# Accessibility Within Professional Development: Two Promising Practices

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**Abstract**

This article describes two practices employed to close the knowledge gap around accessibility at a postsecondary institution. Practice One integrated accessibility training within existing professional development requirements. Practice Two used a multi-session accessibility training addressing knowledge gaps identified by training registration data and accessibility reports from the learning management system. For practice One, Accessible Technologies worked collaboratively with instructional designers and learning technologists to make accessibility concepts a natural part of training on tools and online teaching. For practice Two, the team created a certification grant program to prepare people for the International Association of Accessibility Professionals certification exams. Practice One resulted in an increase in internal accessibility skills and the availability of intermediate and advanced courses on accessibility. Practice Two resulted in more than 100 individuals with internationally recognized accessibility certification(s). The implication for disability resource offices is to consider how integration with existing training might increase the reach of accessibility training. Additionally, disability resource offices may want to consider the benefits of using existing training materials or programs.

*Keywords: accessible learning, accessible educational materials, accessibility certification, faculty development, postsecondary education*

Depending on the institution, instructors may include full-time tenured or tenure-track faculty, full-time teaching faculty, adjunct teaching faculty, graduate instructors of record, or graduate teaching assistants (hereafter, instructors). The extent to which instructors have access to either formal or self-directed pedagogical training varies widely across institutions, but many start teaching without any pedagogical training (Kálmán et al., 2020; Knight & Trowler, 2000).

Simultaneously, the ADA generation of disabled students have entered post-secondary education (Forber-Pratt & Zape, 2017; Perry, 2015). These students grew up with Section 504 of the Rehabilitation Act of 1973, the Americans with Disabilities Act of 1990, and the Individuals with Disabilities Education Act (ADA, 1990; IDEA, 2004; Rehab Act, 1973). Many have gone to college and increasingly graduate school with high expectations regarding equitable access to educational programs. However, many instructors are not prepared to teach in ways that specifically support disabled students (Carey-Pace, 2021; Hansen et al., 2017; Hansen & Dawson, 2020). A logical step to close the gap between instructors' skills on accessible and inclusive teaching is to embed it into existing training requirements.

Furthermore, the need for training is a consistent theme of the Department of Education Office of Civil Rights (OCR) settlements (Dept. of Ed. Office of Civil Rights, 2022). The literature and OCR agreements together suggest that both availability and incentive for accessibility training are necessary to make lasting change. The challenge is to reach instructors where they are, provide flexible training options, and overcome pre-existing beliefs (Hansen et al., 2017; Hansen & Dawson, 2020; Murray et al., 2011). This article describes two professional development (PD) practices on accessibility that disability resource offices (DROs) and other collaborators should consider for their campuses.

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**Summary of Relevant Literature**

Two prevailing strategies for training instructors on inclusive practices that support disabled students reported in the literature are those related to the following:

1. Digital accessibility (Bong & Chen, 2021; Chen, 2021; Crossland et al., 2018; Gallego & Busch, 2017; Kearney-Volpe et al., 2019; Lazar, 2021; Nover, 2021; Sieben-Schneider & Hamilton-Brodie, 2016)
2. Universal design (UD), including Universal Design for Learning (UDL; Davies et al., 2013; Hakel, 2022; Hutson & Downs, 2015; Langley-Turnbaugh et al., 2013; Olivier & Potvin, 2021; Tobin & Behling, 2018; Wilson & Ellis, 2014) and Universal Design of/for Instruction (UDI; Burgstahler & Moore, 2015; Harrisson, 2006; Hartsoe & Barclay, 2017; Park et al., 2017; Roberts et al., 2015; Scott et al., 2003).

Table 1 summarizes some common methods and outcomes of UDL-based training reported in the literature. Results suggest that training instructors on UDL favors the multi-session approach over the standalone workshop model. Pre-post surveys indicated that participants tended to make instructional changes and perceived positive changes in student outcomes (Hutson & Downs, 2015; Langley-Turnbaugh et al., 2013; Olivier & Potvin, 2021). Several studies highlighted that students do notice these changes (e.g., Davies et al., 2013; Langley-Turnbaugh et al., 2013). Remaining gaps in the literature include determining the longer-term impact of training and its outcomes regarding objective measures of student success (e.g., grades, retention, degree completion) (Hakel, 2022; Wilson & Ellis, 2014).

