be more appealing. The final

tester noted that teachers would need additional training specific to their states after completing this module.

Response to Pilot Test Feedback

Several pilot test suggestions will not be made by DIAMOND staff, largely because they could not be completed within time constraints or because they conflicted with findings from the December and February usability tests. The suggestion to add audio to the scenarios will not be followed because versions with this feature were found to be boring by participants in the December usability test. Creating videos for the scenarios might be engaging, but they cannot be completed because of time constraints. The suggestion by one pilot tester that the videos were out of date was not understood by DIAMOND staff; the videos will not be redone. Also, there will not be a requirement that all module users view the videos because that might be tedious for those who already have some knowledge of accessibility features or accommodations. The suggestion to add more answer options to each question might elicit more critical thinking, but the choice of three answers was intentional to make the module seem less like a multiple-choice test, which usually has four or five answer options.

Several of the suggestions from the pilot test have been addressed in producing the finished module. DIAMOND staff are creating two additional student profiles: one of a student with a disability, and one of a struggling student who is not an EL and does not have a disability. Module users will be able to choose from the three student profiles. DIAMOND staff also are reviewing the images in the module to make sure that they are positive and appealing. In addition, DIAMOND staff are working to correct all technical issues that the testers found.

DIAMOND staff are continuing to consider whether to make changes to the introduction. The purpose of any changes would be to make users are more familiar with the format of the module, as well as to better acquaint users with the term "accessibility features."

Appendix A: December 2018 Usability Test Desirability Matrix

Desirability Matrix

Please choose five words that most accurately describe the product based on your experience today.

	Annoying		Difficult		Helpful		Sophisticated
	Attractive		Discouraging	1	**Inconsistent**	1	**Straightforward**
2	**Boring**		Distracting	1	**Informative**		Stressful
	Bureaucratic	1	**Dull**	1	**Insufficient**		Time Consuming
	Clean	1	**Easy to Use**		Jargon		Too Simplistic
1	**Cluttered**	2	**Effective**		Lengthy		Too Technical
	Complicated		Efficient		Organized		Trustworthy
	Comprehensive		Encouraging		Overwhelming	1	**Understandable**
1	**Concise**	1	**Familiar**		Polished		Unhelpful
1	**Confusing**		Frustrating	1	**Redundant**	2	**Vague**
	Dense	1	**Hard to Read**	1	**Scannable**		Wordy

Appendix B: December 2018 Usability Test System Usability Scale

The System Usability Scale (SUS) is the most widely used standard questionnaire for measuring the perception of usability. First developed in 1986, it has been used on software, websites, mobile phones, hardware, interactive voice response (IVR) systems and even paper ballots. It has been cited in over 600 research publications and is part of leading commercial usability-evaluation tools.											
Question	I think that I would like to use this product frequently.	I found this product unnecessarily comple .	I thought this product was easy to use.	I think that I would need the support of a technical person to use this product.	I found the various functions in this product were well integrated.	I thought there was too much inconsistency in this product.	I would imagine that most people would learn to use this product very quickly.	I found this product very awkward to use.	I felt very confident using this product.	I needed to learn a lot of things before I could get going with this product.	SUS Result
Participant 2*	3	1	4	1	3	2	4	3	4	1	75
Participant 3	1	4	2	4	2	5	1	5	1	4	13
Participant 4	3	1	3	1	2	4	4	4	5	3	60
Participant 5	2	1	4	1	3	4	5	1	5	1	78
Participant 6	5	2	4	2	4	2	4	3	5	2	78
										Average SUS	61

Appendix C: February 2019 Usability Test Desirability Matrix

Desirability Matrix

Please choose five words that most accurately describe the product based on your experience today.

	Annoying		Difficult		Helpful		Sophisticated
	Attractive		Discouraging		Inconsistent	3	Straightforward
	Boring		Distracting	2	Informative		Stressful
	Bureaucratic		Dull		Insufficient		Time Consuming
2	Clean	3	Easy to Use	1	Jargon		Too Simplistic
	Cluttered		Effective	1	Lengthy		Too Technical
	Complicated		Efficient	1	Organized		Trustworthy
1	Comprehensive	1	Encouraging		Overwhelming		Understandable
	Concise	2	Familiar		Polished		Unhelpful
	Confusing		Frustrating		Redundant		Vague
	Dense		Hard to Read	1	Scannable		Wordy
1	Average	1	Thorough				

Appendix D: February 2019 Usability Test System Usability Scale

The System Usability Scale (SUS) is the most widely used standard questionnaire for measuring the perception of usability. First developed in 1986, it has been used on software, websites, mobile phones, hardware, interactive voice response (IVR) systems and even paper ballots. It has been cited in over 600 research publications and is part of leading commercial usability-evaluation tools. SUS Scores are not percentages, even though the SUS ranges from 0 to 100. When looking at scores across many products, researchers found the average SUS score to be a 68. A score of a 68 is 68% of the maximum score, but it falls right at the 50th percentile.