UDI is a UD-inspired methodology for improving course accessibility and inclusion for disabled students. In Roberts et. al.'s (2015) literature review on UDI in postsecondary education, numerous peer-reviewed studies indicated that PD on UD principles has potential for improving student outcomes for disabled and non-disabled students. Table 2 shows additional studies and outcomes of UDI-based training. While much has been learned about the impact of UDI-based training, some identified gaps include earlier training interventions in undergraduate or graduate programs (Hartsoe & Barclay, 2017; Kearney-Volpe et al., 2019) and more multi-session training options (Park et al., 2017).

Digital *accessibility* focuses on the technical aspects of inclusive education (e.g., formatting headings, providing alternative text for images, captioning videos). In a recent and extensive survey of the literature, Bong and Chen (2021) found 16 studies focused on digital accessibility training for instructors in higher education from peer reviewed publications. These studies indicated that it is common practice for the training to be provided by an accessibility subject matter expert. The training audience size ranged from 3 to 15,223 participants depending on the format of the training (in-person versus online). The participants' university role varied across the studies, but largely included: administrators, related academic support staff, graphic designers, instructional designers, and teaching faculty. The literature shows that (a) the topics addressed in the training varied in breadth (e.g.., disability awareness, laws and regulations, assistive technologies, creating accessible content, UDL/UDI) as well as depth (e.g., Web Content Accessibility Guidelines), (b) an accepted instrument for evaluating the outcomes of such training does not yet exist, and (c) there is little objective data on digital accessibility training outcomes.

The literature also indicated that common motivations for accessibility training are legal complaints (Sieben-Schneider & Hamilton-Brodie, 2016) and identifying and addressing knowledge gaps of instructors (Gallego & Busch, 2017). The disruptive force of legal complaints pales in comparison to the impact of the COVID-19 pandemic on accessibility training. The pandemic catalyzed the growth of many campuses' digital accessibility efforts and the availability of training (Bong & Chen, 2021; Chen, 2021; Lazar, 2021; Nover, 2021).

This article describes two distinct practices for accessibility training that build on the best practices reported in current literature. Similar to many of the examples in the literature, the first practice was built on the one-time training paradigm. However, instead of the common stand-alone accessibility workshop model, it intentionally incorporated accessibility into PD classes on instructional design and academic technologies. The second practice was a more intensive multi-session program with a goal of long-term impact. It differed from most of the studies in the literature in that it incorporated professional certification. Since the training was open to a broader audience (non-instructors), it had the added benefit of influencing those who support instructors in their course development and execution.

**Participant Demographics**

The practices took place primarily at the Virginia Tech Blacksburg campus (VT). Participants in Practice One were volunteers obtained through the Professional Development Network and campus marketing notices. The computer refresh program requires 12-

**Table 1**

*Descriptions of Relevant Literature on UDL Based Training for Instructors and Related Outcomes*

| Objective | Participants | Training Method | Outcomes | Reference |
|---|---|---|---|---|
| To determine the effectiveness of UDL training on instructors and impact on student outcomes. | 6 graduate student instructors. 3 received UDL training and 3 did not. | 5, 1-hour discussion meetings covering assigned reading on UDL. | Students surveyed before and after training. UDL group reported a significant increase in multiple means of representation, percentage of engagement level, and percentage of summarizing key points by the instructors. | (Davies et al., 2013) |
| To modify instruction to meet the needs of a growing enrollment of disabled students. | Multi-phase faculty cohort of 16 participants | Phase 1: 3 seminars, one from disability services, one from an accessibility expert, and a specialist on Asperger's. Phase 2: UDL redesign workshop from Center for Applied Special Teaching. | Faculty received pre- and post-surveys. Students received post- survey. All participants made changes to their course. 62% felt UDL benefited student outcomes. 64% of instructors provided information in multiple formats going forward. | (Langley-Turnbaugh et al., 2013) |
| To develop faculty knowledge and skills on supporting diverse learners with an emphasis on disabled students. | Tenure and tenure-track faculty in a faculty learning community | Alternating sessions on content and development | Pre- and post- surveys indicated participants' ability to implement UDL concepts increased, and participants perceived that the UDL-informed changes improved student learning. | (Hutson & Downs, 2015) |
| To increase awareness of the needs of diverse learners, promote the use of UDL and develop a foundation for future faculty development. | 15 individuals who were a mix of part-time and full-time instructors at a community college | 3 session training on UDL with a pre and post survey | Pre- and post- surveys showed an increase in use of UDL principles. Participants reported changing instructional methods and student learning activities. 46% reported that the training caused self-reflection and 69% reported making changes based on the training. | (Olivier & Potvin, 2021) |
| To improve learning outcomes for diverse students | Tenure or tenure track instructors | 1 to 4-hour seminars, day-long workshops, semester-long course(s). Post survey. | Feedback from instructors on their long-term retention of the content ranged from nothing to accessibility minutiae | (Hakel, 2022) |

**Table 2**

*Summary of Relevant Literature on UDI Based Training for Instructors and Related Outcomes*

| Objective | Participants | Methods | Outcomes | Reference |
|---|---|---|---|---|
| To show how DROs can serve as UDI consultants. | | Recommended a dynamic course design model to provide formal or informal PD. | | (Harrisson, 2006) |
| To determine the impact of UDI training on the GPA of disabled students. | 6 instructors attended a 1–3-hour UDI training | UDI trained instructors were matched with untrained instructors teaching similar subjects at a similar level. Analysis of student GPA pre- and post-training. | Comparing GPAs for 126 classes (264 disabled students and 3066 without disabilities) results showed a significantly improved GPA for students taking courses with UDI trained instructors. | (Burgstahler & Moore, 2015) |
| To determine patterns and themes in the variation of faculty's UDI implementation. | 16 instructors trained, 4 participants in follow-up study. | 3-day training covering UDI and teaching disabled students. | Variations in implementation tend to relate to perceiving UDI as ongoing effort, use of self-reflection, and internalizing the social model of disability | (Park et al., 2017) |
| To determine the relationship between faculty's beliefs, knowledge and confidence using UDI | 60 instructors who were tenured, tenure track and non-tenure track | Used the Inclusive Teaching Strategies Inventory (Lombardi et al., 2018) to survey participants | Results support the belief that UDI is a strategy instructors are using to make learning more inclusive. | (Hartsoe & Barclay, 2017) |
| To use seed grants to incentivize instructors to develop accessibility modules in technology related courses. | 12 instructors who applied for and received the Teach Access grant. | Pre- and post-surveys provided to the instructors and students. | 400 or more students (undergraduate and graduate) received accessibility training. Pre to post results indicate a strong increase in student confidence in accessibility concepts particularly the Americans with Disabilities Act and Web Content Accessibility Guidelines. | (Kearney-Volpe et al., 2019) |

hours of PD on a 4-year cycle from courses in the Professional Development Network course catalog. Beyond the approximately 2,400 eligible full-time teaching instructors who are required to participate to earn a new computer, an additional 3,000 individuals (administrative faculty, university staff and graduate students) of other ranks are eligible to participate without the incentive. The Professional Development Network's annual needs assessment survey indicated wide variability in the disciplines represented, level of technical ability, and familiarity with U.S. disability laws and accessibility standards. Demographics such as age, sex, gender, race, and disability were not collected as part of the application and registration processes for either PD practice.

Participants in Practice Two–international certification–self-selected through an application process. The pilot group of 16 individuals were not current instructors. They were a mixture of administrative professional faculty and staff from key areas of the university. Of the 138 total participants in Practice Two, 27% were from Information Technology, 8% were from the University Libraries, and 12% were from Disability Resources.

**Depiction of Problem**

Given the size and decentralized structure of VT, the issue of what instructors need to know about accessibility has historically fallen on a small group of subject matter experts in Accessible Technologies. The partner office, Services for Students with Disabilities, supports student accommodation requests and training on associated legal requirements; the Office of Equity and Accessibility serves the same role for employees. Accessible Technologies falls under the Division of Information Technology and is within Technology-enhanced Learning and Online Strategies (TLOS). One of TLOS's functions is to provide PD courses to increase instructors' technology skills. As a group within TLOS, Accessible Technologies is responsible for implementing technology and digital solutions to support accommodations and institutional universal design efforts and provide related training.

Training offered by Services for Students with Disabilities and the Office of Equity and Accessibility have traditionally focused on disability law and the reasonableness of accommodations. This left Accessible Technologies to provide training on assistive technologies and "how" to create accessible content. When the office was established in 1998, PD on accessibility took the form of one-time guest lectures to undergraduate and graduate courses through collaboration with individual instructors. Later, optional one-time PD courses for instructors were offered through the Professional Development Network.