Question	I think that I would like to use this product frequently.	I found this product unnecessarily complex.	I thought this product was easy to use.	I think that I would need the support of a technical person to use this product.	I found the various functions in this product were well integrated.	I thought there was too much inconsistency in this product.	I would imagine that most people would learn to use this product very quickly.	I found this product very awkward to use.	I felt very confident using this product.	I needed to learn a lot of things before I could get going with this product.	SUS Result
Participant 1	1	1	5	1	4	2	5	1	5	1	85
Participant 2	1	2	3	1	4	2	4	4	2	3	55
Participant 3	2	1	5	1	5	1	5	1	5	1	93
Participant 4	3	1	5	1	4	1	5	1	5	5	83
Participant 5	4	2	5	1	4	2	5	1	5	2	88
Average	2.20	1.40	4.60	1.00	4.20	1.60	4.80	1.60	4.40	2.40	
Variance	1.7	0.3	0.8	0	0.2	0.3	0.2	1.8	1.8	2.8	
										Total Average SUS	81

Appendix E: April 2019 Pilot Test Responses

1. **What (if anything) is out of date in the content?**

    - No, the content of this training is current.

    - Nothing that I noted.

    - I did not find anything out of date in this module.

    - The videos appear to have been made years ago with out of date technology.

2. **What (if anything) is confusing about the content?**

    - I watched every video, and it was very clear. I truly appreciated the short, clear and concise information presented in the videos.

    - I would like to see more instructions in the beginning about how the module will flow - that you will choose your answers as you go along, and that resources are available in the form of videos. Maybe even a mention of four different content areas, so it is clear to participants that they will do all four sections.

    - I did not find anything confusing. It was informative.

    - Nothing is confusing.

3. **How does the content flow?**

    - The presentation of the information made sense, from basic observation to implementation of supports and accommodations.

    - It is hard to address this topic in a linear fashion, as it is such a big topic. However, this module does roll it out in a nice fashion.

    - The content flow was good. It gave instructions for how to start at the beginning of the year and where to go from there. It followed the student for the entire school year.

    - The content flowed well. I appreciated that if I clicked the wrong answer, it brought me to a resource to learn and then try again. In general, I don't know how many would read/watch the resources if this were a required module since it would be so easy to simply guess correctly with so few options and only 1 question at a time.

4. **How accurate and realistic is the content?**

- It is accurate. One issue is always the factor of not enough time for teachers to consult and collaborate. I do like the way this issue was presented in this training.

- It's solid. I like how the teachers are popping in like, "what do I do?" I think that this is very realistic, as a large majority of teachers have not had training in accessibility features. They want to know what to do, but are unsure where to go for information.

- I would like to see more than simply review the student's file though. Many schools do not have accurate files on students, which would impede understanding of student's needs from the beginning. Also, EL students are not too common in all areas. It would be beneficial to have a second example student as well. Many times students who are in the student support process that do not have an IEP would benefit from these features. Every teacher would experience this type of student every year and an example based on this type of student would be more relatable to every teacher.

- I loved Ana's profile. It was very realistic, and I think many teachers would be able to relate to a student like Ana. I also liked that this module addressed accessibility for those with an IEP along with ELs. The accommodations were also realistic. Again, I did not find the videos appealing.

5. **How does this module engage you in critical and abstract thinking?**

- This module made me take a better look at Universal Supports that are to be provided to all students who have a need. It also made me consider additional options that we need to look at as a district to collect data on the supports that are being provided to our students.

- You've got to make decisions along the way, based on content that you read and view in the videos. This is different than sit and get, and ensures that participants are engaged, and not just letting the video play while they are doing something else.

- This module gets you thinking about individual students in your class and how you can help them. I think it leads a lot to independent teacher desire to support students though. Accessibility features are so broad and there are so many out there it is difficult for busy teachers to find time to do the research. A list of accessibility features and links to programs would be beneficial. Another option would be to make the videos a required part of this module so those using it could not skip this.

- I like the scenarios to consider and allow for critical/abstract thinking. Having more options or harder answers would nudge me to think more deeply. Most answers seemed obvious with only 3 choices.