In hopes of increasing PD enrollment in accessibility courses, Accessible Technologies analyzed available enrollment data from 2004 to 2017. The data revealed that the reach of accessibility training was quite small. Over this 13-year period, Accessible Technologies offered 58 unique courses and only 117 unique individuals participated. Just under one-third of participants (28%) attended at least two courses, 10% attended at least four courses and 9% attended at least six courses. However, the total number of participants was only 2% of eligible participants. Also, over this time frame no GTAs participated in any of the training. Given the length of time the data covered and the natural roll-off of people retiring or changing institutions, the reach was likely smaller than 2%.

When exploring the participant subcategory of administrative/professional faculty and staff, Accessible Technologies further discovered that participants often did not have the authority to make widespread digital accessibility changes. Many participants in this subcategory shared that their interest came from being asked to take on roles related to website management with limited prior knowledge on basic web design. After the training, these individuals had the knowledge and skills to make accessibility changes but no authority or widespread influence to do so. All in all, the courses did not have an impact on systemic barriers such as the inaccessible webpage theme produced by the institution or inaccessible course materials in the learning management system.

At the same time, Accessible Technologies gathered information on the skills of TLOS employees related to accessibility. The instructional design team was of particular interest due to their impact on direct instruction. At that point, the instructional design team was heavily focused on an internal grant program to certify instructors for online teaching and evaluate redesigned online courses against the Quality Matters rubric. Only courses that passed the rubric were eligible to receive a financial grant for their participation. The conversations revealed that the instructional design team was only passingly familiar with accessible instruction. Their skill set was limited to creating captions and transcripts for videos. Based on this information gathering, Accessible Technologies determined that not only was there very little incentive and participation in accessibility PD, but also that few people within the university were subject matter experts capable of providing accessibility PD. The lack of impact and skilled trainers led Accessible Technologies to consider ways to increase accessibility skills internally and re-evaluate the methods used for teaching accessible through PD.

**Description of Practices**

The first practice to address the lack of long-term impact was assisted by a department goal to transition from stand-alone, one-time training to a clearly branded, integrated curriculum on technology-enhanced teaching. For example, instead of stand-alone classes on online teaching and accessibility, the courses were revised so that concepts from online teaching were embedded into accessibility training and vice versa. The integrated training was a collaborative effort among 19 employees whose roles included specialists in professional development, instructional design, online learning, accessibility, and learning technologies. These individuals participated in the TLOS Curriculum Working Group. Their charge was to collaboratively redesign 16 workshops covering the learning management system (Canvas), the content management system (Adobe Experience Manager), teaching online, and accessibility. A key goal of this effort was to design the courses such that a train-the-trainer approach could be used for introductory courses. This allowed new student employees to take on the role of trainer for most introductory courses, and it freed the specialists to increase the availability of intermediate and advanced training in their areas of expertise (e.g., accessibility, online learning, etc.).

To address the lack of internal accessibility knowledge a second practice, international accessibility certification, was explored. Based on the low impact of in-house PD on accessibility, Accessible Technologies explored third-party accessibility training that could be purchased to meet VT's needs. A key element in the search process was to provide training to individuals with both the responsibility and authority to address systemic barriers, particularly related to web accessibility. Ultimately, this approach led to the development of a grant program to incentivize completion of the International Association of Accessibility Professionals (IAAP) certification exams.

***Practice One: Integrated Accessibility Training***

TLOS's Curriculum Development Committee was a multidisciplinary team. The core team of six individuals reviewed the existing classes. They collaborated to formulate a new structure based on the skill sets of the trainers and the PD needs of stakeholders. The result was a series of Level I courses designed to be taught by anyone on the training team and require minimum depth of knowledge on the part of the trainer. Level I classes included a detailed facilitators guide, pre-created slide deck, handouts, and email communication templates. Before the new classes were taught, they were evaluated by the core committee on the following: clear script for direct instruction, clear directions for guided practice, clear directions for individual practice, opportunities for reflections, and how the reviewer's unit could contribute. This format of development and evaluation allowed the TLOS staff to hand off the Level I training duties to graduate assistants and allowed TLOS staff to invest additional time and resources into the development of the Level II training in their areas of expertise.

The Level II training was designed by the staff with the most subject matter expertise on the topic. For example, the Accessible Technologies staff created a collection of courses related to creating accessible educational materials and supporting assistive technologies. Members of the curriculum committee were given the opportunity to review the Level II courses and provide feedback. This level of cross-pollination in training was the first of its kind in the department. The committee chair summarized the impact of this work best when he said, "The funny thing about that time was that accessibility was going from *we need to do it* to *how can we do it*." (I. Griffin, personal communication, February 28, 2022). At a departmental level, this collaborative process increased awareness of the need for intentional and strategic training on accessibility.

***Practice Two: International Accessibility Certification***

In tandem with efforts around PD curriculum development, Accessible Technologies was motivated to find possible third-party training options based on the gaps identified in the past PD training analysis. Financial support was unexpectedly supplied through the Division of IT strategic planning cycle in 2018 when senior leadership decided to place an emphasis on accessibility. As part of the operational plan, Accessible Technologies was asked to explore existing, well-established methods to provide PD. This led to the formal creation of the Accessibility Professionals Certification Grant.

Accessible Technologies discovered that the International Association of Accessibility Professionals had two certification programs relevant to increase accessibility skills for individuals with responsibility and authority over (1) direct instruction and (2) web content. The breadth of content covered in the body of knowledge for the Certified Professional in Accessibility Core Competencies (CPACC) and the depth of the body of knowledge for the Web Accessibility Specialist (WAS) credentials seemed like an excellent fit for improving campus culture and increasing support for digital accessibility. The IT operational plan stipulated a budget to cover membership to the International Association of Accessibility Professionals, cost of the exams and cost for the relevant training material from Deque University. The institutional sup-

port also allowed Accessible Technologies to expand the offering to participants previously excluded from training offered solely through the Professional Development Network. This included campus communicators, graduate students, library staff, and others.

Sixteen individuals participated in the first cohort during the pilot year of 2018-2019. They were a mix of web developers, designers, and library staff who were already invested in accessibility. Using the preparation materials from Deque University, each participant completed sections of the self-paced material on a weekly basis. Then the cohort met for weekly discussion to review the material. The meetings included a mix of face-to-face and virtual attendees. All told the participants took a little over a year to prepare and sit for the CPACC and WAS exams. Based on the favorable results of the pilot cohort, Accessible Technologies decided to run two cohorts each semester. One cohort prepared for the CPACC exam and one the WAS exam. Over the course of the program, this changed slightly to 2 CPACC study cohorts and 1 WAS cohort per academic year.

During the summer of 2020, Accessible Technologies reviewed participant feedback related to the study materials and the value of the exam. One theme of the feedback was low satisfaction with the Deque study material for CPACC preparation. According to comments, participants were interested in content that was more engaging and less generalized. To that end, new preparation materials were developed during Summer 2020.

Accessible Technologies decided to use the UDL framework and the engagement pillar in particular to shape the overall materials (CAST, 2018). The course materials were ultimately housed in Canvas using pages, modules, discussion boards, and integration with the Kaltura video management system. One of the key changes was the creation of introductory summary videos to complement the reading provided in the CPACC Body of Knowledge (Principle 3: Options for Comprehension). The "flipped class" style videos were short 7-10-minute videos that summarized key concepts, provided examples, and explored exceptions to the concepts. The second change was the use of multimodal, first-person supplemental material organized into three formats: videos, audio files (podcasts), and reading (Principle 1: Options for Perception). Participants were instructed to spend 30-60 minutes in self-study per week in addition to watching the summary video and reading the body of knowledge (Principle 7: Options for Recruiting Interest). Another change was the addition of weekly self-reflection prompts to solidify learning (Principle 9: Options for Self-regulation). Lastly, small group engagement activities were designed to increase mastery of concepts during the weekly discussion groups (Principle 8: Options for Sustaining Effort and Persistence).

In implementation, the cohort met weekly for 13 weeks. Week 1 was an orientation kick-off meeting. Weeks 2-11 were discussion sessions and Weeks 12 and 13 were exam preparation reviews. The content weeks were divided into 10 modules each covering a section of the CPACC body of knowledge. The weekly discussion sessions included a 10-15-minute review of practice quiz questions followed by 30-40 minutes of small group activities, and ended with a 5-10 minute recap of the key takeaways.

## Evaluation of Observed Outcomes

### *Practice One Outcomes*

Through the collaborative curriculum development work, Accessible Technologies found that VT instructional designers lacked skills beyond creating closed captions and transcripts. There were a few people who had knowledge on document accessibility, but it was largely limited to adding alternative text for images. There were also few to no skills around PDF accessibility or deeper web accessibility concepts. Perhaps the most noticeable outcome of the collaboration was a gradual closing of the internal accessibility skill gap through their participation in the certification program.