6. What knowledge did you need to be better prepared for this module?

- I believe that a brief, general overview of accommodation examples may provide the viewer a better framework of the purpose of this module.

- Not much prior knowledge is needed. This starts at a very basic level, including who to talk to about making decisions.

- I am not familiar with EL students. I have had no experience with EL students in my 15 year career. Also, because I am a special education teacher, I am familiar with testing accommodations. Teachers without a special education background would have minimal experience with accommodations and statewide testing experience.

- I benefited from already having knowledge of ELs, those with IEPs, our state assessments and the universal and designated supports and accommodations allowed on state testing.

7. What (if any) technical issues did you experience?

- The video, "What Resources Are Available to Me as I Make Assessment Accessibility Decisions?" did not work.

- Could not use text to speech from a google extension for the module. This would make it more accessible:)

  Unsure if this was just something on my end, but when I completed the fourth module, the test window shrank down. I thought it had closed, but it was just reduced. I wanted to look around at the glossary and links provided for more information. Just something to consider, as folks taking the module might not engage further with the content if this happens to them.

- I went to the YouTube videos and was unable to go back into the module. When I returned to my email and clicked on the play module link, it returned to the module but I was unable to click on anything else. After many attempts, it finally returned me to the module, but it was difficult to access for a while. I'm not sure if this was user error or an error in the system.

- When I clicked the links at the top (profile, helpful links, glossary, videos, exit), I was unable to click a different resource link until I clicked "done." This was a bit confusing as I at first thought it was a technical glitch. Ana's profile opened with the link provided, but when I clicked profile at the top, it did not open again.

8. **What do you like about this module?**

- I liked the short, clear and concise information presented in the videos. The scenarios in the video were current and applicable to all teachers.

- The wide range of specific examples. The short videos that are available for each topic. Nice to have CC options for the YouTube videos.

- I like that videos are easily accessible if you aren't sure how to answer a question. Also, if you answer incorrectly, it provides you with an explanation and additional videos for instructional purposes. The videos are excellent!!!

- I liked that it was broken into 4 manageable parts. I also liked the connections for supports and accommodations for many students. Additionally, making explicit real, classroom-based scenarios connected to state assessments made the learning more meaningful.

9. **What can we do better in this module?**

- I would provide additional student with disabilities examples for the scenarios. For example, discuss a student with a learning disability. We do not have many EL students in our district at this time.

- Unsure! It was very helpful and would be a great intro module for professionals. Very much needed!

- Give another example besides an EL student. Perhaps using a student who is struggling academically but is not an EL student would be a good example as well.

  I was able to easily navigate the module without watching the videos. However, I returned to watch the videos for additional review and understanding. Due to my background and experience, I am familiar with the content. Many teachers could benefit from the information provided in the videos. Perhaps consider making this more of a required feature of the module to be more instructional and informative. Many people will skip through without watching them if they aren't required. The best information in this module is in the videos.

- I would recreate the videos. I would also like the pages read aloud optionally – or even better, a short recording of the scenario acted out rather than reading about a scenario. If you want participants to truly think deeply and not just click through quickly, more questions and answer choices should be required.

10. Would you recommend this module? Why or why not?

- Yes, I feel this module would be great for teachers to view during their required staff development training sessions. It is information that all teachers need to be familiar with and comfortable incorporating into their instructional practices.

- Yes! It is direct, with lots of opportunities for additional information (via videos) when needed.

- Yes, many teachers do not understand accessibility features. This can teach them what they are, how to identify when to use them, and the appropriate channels to obtain support. Many times teachers feel that only students who have an IEP are permitted to use these features when in reality it can be very helpful to all students. This can also show teachers valuable tools within their classroom instruction and planning to be more supportive to students within the lesson and not just on tests or assignments.

- It would depend upon the audience and purpose. Overall, I would not recommend the module if it could be communicated in person. If digital was the only option, I would recommend it for specific people with clear purposes.

11. What other comments do you have?

- If this was presented to our teachers, there would need to be additional training specific to our state and the Universal supports and accommodations permitted during testing to bring it all together.

- I like the direct language in each of the videos. The length of the videos is also spot on. I love that it is suggested to talk to the student about what they think. I do like that there is a variety of speakers in the video. Keeps it interesting:)

- Some of the pictures are negative and were not appealing. The thumb down photo in the first section was a little too intense.

  Consider making the videos required.

- The gray background and imaging could be more appealing. Music, better sound effects, and up-to-date videos would all make the experience more enjoyable.