After the pilot cohort of the Accessibility Professionals Certification Grant, several TLOS instructional designers from the curriculum development committee applied to participate in the next cohort. Gradually, each semester 1-2 additional instructional designers joined a cohort, including full-time instructional designers and graduate assistants. Many of these individuals were working on graduate degrees in instructional design and technology from VT. In subsequent calls for applications, Accessible Technologies noticed an increase in the number of graduate student applicants from the instructional design and technology program who were not employees of TLOS. This might be an indication of the growing desirability of instructional designers trained in accessibility.

The efforts around curriculum development provided the opportunity not only to integrate accessibility in courses such as Canvas Basics, but also redesign some courses to reflect best practices for UDL. In Fall 2018, the redesigned courses had 2,168 participants and Spring 2019 had 489 participants. The combined changes make it challenging to determine how faculty skills changed over time, though. Since the Level I courses were typically taught by TLOS graduate assistants using the facilitator's guide, it is also challenging to determine the impact of the accessibil-

ity content in the basic courses. Another confounding variable is that many of the redesigned courses for Canvas transitioned to a self-paced online course after Spring 2019 because TLOS had concluded its rollout of the Canvas LMS.

While not as many instructors participated in the Level II courses as the Level I courses above, there were some interesting takeaways from the (re)designed courses. From Fall of 2019 to Spring 2022, Accessible Technologies gave 34 unique course offerings related to accessibility (accessible documents, assistive technology, web accessibility, and PDF accessibility). Some courses were offered more than once per semester amounting to 92 unique opportunities for participation over a 3-year period. This was a positive increase in the number of courses and the diversity of the topics offered. The number of unique attendees jumped to 527 in this time frame to 9% of eligible participants. Within those, 136 individuals participated in 2-3 courses, 31 participated in 4-5 courses, and 4 participated 6 or more times. In general, this is an overall positive trend in enrollment and persistence in accessibility related courses. Some of this upward trend may be attributed to additional campus efforts around PD technology improvements, marketing around accessibility course offerings, and an increase in institutional support.

One area of strong growth for Level II courses was in enrollment in PDF accessibility training. This Level II course, prior to the redesign, consistently had low enrollment. From Spring 2016 to Summer 2018, there were 4 offerings of PDF accessibility. The average enrollment in these courses was 7 individuals. The highly technical nature of PDF accessibility and the amount of prerequisite knowledge meant that few participants were able to remediate even basic tags by the end of the session.

Once again leveraging the UDL framework, Accessible Technologies identified engagement and action and expression as key areas for improvement based on participant feedback (CAST, 2018). Just a few of the intentional improvements included the following: a check-your-knowledge quiz with discussion (Principle 3: Options for Comprehension), demonstrations using participant materials (Principle 7: Options for Recruiting Interest), a kinesthetic activity on identifying document structures (Principle 4: Options for Physical Action), and live remediation of documents provided by participants (Principle 6: Options for Executive Functions). The redesigned course was offered 11 times from Fall 2019 to Spring 2022. The average enrollment for the redesigned course almost doubled with 13 participants on average.

Since the training included instructors and VT staff, finding adequate ways to determine impact is a challenge. One measure to consider though is the institutional data available from the Anthology Ally tool integration with Canvas. Having acquired the tool for pilot testing in January 2019, Accessible Technologies reviewed the institutional accessibility score data for the prior academic year. The goal was to use the data to identify gaps in the PD offerings and potential areas of focus for awareness campaigns. The institutional report from 2017-2018 academic year, prior to introducing Ally, showed 15,056 course shells and 1,367,420 individual documents in Canvas. The reports, highlighted in Table 3, showed that the most severe violation was *Image Only PDF Documents* (approximately 10% of all PDFs in the system). The report also showed the most frequent error was inaccessible PDF documents. A tremendous amount of effort around PDF accessibility tools and training was prioritized in direct connection to this data. The institutional report for 2020-2021 and 2021-2022 show an interesting shift detailed in Table 4.

In general, there is a downward trend of scanned, image-only PDF documents. This is remarkable considering the number of PDFs in the LMS during the 2021-2022 academic year totaled 905,094, a nearly 40% increase from 2017-2018. The increase in the amount of content does not appear to have negatively affected the level of accessibility in those dimensions.

With the impact of the COVID-19 pandemic, it is even more remarkable to see a downward trend in the number of scanned, image-only PDF documents. The previously established integrated approach of including accessibility in Level I PD was carried forward during the rapid transition to remote learning. PD courses related to the rapid transition to virtual teaching included information about how to use Ally to improve the accessibility of course materials and how to access VT's institutional captioning services.

**Practice Two Outcomes**

As mentioned earlier, the Accessibility Professionals Certification Grant program was established during the same period as the integrated and redesigned PD courses. The short-term result of the Accessibility Professionals Certification Grant program was sustained funding from the Division of Information Technology to support the cost of membership, exam fees, and one retake per individual. The long-term effect was a growing number of accessibility professionals with core competencies.

Applicants to the CPACC grant were asked to self-evaluate their prior knowledge of the domain areas using a 5-point Likert scale: 1 Fundamental Awareness (basic knowledge), 2 Novice (limited ex-

**Table 3**

*Top Ranked Severe Issue and Major Issue From Institutional Reports From Ally*

| Year | Severe Issues | | Major Issues | |
|---|---|---|---|---|
| 2017-2018 | Scanned PDF: 15.7% | Encrypted PDF: 0.06% | Untagged PDF: 56.4% | Contrast: 35.2% |
| 2018-2019 | Scanned PDF: 15.2% | Malformed Doc: 0.07% | Contrast: 36.2% | Untagged PDF: 55.9% |

**Table 4**

*Top Ranked Severe Issue and Major Issue From Institutional Reports From Ally*

| Year | Severe Issues | | Major Issues | |
|---|---|---|---|---|
| 2020-2021 | Scanned PDF: 12.4% | Malformed Doc: 0.12% | Untagged PDF: 57.9% | Contrast: 34.0% |
| 2021-2022 | Scanned PDF: 11.4% | Malformed Doc: 0.09% | Untagged PDF: 59.0% | Contrast: 35.0% |

perience), 3 Intermediate (practical application), 4 Advanced (applied theory), and 5 Expert (recognized authority). Table 5 shows that in most categories at least one-third of applicants felt they had some practical knowledge of how to implement accessibility. Familiarity with accommodations was the domain with the largest number of expert ratings (6% of applicants), the majority of whom were disability resource office professionals. The weakest areas of prior knowledge were in organizational governance and UDL. Organizational governance had the highest rating of applicants with only basic knowledge (34%), and UDL had the fewest number of applicants with expert knowledge (2%).

From 2018 to 2022, about 160 VT individuals participated in the grant program. Of those 102 individuals earned the core competencies CPACC certification, 16 individuals earned the WAS, and 11 individuals earned both and are Certified Professional in Web Accessibility. The end-of-course evaluations and pass rates indicate that the cohort study method generally supports the likelihood of passing the certification exam. The pass rate is currently 92% for the CPACC certification and 50% for the WAS certification. Additionally, since not all individuals pass the certification exam or wish to take it, a VT micro credential (badge) is now offered. Currently, 78 individuals have the A11y Core badge for completing the CPACC preparation, and 27 individuals have the A11y Dev Core badge for completing the WAS preparation. Only the pass rate for VT participants was tracked over time, and it has remained fairly high. Table 6 details the participation and the certification rate.

Over the last three years, several key shifts have occurred in the program. Based on the pass rate of the WAS exam, Accessible Technologies decided to recommend participants complete the CPACC certification prior to attempting the WAS certification. The pass rate also suggested that the WAS certification was more appropriate for developers rather than content designers. Many participants who were content designers did not pass or opted not to sit for the exam. The Pandemic also caused several shifts to the program. One shift was that the hybrid discussion meeting format became a synchronous all-virtual format. Moving to a fully online format allowed VT to expand participation in the program to other disability and accessibility professionals in Virginia.

To determine the value of continuing to leverage international certification, a post exam survey was conducted. Of the total examinees, 54 completed the post-exam survey. The consensus from both CPACC and WAS examinees was that the weekly meetings

**Table 5**

*Self-Reported Prior Knowledge From CPACC Application*

| Domain Area | Level of Prior Knowledge | Percentage |
|---|---|---|
| Theoretical models of disability | 1 - Fundamental Awareness | 37% |
| Assistive technologies and adaptive strategies used by people with disabilities | 2 - Novice | 34% |
| Academic and workplace accommodations | 3 - Intermediate | 38% |
| Accessibility in information and communications technologies | 3 - Intermediate | 35% |
| Accessibility in the physical world | 3 - Intermediate | 33% |
| Universal Design for Learning | 3 - Intermediate | 29% |
| Usability and user experience design | 3 - Intermediate | 36% |
| Laws and policies regarding the rights of people with disabilities | 3 - Intermediate | 33% |
| Accessibility standards and regulations | 3 - Intermediate | 38% |
| Organizational governance and management strategies | 1 - Fundamental Awareness | 34% |

**Table 6**

*Accessibility Professionals Certification Grant Participation and Exam Pass Rate*

| Semester | CPACC Participants | CPACC Examinees | CPACC Pass Rate | WAS Participants | WAS Examinees | WAS Pass Rate |
|---|---|---|---|---|---|---|
| Fall 2018 | 16 | 16 | **94%** | n/a | n/a | **n/a** |
| Fall 2019 | 15 | 14 | **86%** | 16 | 14 | **57%** |
| Spring 2020 | 14 | 12 | **100%** | 8 | 6 | **50%** |
| Fall 2020 | 20 | 16 | **94%** | 7 | 6 | **33%** |
| Spring 2021 | 20 | 18 | **89%** | 5 | 4 | **50%** |
| Fall 2021 | 23 | 18 | **89%** | 5 | n/a | **n/a** |
| Spring 2022 | 19 | 17 | **94%** | n/a | 4 | **25%** |
| TOTAL | 127 | 111 | **92%** | 41 | 34 | **47%** |

and supplemental materials were of the most value in preparing for the exam. They also rarely reported feeling confident that they had passed, rating their confidence on having done well at "slightly" to "moderately" on a 4-point Likert scale. Perhaps most telling, however, is that 83% of examinees report that preparing for certification made them better prepared to address issues related to accessibility in their job either to a "very great degree" (57%) or "somewhat" (26%). Only 16% reported that preparing for certification did not make them better prepared to address accessibility in their jobs. Lastly, those who completed the preparation cohort and sat for the CPACC exam also generally passed in spite of how they felt directly after the exam.

### Implications and Transferability

Collaboration and leveraging disruptive forces (such as strategic planning cycles, leadership goals, and the pandemic) were key factors in VT's approach to accessibility training. The number of accessibility allies grew by including accessibility in existing training on teaching and learning, which affected both the trainers and learners. This change was particularly noticeable in VT's instructional design team. As team members became more fluent in accessibility, their training gradually influenced their work with individual faculty. They began to include document accessibility as part of their one-on-one consultations with faculty and to use Ally to evaluate the accessibility of online courses.

However, others wishing to use a similar practice may need to generate leadership buy-in first. The integrated effort was initiated by a goal from leadership around PD. This focus created natural accountability for the curriculum committee that might not already exist at another institution.

A key finding from Practice Two is instructors are the least likely to have the available time to commit to an in-depth certification program when they are actively teaching. However, the process of re-evaluating current practices and creating the grant program had the unexpected benefit of reaching groups of people previously missed by the traditional PD approach, namely graduate students, web developers, and application developers. Their success ended up impacting inaccessibility outside the classroom. Furthermore, the enrollment of a strong contingent of disability resource professionals is an indication that there is a desire in the field for accessibility PD that goes beyond accommodations and legal standards.

In summary, without external pressures, it is difficult to transition from grassroots efforts to self-sustaining initiatives. Other groups looking to try similar strategies should look for opportunities to take advantage of existing structures, such as required PD, department goals, and strategic planning cycles to insert accessibility. In the process, DROs should keep in mind that success does not need to come solely from resources within a single department or college. There are numerous pre-existing training programs at various price points that can support colleges' goals around accessibility skill development for faculty and staff.

## Conclusion

Providing flexible training options that meets instructors where they are is a way to address the accessibility PD challenge. Practice One, integrating with existing PD, may offer the most availability and reach the largest number of people with basic accessibility concepts. The additional advantage of the train-the-trainer model is that it may increase capacity for accessibility training. Subject matter experts may then have time to train on additional topics and address specific gaps.

In the practice at VT, this was achieved through internal collaboration. Even though the collaborators fell under the same larger organization (Information Technology), the principle of using campus partnerships can still benefit others. Others may find that possible collaborators are the institution's talent development, center for teaching and learning, or academic technologies, just to name a few. Depending on the availability of accessibility subject matter experts, the additional benefit of making intermediate to advanced training available may not be immediately possible. Offloading the training or acquiring third party training may be especially helpful to DROs given the caseload sizes and staffing challenges of many offices.

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